

Canadian Nuclear  
Safety Commission

Commission canadienne de  
sûreté nucléaire

Public hearing

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Le 14 avril 2015

Davidson Centre  
Kincardine Hall  
601 Dunham Street  
Kincardine, Ontario

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Kincardine (Ontario)

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Mr. Dan Tolgyesi  
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Ms Rumina Velshi  
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M. Marc Leblanc

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Ms Lisa Thiele

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Kincardine, Ontario

--- Upon resuming on Tuesday, April 14, 2015 at 8:33 a.m. /

L'audience reprend le mardi 14 avril 2015 à 8 h 33

### **Opening Remarks**

**MR. LEBLANC:** Bonjour, mesdames et messieurs. Welcome to the continuation of the public hearing on Bruce Power's application for the renewal and consolidation of their operating licence for Bruce A and Bruce B Nuclear Generating Stations.

During today's business, we have simultaneous translation. Des appareils de traduction sont disponibles à la réception. La version française est au poste 2 and the English version is on channel 1. I would ask that you please keep the pace of your speech relatively slow so that the translators have a chance to keep up.

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

Les transcriptions seront disponibles sur le site Web de la Commission dans environ 10 jours. The transcripts will be available on our website in about 10 to 12 days.

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.

Good morning, everybody. Welcome to the continuation of the public hearing of the Canadian Nuclear Safety Commission. Welcome also to all of you who are joining us via webcast and via teleconference.

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

I would like to begin by introducing the Commissioners who are with us here today.

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

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

Commission.

Marc.

**MR. LEBLANC:** Yesterday evening, we heard the presentations by Bruce Power and CNSC staff and also went through a number of the written submissions.

Starting this morning and until Thursday, fifty-eight intervenors are scheduled to present orally. Ten minutes are allocated for each presentation, with the Commission Members having the opportunity to ask questions after each presentation.

To help you in managing your time, a timer system is being used today. The light will turn yellow and beep when there is 1 minute left and turn red at the 10-minute mark and there will be a double beep.

Time allowing at the end of each day, we will be addressing some of the written submissions. Written submissions from people who chose not to make an oral presentation are very important to this review. These written submissions are being carefully considered and we will address each of them before the close of this hearing.

We have in attendance or by teleconference, available for questions from the Commission, representatives from different departments, notably Fisheries and Oceans, Environment Canada and the Office of the Fire Marshal and Emergency Management.

Your key contact persons for the next three days are Ms Louise Levert and Ms Johanne Villeneuve, who are in the back of the room, and they also have the material that is being considered today.

The break for lunch will be around 12:30 until 1:30 and there will be short breaks in mid-morning and in the afternoon. Dinner will be around 6:00 p.m., and again for a one-hour period.

There are planned evening sessions today and tomorrow.

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

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

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

As the Commission wishes to hear the 58 oral presentations and ask as many questions as it deems necessary on these, we ask that everyone respect the 10-minute time allocation as well as the decorum of a tribunal setting and assist with the orderly, civil and respectful conduct of this hearing.

The Commission will not tolerate inappropriate behaviour and will take measures necessary to ensure the orderly conduct of this proceeding in the same way it does for all other proceedings it conducts in Ottawa and in communities.

Thank you.

Mr. President.

**CMD 15-H2.50**

**Oral presentation by the Municipality of Kincardine**

**THE PRESIDENT:** I would like to start with the first presentation by the Municipality of Kincardine, as outlined in CMD 15-H2.50. I understand that the Mayor of Kincardine, the Honourable Anne Eadie, will make the presentation.

Your Honour, the floor is yours.

**MAYOR EADIE:** I am Anne Eadie and thank you for this opportunity to speak. I'm speaking on behalf of the residents in the Municipality of Kincardine.

For your background information, Kincardine is a municipality of about 12,000 people, located on the shores of Lake Huron here in Bruce County and is the host municipality of the Bruce Power site. An estimated 35 to 40 percent of Bruce Power's 4,200 employees live in the Municipality of Kincardine.

So this employment opportunity for many people has great economic impact on our region. It is the largest employer in the region and since 2001 Bruce Power has been a source of jobs, tax revenue and economic growth for our community.

The Bruce site has a tremendous economic reach while growing the skills and knowledge of a

generation of workers. This was confirmed through a report released in October 2014 that was co-authored by a range of very prominent groups.

Bruce Power is not just a large economic driver but is a good neighbour committed to safety and open communications with the municipality. And on the next slide we have some of the communications listed there.

I must say that Bruce Power has demonstrated open transparent communications with the municipality and has a very active outreach program within the region.

Community support. Bruce Power shares with the municipality on an annual basis polling that is carried out in the region and I think this is very important so that you understand our area.

A survey conducted in late 2014 by Ipsos Reid indicated that the vast overwhelming majority of residents in Bruce, Grey and Huron counties have positive impressions of Bruce Power, and below in the bullets you can see the very strong support, 90 percent, 89, 86, 85. So that is pretty significant.

Community investment. Bruce Power has a strong history of assisting and championing needs and causes close to home. Since 2011, the company has donated about \$5 million to support programs and the various focus

of the programs are listed there and cover a wide range.

Funding has also been made available to support the expansion of emergency services at the Kincardine Hospital through a \$1-million contribution provided in 2013. In a small community like ours, this is very significant.

The safety performance is also important to us all. Bruce Power reports regularly to the municipality on its safety performance. The site goal of zero occupational injuries and illnesses reflects a steadfast commitment to the safety of employees and contractors. Bruce Power has one of the strongest industrial safety records in Canada's electricity sector and it's important to our community that our largest employer shares this dedication to safety.

We just had a report at Council showing a graph with their safety records and that is fairly typical. They come and report on safety as well as other things on a regular basis.

Environmental commitment. Bruce Power communicates regularly on its efforts to protect the environment to comply with relevant legislation and regulations.

It aims to protect resources, conserve energy, reduce water consumption and reuse and recycle. It

monitors all aspects of the environment surrounding the Bruce facility, including the air, water, land, vegetable gardens and wild animals to ensure safety.

It demonstrates leadership and encourages environmental stewardship in the community and beyond. For example, it's supporting our Municipality of Kincardine Phragmites Program. It's being a partner in that with us and the Lake Huron Coastal Centre. And being by the lake, the environment is very, very important to us.

The municipality is confident that Bruce Power continues to be an industry leader in environmental protection and sustainability with a particular focus on Lake Huron.

On the topic of emergency preparedness, Bruce Power supports the municipality in many ways. The Municipality and Bruce Power are actively engaged in emergency preparedness. The site has a fully equipped fire department, an ambulance and an emergency response organization which offer around-the-clock response that at times is called upon to provide aid to the surrounding municipalities.

Right now they are working on a KI tablet distribution. It is already started in the 10-kilometre range and hopefully it will be finished to 50 kilometres by the end of 2015.

As part of the emergency focus, they have launched and worked with surrounding municipalities on this BePrepared website for Grey, Bruce and Huron.

I personally have looked at the website. I think it is excellent. It is a resource not just for nuclear but for different types of emergencies that all residents should be prepared for and provides tips on what to do in the event of various types of emergencies, whether it's fire, flood, tornado, winter storm or nuclear emergency. The idea was to establish this as a one-stop location for all information.

Physician recruitment. The municipalities of Kincardine and Saugeen Shores have a unique relationship with Bruce Power to support physician recruitment. This is very crucial in a rural area. As you must know, rural areas sometimes have trouble attracting doctors when needed and physicians are critical to both communities to provide primary and emergency care to residents.

As a result of this program, six full-time recruits have been secured along with over a dozen locum placements. This is essential to good health care in our region.

Bruce Power also has a clinic on site to reduce the volumes of its workers using facilities in the community. So that contributes to our safety as well in

the area.

So for a summary, the Municipality has a very open and regular communication link with Bruce Power and is well informed on a wide range of issues relevant to this license application. Bruce Power provides effective, transparent communications not only with the municipality, but with residents throughout the region. A value of safety first and a commitment to environmental stewardship are key performance areas worth outlining.

Emergency preparedness will continue to be a key area of ongoing collaboration. Joint physician recruitment efforts are very important to the health of local residents. The Municipality supports the five year license renewal application for both Bruce A and B.

Thank you.

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

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

With regards to physician recruitment for the hospital, you mentioned that you have a full-time recruiter looking after this. Do you have enough volume to keep this person occupied fulltime?

**MAYOR EADIE:** Yes.

**MEMBER BARRIAULT:** You do.

**MAYOR EADIE:** Yes. The recruitment efforts are extensive. Our recruiter of course has to travel, sometimes out of province to various -- I don't know the exact word, but meetings where doctors are there. There are shows that -- what's the word, medical --

**MEMBER BARRIAULT:** Conferences.

**MAYOR EADIE:** Yes, medical conferences and young doctors and prospective young doctors going to university are there and sometimes they are engaged well before they even graduate. So it is a long process and very extensive. She has done an excellent job and we have doctors coming up to retirement.

Right now we are down to about 100 patients that are called orphan patients. However, we have some doctors nearing retirement and at one time we were up in the thousands of orphan patients and that is really, really difficult and so we really appreciate the collaboration in that area.

**MEMBER BARRIAULT:** A follow-up question: Do you have problems covering your emergency department?

**MAYOR EADIE:** In the Municipality of Kincardine I must give the doctors credit. They have organized and done a very good job and sometimes locums come in to help. I know in Saugeen Shores sometimes that has been an issue and it could be an issue soon in the

Municipality of Kincardine. So that's what -- we need a full time person working on that.

**MEMBER BARRIAULT:** Okay. Thank you.

To Bruce, you have a clinic on site. Do you have a physician at the clinic or is it nurse practitioners or nurses or --

**MR. SAUNDERS:** Both actually, yes. We have physicians there and we have nurse practitioners and it's a cooperative agreement we have with the local municipality. So the physicians generally are doing both. They are spending some time in our clinic and sometime in the municipality.

**MEMBER BARRIAULT:** Okay. The same people?

**MR. SAUNDERS:** Same people.

**MEMBER BARRIAULT:** Yes, okay. On the issue of physician recruitment, you have been involved actively, I guess financially I would imagine. How extensive is this involvement?

**MR. SAUNDERS:** I will turn that one over to Mr. James Scongack here, our VP for Corporate Affairs.

**MEMBER BARRIAULT:** Thank you.

**MR. SCONGACK:** Sure. James Scongack, for the record.

And I appreciate the question on physician recruitment because actually in addition to my role at

Bruce Power I am actually Chair of this joint physician recruitment effort. So we started this program back in 2010 with a \$500,000 commitment that ran until 2014. That \$500,000 was split between both municipalities to not only fund a full-time physician recruiter but to also support incentives for physicians to relocate to the area. Since that time we have developed it, as the Mayor mentioned in her presentation, a joint effort that is co-funded between the three organizations to maintain that.

Maybe if I could just back up for a second, your initial question with respect to keeping a full-time recruiter busy, that was actually an issue that we struggled with from a need point of view when we started this process. Just to give you an idea, given the competition for physicians across the province, for every one physician that we may be able to secure for this area, you probably have to tour through anywhere from six to eight physicians through site visits through the municipalities for everyone recruit. So there is very few weeks of the year where we don't have some active recruitment activities underway. And of course it's not just about attracting a physician. It's about ensuring we have the right mix of physicians. So for example, as the Mayor mentioned, on the Kincardine side there is a greater need for family physicians, where on the Saugeen Shores

side the focus has been on full-time emergency room support.

**MEMBER BARRIAULT:** Thank you. Thank you, Mr. Chairman, that's it for now.

**THE PRESIDENT:** Thank you.

Monsieur Tolgyesi...?

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

You were talking about the "be prepared" website which is a website where information is provided what to do in case of emergency. Is this site an interactive site where you could ask your questions and you will receive answers or is it specifically information just provided without the possibility of question and answer?

**MAYOR EADIE:** Is the question directed to me?

**MEMBER TOLGYESI:** Who is managing this site?

**MR. SAUNDERS:** It's a joint site with the communities and Bruce Power. Yes, it is interactive. You can send emails and there are contact numbers on there, so there are ways of reaching people to get answers.

**MEMBER TOLGYESI:** You were talking about established forums of communications and committees. So what are these forums and how do they proceed? Who is

leading? Who is responsible? How do you participate?

**MAYOR EADIE:** Anne Eadie.

Well, at our Council, Bruce Power comes regularly to Council and consults with us and with physician recruitment we have a committee set up. We have a Memorandum of Understanding on how we interact. We have just passed that recently. So any time there is something in emergency preparedness, Bruce Power is involved in that and we have regular meetings on emergency preparedness in our area.

So the different ways we interact, if there are communications coming out we are always notified about anything at Bruce Power. We are invited to several events at Bruce Power to learn more any time. We go on tours. Just this week, yesterday, there was the fire training site opening and we are very grateful Bruce Power has said that surrounding municipalities can use their training site. It is state-of-the-art. Unfortunately I had another meeting yesterday and sent another member of Council, but I hope to tour it soon. So all the areas I mentioned in my presentation we collaborate back and forth on a regular basis in different venues.

And before I was Mayor we used to have a monthly or bimonthly meeting of the five surrounding municipalities and it was a good way of communicating what

was going on in the nuclear industry and then the County, at the county level, all the Mayors go to the county level and presentations are done there as well on a regular basis to update not just the Municipality of Kincardine, but the surrounding municipalities on various issues.

**MEMBER TOLGYESI:** You know, I was meaning that you have regular meetings with Bruce that's on the committee levels or the Council, but how do you transfer this information to the population, to the community?

**MAYOR EADIE:** Well, in my presentation it was listed. I didn't read them all off, but our Council meetings are on TV and so it's the municipality of Kincardine and that also goes out to surrounding municipalities.

And then the CEO, Duncan Hawthorne, has his town hall meetings. I have listened to them, and I think it is quite unique that a local resident can just phone in and talk right to the CEO and ask him any question out of the blue.

Let me see what other ones didn't I -- there are newsletters that go out on a regular basis; the social media; there is advertising; just the traditional forms of communication. Bruce Power uses them all. So our community is very well informed.

And Bruce Power gets feedback through

various methods as well, their polling, they invite feedback various ways. We give them honest feedback as representatives of the community as well, but that is not the only way they get feedback.

**THE PRESIDENT:** Just for clarity, when Bruce appears in front of you to report on their safety case or projects, are those meetings open to the public and the public can come in and ask questions and interact?

**MAYOR EADIE:** All our meetings are open to the public and Council asks questions on behalf of the public. But any member of the public is welcome to have a delegation to Council at that time.

So, for example, Bruce Power just came recently and this is the PowerPoint that they presented in public. Anybody can come to our council meetings. As I said, it's on TV, and any questions can be asked and were asked.

**THE PRESIDENT:** Thank you.

**MEMBER TOLGYESI:** And my last is, one of the interveners was talking about that Appendix N of emergency preparedness and therefore is not complete and therefore Kincardine's nuclear emergency response plan is not complete. Could you comment on that?

**MAYOR EADIE:** I'm sorry. I didn't catch what you said. What did the interveners say?

**MEMBER TOLGYESI:** One of the submissions

is talking about the fact that the Appendix N of emergency preparedness is missing in Kincardine's Nuclear Emergency Response Plan. Therefore, because that section is missing your Nuclear Emergency Response Plan is not complete. That was specifically in the submission of CELA.

**THE PRESIDENT:** I think we are going to deal with all emergency management on Thursday, but I think what Monsieur Tolgyesi is referring to, I think the provincial emergency plan; its appendices that goes to the role of the province, the role of the region and the role of the municipality.

And presumably in the rural municipality and the municipality activities are written by you guys. I think some intervener is saying that it is not complete.

**MAYOR EADIE:** Well, as Deputy Mayor -- I just became Mayor in December, but as Deputy Mayor I went to quite a few meetings on behalf of the Mayor on emergency preparedness and all the stakeholders are at those meetings, from your police, Bruce Power, OPG and, et cetera, et cetera, the health units.

And we had a fulltime staff person dedicated to emergency preparedness in our Municipality. She is retiring, but she will be replaced, and she was collaborating all the time with Bruce Power, going over procedures, interacting with the province. We have several

reports. Provincial agencies attended some of these meetings.

I was quite convinced that we are doing our due diligence in emergency preparedness and the nuclear industry, Bruce Power and other parties have been most helpful collaborating for years on emergency preparedness. I feel the safety and due diligence is excellent from my viewpoint, from the municipal viewpoint and from listening to all the different agencies.

There is just the distributing the KI pills. I have attended three different meetings on that alone. So, to me, they examine every little detail very diligently.

**THE PRESIDENT:** Thank you.

Anybody else? Dr. McEwan...?

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

Just a couple of questions and this relates a little bit back to the Bruce presentation, environmental presentation yesterday as well. You mentioned in your presentation that the community is involved in the monitoring and I think you said that you asked for volunteers for the monitoring process. So I guess two questions.

Are there any difficulties in getting volunteers? Do they have specific instructions on what

they are required to do?

And my second question is, your monitoring footprint for the produce and things like that seemed relatively narrow. Are there any considerations of just expanding it out a little wider radius?

**MR. SAUNDERS:** Frank Saunders. Yes, it's roughly in a 10 km zone more or less and honestly we barely see impacts there. So going further is not likely to be productive. It's not really an issue.

We use volunteers because of course you can't compel people to do this. Now we don't really have any real problem getting volunteers. In our general area there is not a lot of fruit crops. There is grain and cattle and those things, so sometimes getting exactly the right mix can be a bit of a problem. But you know, the sort of size vary. We choose on that. It's based on the likelihood of there being anything to find and to distinguish. I don't think there would be a lot of advantage going much beyond where we are at.

**MEMBER MCEWAN:** (Off microphone).

**MAYOR EADIE:** On the area?

**MEMBER MCEWAN:** Yes.

**MAYOR EADIE:** The 10 kilometres? I think again due diligence. They come and report to Council how they have upgraded their monitoring in that 10 kilometre

range and report on the safety of it, any results.

It seems to be -- like I can't recall anything significant now. The 10 km range I think is quite adequate. It is a significant buffer zone and seems to be well monitored. You can drive through the area and see the new installations they put in that report instantly.

**THE PRESIDENT:** Staff...?

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

Just to add to Dr. McEwan's question I will ask Dr. Patsy Thompson to explain our Independent Environmental Monitoring Program of the CNSC which extends far beyond the 10 kilometres zone.

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

I wanted to add before I talk about the IEMP, just a complement to Bruce Power's response, the program put in place by Bruce Power is based on the CSA standard which -- and we reviewed their proposed plan and it's based essentially on expected dispersion from dispersion modelling, the critical groups, the pathways that are more significant in terms of public exposure. We have reviewed and improved our program. They also have reference locations that are off-site and away from the area to be impacted so we can validate the measurement with

the values that are being reported within the area impacted by Bruce Power in comparison to reference for the Independent Environmental Monitoring Program that CNSC staff has put in place.

We have also used the CSA Standard as a basis for development, as well as our knowledge of the Bruce station's emissions, but our footprint for monitoring this is a bit more extensive and we essentially validate the findings of Bruce Power in terms of detection limits in what is being monitored in the environment and the values that are being reported.

**THE PRESIDENT:** Thank you.

**MEMBER MCEWAN:** Just --

**THE PRESIDENT:** Okay.

**MEMBER MCEWAN:** So one more question.

On your slide 8 you discuss the results of the Ipsos Reid survey and one of the figures that struck me was that 14 percent of the people surveyed disagreed that they had confidence in security measures. As a community, do you do any follow-up on that to find out what those concerns might be or whether you can discuss it back with Bruce Power on how you address them?

Slide 5, sorry. Slide 5.

**MAYOR EADIE:** Okay, Slide 5.

Let me just check it there. Which one is

it?

**MEMBER MCEWAN:** Slide 5.

--- Pause

**MAYOR EADIE:** It's the Ipsos Reid one.

**MEMBER MCEWAN:** So the third bullet down.

**MAYOR EADIE:** I think we both agree, Bruce Power and the Municipality, that good communications is the way to answer people's questions and Bruce Power provides lots of opportunities. I feel that they are the experts. If people have technical questions or questions about some safety measures, their redundant systems are built-in. Then Bruce Power is the best one to answer their questions.

And I'm sure on behalf of the municipality I can say Bruce Power is most open and transparent and willing to answer questions any time. People can go to the visitor centre if they want to go and talk to somebody. They can email. They can -- there are many ways that they can contact Bruce Power and get specific answers to their questions if they are really concerned about an issue.

**MR. SAUNDERS:** Yes. I think it's important to remember the surveys are done on a confidential basis. So we really don't know who the 14 percent are. That will be made up of some people who just say they don't know or are unaware as well, right? It won't necessarily be 14 opposed. I don't remember the

numbers exactly on this particular survey.

But all we really do is look at these surveys and if we see there is a major disconnect then we try through publication or other things to correct that, right. We really can't query the "who", unfortunately. Otherwise, people wouldn't participate in the surveys.

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

**MEMBER VELSHI:** I just have a follow-up question on slide 5. That survey was conducted in late 2014. So would that cover -- capture your cottager population?

**MAYOR EADIE:** I would have to let Bruce Power answer that. I am assuming if it was late 2014 it might not have captured our seasonal residents, but other efforts are made to reach our seasonal residents when they are here.

**MR. SCONGACK:** James Scongack, for the record.

So let me give just some background on what we do here with this polling. The polling is done on a rolling basis so, you know, what we try to do is avoid, you know, just taking the results of one pole and one snapshot in time, so we will do this on a rolling basis. You are correct that this particular poll where these numbers are quoted from were actually carried out in

November-December, I believe, but if you look back to previous polls they have actually been at different periods of the year. So you do really get on a rotating basis a pretty good sense of what the broader area covers.

The other important component I think related to our polling that is important to flag is, we consider the entire counties of Bruce, Grey and Huron counties as the impact area that's polled, so we're not just talking about an immediate area around the site, whether it's the Municipality of Kincardine or the Municipality of Saugeen Shores, we're talking about an area that would span just north of London and as far east as around Collingwood.

So it's a very large area and within that area there is a lot of seasonal residences. As you go to the east of that region, a lot of the seasonal residents are on the ski hills in the Collingwood area, so capturing them in the winter months is more preferable; whereas around the -- on the shores of Lake Huron it tends to be in the summer.

So by doing these things on a rolling basis we get a good indication.

I think it's also important to flag that one of the things that we also do in addition to quantitative research is we do qualitative focus groups

occasionally. And while these poll numbers remain very consistent, the advantage with qualitative research, whether it's Ipsos Reid or another firm, is it provides the opportunity to, you know, have an evening with local residents and really kind of probe into the questions.

Because I think to the previous question, sometimes when people are answering top-line questions, you know, it's great to hear that there's a level of support, the level of acceptance with our communications, but frankly, the feedback that we'd like to hear is, how do we make things better? And so sometimes that qualitative research is very helpful and that is as simple as, you know, getting together a group of 20, 30 people from throughout the region in a facilitated comfortable session where we can share messages, share communications materials and get feedback.

**MEMBER VELSHI:** So with that input, what would you say are sort of the top three areas that they feel you need to do more on?

**MR. SCONGACK:** Well, I would say -- I would kind of separate that into two areas.

Firstly, a lot of the items that we'll talk about over the course of the next several days, safety and environment there tends to be a high level of confidence in those areas.

The things most local residents are interested in is a lot of the economic impacts of the area, the future of the Bruce site from an energy policy point of view. Those tend to be the top of mind issues.

In terms of areas for performance improvement, it's an area we're always taking seriously. We're trying to find the right balance between using new communications technology, whether it's social media, telephone town halls on the one hand, compared to a lot of people who still like to receive their information through traditional means, whether it's newspaper, direct mail.

So I would say the biggest challenge we have is trying to find that right balance, and so the approach that we've adopted is really to do all the above and work on the basis that any one of those communications tools is not going to reach all residents.

But you really do get a wide range of views on those kind of things and I think that's actually probably a challenge for any licensee to find that right balance.

**THE PRESIDENT:** Okay, thank you. I think we need to move on.

Thank you. Do you have any final comment?

**MAYOR EADIE:** One thing I didn't mention was that in the Municipality we really appreciate that our

young families can stay here and have good jobs, make a living here.

Often in rural communities young people have to leave this area and find jobs elsewhere and Bruce Power has an initiative to make sure that younger people are trained well and stay here and work in the Municipality of Kincardine and we really appreciate that.

And, of course, the safety record and their involvement in the community is paramount and we really appreciate all their efforts.

So we support this renewal of their licence. Thanks.

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

I'd like to move on now to the next submission which is an oral presentation by North American Young Generation in Nuclear as outlined in CMD 15-H2.42 and H2.42A.

I understand that Mr. Lee and Mr. Good will make the presentation.

The floor is yours.

**CMD 15-H2.42/CMD 15-H2.42A**

**Presentation by North American Young Generation in Nuclear**

**MR. LEE:** Andrew Lee, for the record.  
Good morning, Commission, thank you for giving us the opportunity to present.

My name is Andrew Lee. I'm an Executive Member of NAYGN as a professional development chair. My co-presenter here is Orié Good, Executive Member, student liaison.

So the Bruce Chapter of NAYGN. Bruce Power is one of our main sponsors. Our 2015 count right now is 150 new members within NAYGN. As part of NAYGN, we develop and execute strategic plan and guidance based on NAYGN annual goals and business plans. With annual plans, we host and support professional and social events. Other chapters for NAYGN include OPG, AECL, Cameco and AMEC.

So our mission: to support and develop our nuclear workers professionally, socially by supporting Bruce Power business plan to enhance recruitment, retention and uphold the company's reputation.

**MR. GOOD:** Orié Good, for the record.

The Advisory Board for the Bruce Chapter of the North American Young Generation in Nuclear is composed of an authorized nuclear operator in training,

personal assistant, financial analyst and graphic designer, information technologist and engineers.

All our young and motivated individuals that combine obviously a wide range of careers provided with great opportunities by Bruce Power.

**MR. LEE:** Andrew Lee, for the record.

So NAYGN provides members the opportunities to develop leadership and professional skills, enhance your professional network, engage and inform the public about the nuclear industry, social responsibility through charity and community outreach and attend professional development workshops.

So for a typical member, when you're new to your career or the industry sometimes it's difficult to find opportunities to lead, to network, to attend professional development and to show your passion for what you do. NAYGN ensures that all young professionals in the nuclear industry have an opportunity available to them.

**MR. GOOD:** Orie Good, for the record.

As one of Canada's top 100 employers of young people, to local youth Bruce Power means high school co-ops and summer jobs, familiarity with highly skilled jobs in the industry and motivation for higher education in business, science and engineering.

To new graduates entering the workforce,

Bruce Power means competitive jobs with career development, a supportive work environment to challenge their acquired skill set and continual education for further achievement.

To local economy, Bruce Power means local young people entering the workforce can find stable, high potential careers and skilled new people moving to the area further grow local communities.

**MR. LEE:** Andrew Lee, for the record.

So one of our biggest initiatives is our community events and outreach programming. So this year alone, 2015, we've attended numerous events including conferences for how to use spent fuel. I've attended the Ontario Clean Energy Consultation as a panel speaker talking about clean energy, you know, future climate change and how Bruce Power contributed to the coal phase-out.

Our other initiatives this year include sponsoring youth camps for Western University in the Saugeen Shore area and our Q-1 event included donations to the food bank. And our future events this year include career mapping, a day in the life of an operator and leadership mentoring.

**MR. GOOD:** Orie Good, for the record.

By re-licensing Bruce Power early professionals will continue to have fair and competitive job opportunities. A licence renewal means that the North

American Young Generation in Nuclear will be able to continue to work with these individuals developing professional career and healthy community.

On behalf of NAYGN, thank you for your consideration.

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

**MEMBER MCEWAN:** Thank you, Mr. President.  
Thank you for the presentation. So how big is your broader organization, how many chapters and do you have any interactions outside of your own chapter?

**MR. GOOD:** Yeah. So, it's across North America. I don't know what the actual number is in terms of membership for the broader organization, but in Ontario alone we have a number of different groups and every month we have a conference call with those groups to align what we're doing with what they're doing, provide support to each other. And we will be attending a conference in June or July, we're just in the planning processes now with those groups and that includes AECL, OPG, Cameco, different organizations that support the NAYGN.

**MEMBER MCEWAN:** And do you have linkages with or meetings with your counterpart chapters in the U.S.?

**MR. GOOD:** Yeah. So last year two groups

came up from GEHNE and -- what was the other group? I forget the name, sorry.

Anyways, they came up for a tour of the CANDU reactors. We had a bit of a social event and they actually invited us to go down there and tour their facility. So that's something that we're planning right now.

**MEMBER MCEWAN:** In your presentation you said a wide range of careers are included in this, so what would that range include?

**MR. GOOD:** So the NAYGN is typically open to anyone who has less than 10 years of experience in the nuclear industry or under age 35. At Bruce Power, we don't put those limitations on it, so it's open to everybody at work. So that -- like the examples that was from a graphic designer to engineers, personal assistants, authorized nuclear operator in training, anyone who's working at Bruce Power, or as a contractor in the industry.

**THE PRESIDENT:** Dr. Barriault?

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

I was interested really in your mission plan or your mission statement, that you are supporting Bruce Power's business plan. And I guess I would like to ask Bruce Power how much of your business plan are they

privy to?

--- Laughter / Rires

**MR. SAUNDERS:** I think they are privy to the high-level business plan. And since many of them work there, of course they are quite knowledgeable on the individual components of that plan. There are aspects of the plan that we don't share so widely, as you may well expect.

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

**THE PRESIDENT:** Dr. McDill?

**MEMBER MCDILL:** Thank you.

You have indicated your support for Bruce. But if you happen to disagree or wish to take something more challenging up the chain, how would you proceed to do that?

**MR. LEE:** Andrew Lee, for the record.

So just a bit of clarification for supporting Bruce Power's business plan. What we talk about when we say business plan is our focus is not on just like the economic side, this has to do with the value of safety culture.

This is something we instil into our employees and, you know, from a larger perspective this is the, you know, Bruce Power mandate these values of safety

culture.

So we are here to support the safety culture and to act as leaders for the safety culture, and to meet the standards of Bruce Power and the nuclear industry as a nuclear professional worker.

And if there is something you don't agree with, we have our executive board members who deal directly with senior Bruce Power leaders, and our concerns are brought to them during these meetings.

**MR. GOOD:** Orie Good, for the record.

In addition to that, like I said, we were planning a conference with the other NEYGN communities within Ontario. One thing that we are looking at doing is a visit to Parliament Hill where we will be voicing concerns and having our voice heard.

**MEMBER MCDILL:** In a previous hearing for another operator one intervener expressed concern that you might not object to something, nothing in particular, but have you objected? Have you expressed concern? Have you brought concerns up the chain to Bruce?

**MR. LEE:** Andrew Lee, for the record.

In 2015 we discussed climate change, and part of this event we brought in a number of stakeholders from around the surrounding area, including the pensioners, the Municipality of Kincardine, and Bruce Power provided an

open forum for discussion about climate change.

And during that discussion we were all able to bring up our concerns. I personally brought up a concern about views of, you know, safety performance and how I can actually understand the performance metrics they put out. And they are able to provide very open and comfortable atmosphere for questioning and challenging them.

**MEMBER MCDILL:** Thank you.

**THE PRESIDENT:** Out of 150 membership, which is the Bruce chapter, how many of them were locally grown? Let me put it this way. In other word, came up through the -- you know, through the local communities?

**MR. GOOD:** Orie Good, for the record.

Yes, I understand your question.

Unfortunately, we don't have those metrics. That would be an interesting thing to have though, so I can follow-up on that.

**THE PRESIDENT:** And relating to this, we heard Bruce saying that they still have some shortages in some aboriginal youth being recruited. Any advice on that aspect?

**MR. GOOD:** I am just trying to think of my own personal experience. So how I was recruited was at the university, right? So they came to a job fair and had a

presentation.

So if they were attending job fairs like that, that would be a good opportunity for them to seek employment or even have Bruce Power go to some of the native communities and do job fairs. I don't know if we do anything like that currently.

**MR. LEE:** Andrew Lee, for the record.

One of the discussions we had with the Bruce Power senior leaders, including the Municipality of Kincardine and previous superintendents and guidance counsellors were that we are developing a program for reaching to the students in both high school and junior high.

Because we recognize that it is not going to be a one-year turnaround, they are developing a long-term, maybe up to like 10 years, right, before we can see our efforts being materialized into, you know, local region workers to university and then coming back to supporting their communities.

But that program is in place right now. We do have high school students that are performing rotations and co-op opportunities at Bruce Power. So they are definitely there and they are definitely being utilized and supportive.

**THE PRESIDENT:** Thank you. Anybody else?

Any last comment?

Okay, thank you for your presentation.

So the next submission is an oral presentation by the NSERC Lake Whitefish Research Program as outlined in CMD 15-H2.116 and 2.116A.

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

**CMD 15-H2.116/CMD 15-H2.116A**

**Oral presentation by the**

**NSERC Lake Whitefish Research Program**

**DR. WILSON:** Good morning. The Lake Whitefish Research Program is an interdisciplinary and collaborative research program based at McMaster University and the University of Regina.

We are supported by funds from the Natural Sciences and Engineering Research Council of Canada through a collaborative research and development grant, and our partner organization in this project is Bruce Power.

At McMaster University is my lab. I am Dr. Joanna Wilson from the University of Regina. We have Dr. Richard Manz here with us today. And Dr. Somers unfortunately was not able to be with us, but Ms Rebecca Eberts is here to speak on his behalf. And a number of our

trainees are here with us as well that are directly involved in performing the bulk of the research.

Our project has three main aims. The first two are involved at looking at the effects of the cooling water discharge on lake and round whitefish embryos, this is the development period of the embryos that would reflect any animals that are potentially spawning in the near shore area where the cooling water is discharged.

One is to look specifically at elevated temperature and the effects of thermal shocks, and the second is to look at combined stressors, looking at chemical, radiological and temperature stress in combination on developing fish.

Most of our work on these two aims have been on lake whitefish to date. This year we started working on round whitefish.

Our third aim is looking at population structure and habitat use from those fish that can be caught in the near-shore area during spawning season, and that has been completed on both lake whitefish and round whitefish from the very beginning.

In this map we show the area where we have done the bulk of our collections, particularly for our population and habitat use studies. We have eight zones that we focused on: two that we consider reference zones,

one to the north and to the south of the Bruce Power site; and six areas that we consider part of a potentially affected zone.

We have sampled fish within these sites during spawning season using a gillnetting approach. We have also deployed temperature loggers as well as embryos back into the field for a number of years, and the reference sites at some sites within the affected zone.

That is the first data that I am going to show you here today. This is data from our temperature loggers from the 2013 to 2014 field season. The site in blue, site number 1, is our southern reference site. And you can see that there is lower temperature and much less variability in temperature at that site compared to two sites that are near the Bruce A and Bruce B cooling water discharge.

And so we see elevated temperature on average around maybe 3 degrees higher than our southern reference site, and more variable temperature in the places where the cooling water discharge is released.

And based on mathematical models that we have developed for fish development, we would expect that fish that are developing in those areas impacted by the cooling water that they may hatch earlier.

And this matches with what we have done in

the lab with lab rearing experiments, where we don't necessarily see increases in mortality or developmental abnormalities with elevated temperature, but we do see changes in the time of the animals to hatch and their size at hatching.

Now, we have done some work on chemical stressors. And in this case we focused on morpholine and sodium hypochlorite. Sodium hypochlorite, unless we are at very high concentrations way outside the range of anything that would be found in the field, they don't appear to impact our lake whitefish embryos.

Morpholine, we can calculate an LD 50 that is way above what we would ever expect in the field. We do see some changes in both growth and time to hatch at 10 mg/L.

We have also done some work on acute radiological stressors, taking embryos at different points of development and exposing them to short-term radiological exposure.

This year we are still in the process of crunching data where we have exposed embryos to chronic radiological stress throughout their whole development. And we found that early embryos are more sensitive, but that in general, like other fish species, the lake whitefish are fairly insensitive to radiological stress, so

it takes quite high doses. We see increases in mortality at 5 to 10 Gy.

And then we have done some initial studies looking at combined stressors. These are primarily with acute stressors, for example, heat shock and radiation together or morpholine and radiation together.

And while we do see some inner-active effects, meaning that effects larger than we might expect based on individual stressor experiments alone, that is only when we reach doses that are far above what is environmentally relevant, suggesting that for the receiving waters that our single-stressor experiments are sufficient to potentially predict effects.

**DR. WILSON:** Richard.

**DR. MANZON:** Dr. Richard Manzon, for the record.

One focus of my research group is to understand the impact of stressors on embryonic and juvenile Whitefish at the cellular level. The heat shock response is perhaps one of the most universal responses to stress, and that's to a wide variety of different stressors.

Organisms will produce heat shock proteins, which are fundamentally protective in nature, in both stress and non-stress conditions. Some of our work to

date has shown that in embryos or fry exposed to short-term stress of 3 or 6 degrees above ambient temperature we do not see a heat shock response. We only see a heat shock response when we expose embryos to higher temperatures of 9 degrees Celsius, and these are short-term exposures.

In contrast, when we expose embryos to repeated 3- and 6-degree heat stress every three to six days, we do begin to see an elevation in heat shock proteins. But, importantly, in these same embryos we see an attenuated or a reduced heat shock response when they're exposed to very extreme heat stress of 12 to 18 degrees, suggesting perhaps some protective effects.

Collectively, the data indicate that both embryos and fry are able to initiate a heat stress response, which is protective in nature.

**MS EBERTS:** Rebecca Eberts.

As Dr. Wilson said at the beginning, the last theme of our program is to assess the genetic structure and habit use of fish in this area so that we can understand the impact of our findings in these previous themes. So our goal here is to determine if Lake and Round whitefish in the affected zone are in some way distinct from fish farther away from this discharge area.

We've assessed this in two ways: we've used microsatellite markers to compare genetic distinctness

between these two areas; and then, secondly, we used stable isotopes to look at whether fish in these areas are distinct in their habitat use. We've done this with fish that we've gillnetted between 2010 and 2012, so around 300 individuals of each species.

For our genetic comparison, our microsatellite analysis showed that there is no genetic differentiation between fish in the affected zones and the reference areas, so here I'm reporting the  $F_{st}$  values: the closer an  $F_{st}$  value is to 1, the larger the genetic distinctness is between two groups. You can see that our values for both species are close to zero, implying no genetic distinction, so we conclude that Lake and Round whitefish in the affected zone are not genetically distinct from those in the reference areas.

Then, lastly, our comparison of habitat use with stable isotopes, we found that there was high overlap of carbon 13 and nitrogen 15 values for fish from reference areas and affected areas, implying that they're using similar habitat and prey sources. We found that isotopes were quite diverse, implying that these are a diverse group of individuals, possibly reflecting multiple areas of the lake and food webs, but we conclude that Lake and Round whitefish habitat use is similar and reference in affected areas.

To date, we know that in this eight-zone area the fish here are genetically similar and they are also similar in their habitat use. We are now looking to expand this to compare this eight-zone area to populations further away from this discharge area throughout the lake.

**DR. MANZON:** Thank you.

**THE PRESIDENT:** Thank you.

Questions. Dr. Barriault.

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

Chairman.

I'm looking at your map, really, and your reference areas. Do you tag the fish in your affected zone to see where they're migrating to or do you just fish randomly in these areas?

**DR. WILSON:** Joanna Wilson.

No, these are not tagged individuals. This is during gill-netting programs that are ongoing during spawning season. The fall spawning season is particularly challenging for us to fish during, so we have a limited number of days that we're on the water, especially considering these fish have a very short run. We could have a maximum of 10 days to two weeks to fish, and, depending on weather conditions, we might have two to six days on the water.

We set the gill nets within these

individual zones -- they're set overnight -- and then we pull the nets up. We are not sure at all whether they are, in fact, coming into that area and going to spawn within that zone or they're passing through.

**MEMBER BARRIAULT:** So the gill nets, actually, I would imagine, would kill some of the fish.

**DR. WILSON:** Yes.

**MEMBER BARRIAULT:** It does.

Would you be able to use a box net to trap them, rather than gill nets, so you can keep them alive or -- I guess, you know, we saw where hypoxia, for example, is affecting these. Fish breathe through gills, obviously. Having said that, when you have a gill net you're creating almost an hypoxia situation, where the fish can't breathe properly.

Have you looked at that at all or...?

**DR. WILSON:** Yeah, so I can address that.

There's two issues here. One is about whether or not the box nets are possible in this particular site --

**MEMBER BARRIAULT:** Right, yeah.

**DR. WILSON:** -- and it's not really. We need to gill net in these sites if we're to collect the fish.

In the case of the gillnetting program,

when we pull them up they're not all dead in the nets. Of course some of them do die from this. But in the case of our sampling for the population work, we're doing terminal sampling on those fish anyway because we're having to take liver, muscle and the ear bones from them. So part of the assessments that we're doing is requiring terminal sampling anyways.

**MEMBER BARRIAULT:** Okay.

So, actually, this is during the, I guess, the spawning season that you're catching these fish is what you're saying.

The area that they travel, do you have any idea how far they travel to spawn?

**MS EBERTS:** Rebecca Eberts.

All we really know is that they can move a lot, but we don't know if these fish are actually here to spawn or not. But just looking at previous studies on Lake whitefish, we know that they can move a lot -- maybe less, though, than round whitefish. They could be moving through this area, moving elsewhere, or they could be stopping here, we're not sure.

**MEMBER BARRIAULT:** Yeah. Okay, thank you.

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

President.

**THE PRESIDENT:** Member McEwan.

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

Just following on Dr. Barriault's comment, so does the gillnetting, as itself, induce a stress response? If you're sampling live -- you know if you have live fish, would there be an induced stress response because of the netting?

**DR. MANZON:** I would say probably most certainly, but we've never measured that stress response. I would be surprised if we didn't see a stress response.

All of the animals that we have done stress experiments on are from in vitro fertilization from the males and females collected in the gillnetting. We do in vitro fertilization on the boat, and we rear the embryos in the lab, and then do our controlled stress experiments.

**DR. WILSON:** Joanna Wilson. I'll just follow up on that.

We're getting two bits of sampling out of these animals that we're gillnetting. We're collecting data for the population and habitat use on the adult animals, but if they are ripe we're able to collect eggs and sperm, do the in vitro fertilization, in order to follow the effects data in the embryos.

So we're looking at what is happening in these fish just during development, from fertilization through to hatch.

**MEMBER MCEWAN:** Going to your irradiation experiments, you explain in your submission the irradiator. What's not clear to me from the mortality figures that you give and the fertilization of the different doses, are these acute doses or chronic exposures?

**DR. WILSON:** At this time the data that we're showing you is from acute. This year was the first year that we've been able to do any chronic irradiations and we don't yet have a complete data set where we've analyzed everything.

The experiments take a very long time. We start them immediately after we do the in vitro fertilization, so that's in December. And then, depending on the temperature that the animals are reared in, they could hatch anywhere from, you know, 130 to 200 days later.

It's quite a long incubation period, and so we don't have the chronic irradiator data complete and done. This data is from the acute exposures, and we've done those exposures at a number of developmental time points post-fertilization. The earliest time point was one day after fertilization, and that's where they are the most sensitive. We see an increase in mortality at 5 grays.

**MEMBER MCEWAN:** So presumably that would, then, inform your chronic exposure experiments, because if you have a threshold at that low doses you can start

looking at where you would pitch the chronic exposures.

**MR. TOME:** Sure. Chris Tome.

The chronic irradiator doses, we've gone below the acute threshold levels. We have doses up to just under 5 milligray per day.

**MEMBER MCEWAN:** And, again, the data will come out.

Will you also be doing the combined stressors, so chronic irradiation morpholine exposure, as well as the acute?

**DR. WILSON:** Yeah. We're in year three now, so we have two more years, so yes.

I mean part of the reason why we started with the acute combined stressors is combined stressor experiments are extraordinarily complicated to do and the number of variables and the number of treatment groups we can have would be quite large, particularly when we're working with a developing organism, because you can pick many different development points.

The idea is that, moving into the last two years, now that we have the chronic irradiator built, that we would be able to look at chronic exposures with combined stressors.

**MEMBER MCEWAN:** Thank you.

**THE PRESIDENT:** Dr. McDill.

**MEMBER MCDILL:** Just so it's on the record for the community, could staff make the conversion from gray to sievert, please?

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

For all intents and purposes, 1 gray would be 1 sievert, or 1,000 millisieverts or milligrays. Yeah, 5 gays is the -- the value that was given is 5 sieverts, so it's a very, very high dose for environmental purposes.

**MEMBER MCDILL:** We come into the community and talk in sieverts, so I thought it was.

**THE PRESIDENT:** I don't think that's the only thing the community didn't understand, including me --  
--- Laughter / Rires

**THE PRESIDENT:** -- I know, and we'll get into my turn here.

Mr. Tolgyesi.

**MEMBER TOLGYESI:** On your chemical stressors you were using morpholine and sodium hypochlorite as a sodium stressor. Were they selected because they are present near Bruce Station or they were selected because they are usually used as a chemical stressor?

**DR. WILSON:** These are used because they're -- we would expect to find these within the cooling waters. There's actually very little data. Morpheline, in

particular, is, I think, a very interesting chemical stressor for us to look at because it's used in a number of industrial applications, but there is no data that's out there on whether or not that's a chemical -- causes chemical effects in developing fish. So it's particularly novel data, I think.

**MEMBER TOLGYESI:** So you expect that it could be present.

Do you have any comments, Bruce? No?  
You are looking after also?

**MR. SAUNDERS:** No. I mean, the purpose of the experiment was to look at a number of these things and to understand them.

I think, from an industry point of view, frequently there's a lot of speculation about what the impact of various components can be, and frequently, there's not very much knowledge. And it's difficult for us to figure out how to respond, so I mean, that's really why we support the work because we understand it. We know how to deal with it.

**MEMBER TOLGYESI:** This is a collaborative decision between three research organization, national body and Bruce. You have some progress in this.

How you communicate this progress and knowledge what you acquire to communities? Do you do that,

or to natives, because they are looking very close to what's happened to the fish. And also to the fishery industry.

**DR. WILSON:** Joanna Wilson.

Yes. The communication of the science, I think, is really important. It's something that I think academic researchers often struggle with a little bit.

But what we have done from the very beginning is that we submit regular reports both to our national granting agency on the successes and challenges of the research on an annual basis. We also prepare a report of our ongoing research on an annual basis to Bruce Power so that they're aware.

We have an annual meeting as well that usually there's representatives from Bruce Power that comes so that they can hear a summary of our research.

Much of that meeting is also a great opportunity since Regina and Hamilton are clearly not right adjacent to each other, so we need to get our people all together so that we can talk about the research and plan sort of what the next steps are of the research.

We conduct a fairly large field, you know, component to support all this research in the two institutions.

So we have annual reporting and annual

meetings that go on as well as things that are on a more ad hoc basis, but we meet, at minimum, once a year with our partner organizations and report to them.

This -- in the past year is when our science has gotten to the point where we are writing and publishing a number of publications, the outcomes of the research, which is definitely a requirement of our granting agency that we make this information publicly available.

Now, the scientific literature is often not that accessible to community members, and so that's one of our aims going forward, is to be able to communicate that information better to the communities. And we've been talking with Bruce Power about how to accomplish that.

Part of our annual meeting this year, for example, will include larger participation outside of what we traditionally have had.

**MEMBER TOLGYESI:** Because I think that, as I said to natives and to fishermen, it's quite important to -- your conclusions, although they should be simplified, you know, to make sure that the people understand what you are talking about because you are flying quite high, you know.

And you have also, I think, the responsibility -- you are independent, but you are a research group, so I think that people is looking up to you

to -- as somebody who is independent, with science-based knowledge and opinions. So it will be quite important.

**DR. WILSON:** Yeah, I would completely agree with that. And I think the reality is that we had meetings that were -- and consultations at the very beginning of the project, and this scale of research is quite a bit to get up off the ground. And it's making sure that we have something reasonable that we can communicate and that we're far enough along to report back.

And we're at the stage now where I think we're transitioning into that part where we have enough data that we can make meaningful contributions to that discussion.

**THE PRESIDENT:** Ms. Velshi?

**MEMBER VELSHI:** So help me with this as I try to make sense of the conclusions so far.

So with the temperature stresses where you say there's early hatching, is there a problem with that? Does that result in higher mortality?

I mean, I don't know what does that really mean, then, in practical terms?

**DR. WILSON:** Yeah. So that's a really great question, and one that we struggle with a little bit as well.

I think when we started this project, you

know, there had been some reports in the literature and certainly we know with other fish species that elevated temperatures can induce mortality and developmental abnormalities, depending on what the optimal temperature for rearing is for a given fish species.

So that's something that I think is fairly straightforward in terms of communication and understanding, but it's -- it's the reality of our data set is that we're not really seeing increases in either mortality or developmental abnormalities within the range we would expect to find in the field.

So -- but what we do see is this change in hatch timing, so if they're exposed to warmer temperatures, they will hatch earlier and their size at hatch is different.

And the implications for that are very difficult at this moment to discern because it might be beneficial, and it might not. And I think that's a place where we really have to follow up with the work that we've been doing so far.

We know that size of larval fish can be important for whether they can capture prey. Early hatching might provide them with a longer growth period so that they're larger before the first winter. That might be beneficial.

If there's, you know, a lot of prey availability, food availability for them on their nursery grounds, they might be totally fine hatching early. If there isn't, then they would die.

So we don't have the data yet to make the full interpretation of what that early time to hatch means. It might be fine for them; it might not. And we can't really comment at this moment because we have not looked at the field conditions that these larvae might be facing when they move into the nursery grounds.

**MEMBER VELSHI:** Thank you.

And would it be accurate to say that, given where you're at right now with your research, that there really is nothing to be seriously concerned about or is it too early to tell, or -- can you make any kinds of conclusions on that front?

**DR. WILSON:** Yeah, I would say that right now, all of our data suggests that for developing whitefish, the embryos themselves, that we don't anticipate a large problem for them during the development. Because we don't know what happens to the larval fish, what the implications are for the larval fish yet, as an academic, I have a problem being 100 percent concrete. We're really bad at those kinds of things anyways, I'll admit up front.

But I would say for the developing

embryos, I don't think that there are large concerns from the work that we've done on the individual stressors or from our combination stressors so far. None of them indicate that, at the doses that the embryos would be expected to experience in the near shore area off of the Bruce Power site, that the doses would be high enough to cause a problem for the fish.

**THE PRESIDENT:** I thought you were very clear. It says no mortality. To me, that meant a very clear kind of thing.

All right. I really would like -- so just following up on that line of talk, I heard no thermal impact, I heard no chemical impact, and I heard no radiological impact.

In fact, if I -- in reading this, I thought you also said that at that low radiological kind of a thing there is no -- the linear model doesn't work.

Did I read this right?

Are you talking about -- are you talking hormesis, about the beneficial impact? What are we talking about here?

**DR. MANZON:** Well, if we look at the thermal stress response, it's very preliminary. But when we expose embryos to repeated low level stressors, we seem to find a protective effect if they were -- are later

insulted with a very severe stressor.

So this suggests that there is potential for hormesis, but we are just now starting to analyze some -- in the final stages of analyzing some 3,000 samples. So give us two months, and I think we should have the data finished and we might have a better answer.

But the data does suggest that the low level stressors might actually be protective in nature.

**THE PRESIDENT:** So you have future research for the next two years or so, and intend to publish some of this material?

**DR. WILSON:** Yes. Indeed, we've already published some of the material within the scientific literature, and we are in the process of continuously generating publications as data sets are complete. And yes, we have two more years left on this project and the start-up with the amount of work we had to do just in figuring out how to rear the embryos within the lab, we had to build custom incubators for these to control temperature. We had to figure out how to rear them in small dishes. They'd never been reared that way before.

So the start-up of the project was actually really intense, and we're in the phase now that we know how to generate the embryos, do the experiments and the data collection and analysis is moving at a much faster

pace. The last two years, I think, will be highly productive from a publication standpoint and from research standpoint.

**THE PRESIDENT:** I have to ask, why Regina? What's your connection with fish?

**DR. MANZON:** That's a fair question.

I grew up by career training, studying the Great Lakes fish, particularly sea lamprey. Got a job offer in Regina. I've been out there, and this year is the first year that I've actually studied any fish in Saskatchewan. They've all been Great Lakes fish up to this point.

**THE PRESIDENT:** So is any of the science transportable to mining in Saskatchewan?

**DR. MANZON:** We're actually looking to get involved with companies such as Cameco and so forth to make a link between their mining activities and understanding their impacts on whitefish, but also many of the popular game fish in Saskatchewan as well.

**THE PRESIDENT:** Thank you.

Dr. McEwan.

**MEMBER MCEWAN:** Sorry. Just a very quick. So in the design of the chronic experiments, are you working with a radiobiologist?

**MR. THOME:** Sure. So Chris Thome.

I have a Master's degree in health and radiation physics, and I'm doing my PhD in medical physics, so with myself and with -- we have other radiation biologists at McMaster that we're working with.

**MEMBER MCEWAN:** And the irradiators at McMaster.

**MR. THOME:** Correct.

**DR. WILSON:** Yeah. I would say that this is the -- I'm based in the Department of Biology at McMaster, but I have students that I supervise both in biology as well as the program that Chris is in that's in the medical radiation, physics. And our facilities is all over within the radiation department, so all of our rearing and our experiments are over where they can be close to the irradiator and close to the -- our needs for that side of our research.

**THE PRESIDENT:** Anybody? Anything else?

Well, thank you. Anything -- last words you'd like to share with us?

We may have to recall you, right, when we get to the final results.

**DR. MANZON:** Thank you very much.

**MR. LEBLANC:** The next session -- the next submission was to be a presentation from Ms. Maryam Syeda as outlined in CMD 15-H2.07. We have been informed that

she is not able to join us today, so intervention will be considered as a written submission and will be addressed later.

So we understand that the next presentation will be from the Saugeen Shores Chamber of Commerce. We have not identified you in the room yet, but we're told you're here.

You are? Good stuff.

So is Ms. Robbins in the room? Because her office told us she was on her way.

**THE PRESIDENT:** Okay. Well, we'll take a break for 10 minutes.

--- Upon recessing at 10:02 a.m. /

Suspension à 10 h 02

--- Upon resuming at 10:19 a.m. / Reprise à 10 h 19

**CMD 15-H2.68**

**Oral presentation by Saugeen Shores Chamber of Commerce**

**THE PRESIDENT:** Okay, can everybody take their seat? We are ready to proceed.

The next submission is an oral presentation by the Saugeen Shores Chamber of Commerce, as outlined in CMD 15-H2.68.

I understand that Ms Robbins will make the presentation.

Please proceed.

**MS ROBBINS:** Thank you.

My name is Joanne Robbins. I am the General Manager of the Saugeen Shores Chamber of Commerce and represent over 450 businesses in that capacity. I've been 15 years with the Chamber of Commerce and five years of that as a Special Event Coordinator and 10 years as the General Manager.

I want to thank the Commission for allowing me the time to speak today on behalf of our membership and the business community in Saugeen Shores.

Further to the Chamber's written submission, I would like to focus and expound on the three main points that my position as the General Manager has allowed me to be the most familiar with.

Firstly is the commitment of Bruce Power to its high standards of safety and environmental responsibility. That environmental responsibility and safety environment has spilled over to the benefit of the surrounding communities, Saugeen Shores included.

Bruce Power and its employees have partnered with us and spearheaded safety initiatives to the betterment of the whole region. Examples include

supporting business education through our Chamber network for workshops and seminars, for workplace safety, WSIB education, health and safety programs, and compliance issues with the health and safety.

They've also aided the community with risk management planning and assessment for our events and functions, helping us to run safe and healthy events and festivals. Other initiatives include a Safe Communities program, work on the Children's Safety Village, a Safety Festival and support of education opportunities for youth in the workplace.

I've just scratched the surface here. There are many more examples that I'm sure you'll hear in upcoming presentations.

This environment of safety and responsibility and understanding has and will continue to be of great importance to the business community.

Secondly, my second point, Bruce Power is a responsible and caring community partner. Bruce Power is now part of the fabric of our community. It's our biggest employer, yes, and our biggest supporter of worthwhile projects. Examples go from the Hospital Foundation in Southampton to the Relay of Life events and many more.

Bruce Power is represented at all our celebrations and milestones and fundraisers and is

continually educating the public, from the school kids to the Probus Club. The Bruce Power Information Centre and its tour have played a role locally in educating the residents of the region but also an added benefit is it's become a tourism draw, so further educating the public from all over Ontario.

Bruce Power is also willing to take part and communicate with the business community and the residents. Our community, which does include a lot of Bruce Power workers, appreciates the continued support and partnerships offered by this great community partner.

My third point is of course economic impact. More Saugeen Shores residents work at Bruce Power than work within the Town of Saugeen Shores, according to the 2011 Stats Canada commuter info. The high level of education and skills of the workers has benefitted Saugeen Shores by allowing us an enviable quality of life with a diverse and robust business community and that serves that quality of life for all our residents.

The study "Affordable Jobs and Growth" establishes the positive role Bruce Power plays in the province economically. This positive economic impact relates locally as well and the direct and secondary impact is critical and very important to the health of our business community.

In closing, I would like to reiterate our confidence in Bruce Power based on its outstanding record and fully support the renewal of its Power Reactor Operating Licence. Thank you.

**THE PRESIDENT:** Thank you.

Questions?

Dr. McEwan.

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

Thank you for the presentation.

I notice towards the bottom of the first page you discuss the Bruce Power communications and you do it sort of in reference to the Fukushima event.

Was there any communication between the communities and Bruce Power at the time of the Fukushima event to understand very quickly what had happened, what the likelihood of further events was?

**MS ROBBINS:** Joanne Robbins for the record.

Absolutely. I think we were probably, as residents and of course for the Information Centre and Chamber, informed before I even saw the first news article. They were in contact immediately from their office to ours.

**THE PRESIDENT:** Ms Velshi.

**MEMBER VELSHI:** I wanted to confirm that I heard you right when you said that the Bruce Power site

itself has become a tourism draw.

**MS ROBBINS:** Joanne Robbins for the record.

Yes, it is now one of our -- on our list of rainy day things to do and it is very well attended by people from all over Ontario and Upper Michigan.

**MR. SAUNDERS:** It's very hard to compete with the beach when the sun is out.

--- Laughter

**THE PRESIDENT:** Which leads me to a question. Are you now organized tours for kids, schools, and do you allow the tours to actually see the inside of the facility or is it just the Information Centre?

**MR. SCONGACK:** James Scongack for the record.

So a few things. It's a great question. I'm glad to hear our Visitor Centre has become a tourist attraction. It's a facility we're very proud of.

So we don't do tours within the physical plant itself. Just given the various security precautions we have to take, there's not an in-plant tour.

However, what we have launched is over the last couple of years we've reintroduced site-wide bus tours and over the last couple of summers, over the course of July and August, we've toured about anywhere from 1,500 to

1,700 people through these bus tours.

And to the previous comment that Joanne made about it becoming a tourist attraction, one of the things we've done is, in addition to working with the local Chambers of Commerce, we've also worked with the County of Bruce over a program called Explore the Bruce. So anybody who comes to Bruce County can get an Explore the Bruce passport and that can take you on nature trails to various other areas and the Visitor Centre has become one stop on that.

Outside of the site-wide bus tours, we have a very robust school program with the Saugeen Valley Conservation Authority that is environmentally focused. So we'll bring a couple of thousand students a year through the DEER Program. Half of these programs are done offsite, half of them are done at the Visitor Centre.

And then of course we have our various site tour programs that we'll do for very specific stakeholder groups. So I know previously Mayor Eadie was able to present and one of the things coming out of the November municipal election was we reached out to every single Council in the area for new members of Council to come and do actually an in-plant tour itself.

So we try our best to be as transparent and open as possible and we're just thrilled with the

uptake.

You know, one of the things that -- you know, it's clear to me, having worked in the Corporate Affairs area at Bruce for a long time, the more people we can get through the facility, whether it's a bus tour or Visitor Centre, exposure to our materials, that comfort level just gets higher and higher. So, you know, we're hoping over a long period of time to have our facility available to as many people as possible.

**THE PRESIDENT:** Thank you.

Anybody else?

You mentioned that you organize, if I understood correctly, workshops and seminars to discuss various aspects of interest. Are they normally open to the public, advertised to the public, anybody can come in and hear and challenge and ask questions?

**MS ROBBINS:** Joanne Robbins for the record.

Yes, they're open to the public. Quite often we'll have a small fee for lunch but usually they are free events just to educate the public on compliance safety issues, from the small to medium size business right up to a bookkeeper working at home to our bigger employers.

**THE PRESIDENT:** So are they well attended and, you know, some real good Q&A's back and forth?

**MS ROBBINS:** Joanne Robbins for the record.

They are well attended. Fifty to 60 people is well attended for our small town and we usually get at least that many out.

**THE PRESIDENT:** Okay. Anybody else?  
Any final words?

**MS ROBBINS:** No, thank you.

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

**CMD 15-H2.118**

**Oral presentation by Saugeen Ojibway Nation**

**THE PRESIDENT:** The next submission is an oral presentation by the Saugeen Ojibway Nation, as outlined in CMD 15-H2.118.

I understand that Mr. Monem will make the presentation.

Mr. Monem, the floor is yours.

**MR. MONEM:** Good morning, Mr. President, Members of the Commission. My name is Alex Monem. I'm legal counsel for the Saugeen Ojibway Nation.

I'm joined today by Mr. Randall Kahgee, former Chief of the Saugeen First Nation and now counsel to

SON.

Also in attendance today is Chief Vern Roote of Saugeen who opened these proceedings yesterday with a prayer.

And we are also joined by a number of councillors from Saugeen and Nawash.

Also with us is Dr. Steve Crawford, who's here to answer questions as may be required. Dr. Crawford is a longtime technical advisor to SON and an SON-sponsored faculty member at the University of Guelph.

In our written submissions we address a number of topics of importance to SON, its communities and its members, including:

- the need for rigorous accident modelling that can credibly address community fears and concerns;

- the need for constant improvement in environmental protection through more stringent release limits;

- the need for full and effective sharing of information on key environmental protection and safety issues;

- the need for SON involvement in emergency planning to ensure such plans are tailored to the specific circumstances and needs of its communities; and

- the need for SON members to have

opportunities to share in the benefits of the Bruce nuclear facility through employment, business and training.

We will not detail these submissions here but they speak to a common and overriding objective, and that is to ensure that the SON communities can have confidence that the Bruce nuclear facility is being operated in the safest possible manner and regulated at the highest possible standard, and further that SON is meaningfully involved in ongoing research and monitoring efforts, relevant planning exercises and key decisions respecting the future development and evolution of the Bruce facility.

This morning we'll focus our submissions on what has been a central matter of concern to SON over the last decades and that is understanding and mitigating any impacts that the Bruce facility might have on Lake Huron and its ecology and consequently the impacts the facility may have on SON's Aboriginal and Treaty Rights, including its established right to a commercial and sustenance fishery in the waters of Lake Huron and Georgian Bay.

Here and in our written submissions we make a central observation that the understanding of the impacts of the facility on Lake Huron is an ongoing process of monitoring, research and analysis. SON has had serious

concerns with the completeness of our understanding of the impacts of the facility on the ecology of Lake Huron and that there is now a significant amount of new data coming in that may aid us in filling these gaps.

For this reason, we respectfully submit that the Commission should resist making any final determinations on the impacts of the facility or the mitigation measures that might be required and, rather, should continue to require constantly improving monitoring and research efforts aimed at developing the best possible understanding of how this facility interacts with Lake Huron and require appropriate management measures to avoid and mitigate adverse impacts based on these findings.

In our submissions we further observe that DFO and the CNSC have recently initiated a regulatory process for the Bruce facility under section 35 of the *Fisheries Act* that will require specific and comprehensive assessment of the impacts of that facility on the fish of Lake Huron.

We appreciate that the current proceedings and the *Fisheries Act* authorization are two distinct processes. However, from SON's perspective, they also are complementary processes and may come to share common data, information and analysis.

For this reason, we have said that no

decision in these proceedings ought to prejudge or any way limit the work that needs to take place as part of that *Fisheries Act* authorization. We understand this to be consistent with CNSC's submissions that nothing in these proceedings will constrain the DFO in its ability to fulfill its responsibilities under the *Fisheries Act*.

Unfortunately, the submissions of the CNSC in these proceedings already raise a number of concerns about the upcoming *Fisheries Act* authorization process. Broadly speaking, our concerns relate to, one, the process CNSC appears to be taking for its work; two, the scope of the review; and, three, timing issues in how new and critical data will be considered. Many of these concerns apply both to the *Fisheries Act* authorization process as well as the ongoing task of assessing compliance with the EA conditions as part of this licensing process. I will briefly address these issues now.

We have said in our submissions that the *Fisheries Act* authorization process must be robust, comprehensive and credible and that SON must be centrally involved. It is only through such a robust and comprehensive process that the Crown will be able to fully discharge its duty respecting a potential infringement of SON's proven right to a commercial and sustenance fishery in the waters of Lake Huron and Georgian Bay. The process

must be based on sound defensible science, credible and sufficient data. We must have a good process for sharing and assessing that data, including technical facilitation to ensure the efficient transfer of information and synthesis of analyses between the parties as well as their advisors. And the process must allow DFO and CNSC to understand the significance of the impacts of the facility to SON's Aboriginal fishery from the perspective of SON, its members and its harvesters. This must also include a credible process to determine the sufficiency and appropriateness of proposed mitigation and offset measures.

As indicated in our written submissions, SON and CNSC have already had preliminary engagement on this process and there appears to be much common ground, including the need to hold a technical workshop to understand specific aspects of the work. There appears to be mutual agreement on the value of a technical facilitator and there appears to be agreement on the need to understand and address SON's concerns with respect to key aspects of existing data, including a report filed by SON-sponsored researchers at the University of Guelph respecting the methodology of the follow-up monitoring program.

CNSC and SON have not yet fully agreed on all the steps of this process. CNSC has provided us with a process map. To be clear, SON has not accepted that this

process would be appropriate or sufficient given the nature of the authorization. However, we believe that a framework for appropriate engagement can be settled quickly between SON, CNSC and DFO through timely meetings and discussions. But in its most recent submissions, CNSC has made comment that raises concerns for SON about this process and how SON will be involved in that.

In submissions filed by CNSC on April 7, 2015, and only received by SON very late last week, CNSC makes reference to a new updated *Fisheries Act* authorization application which it received on March 31 of this year. That update we are told provides additional information specific to the quantification of fish loss as requested by the CNSC staff. Based on this new information, CNSC writes:

"CNSC staff reviewed the submission and conclude that Bruce Power's quantification of impacts due to impingement and entrainment through the operation of the facilities is acceptable to the CNSC staff."

(As read)

This is very difficult for SON to accept. SON has not yet seen the updated application from Bruce Power. We were not informed about CNSC's request to Bruce

Power for further information, nor do we know if this information request takes into account SON's concerns with the follow-up monitoring program that is ostensibly the source of this data and about which SON has articulated deep technical concerns in a 2011 and 2012 report which is detailed in our written submissions.

We can assume that the request does not take this into consideration as CNSC and SON have not yet had the opportunity to hold their technical workshop on the matter. Despite this, CNSC staff have already concluded, without qualification and without an obvious line to addressing SON's concerns, that the quantification of impacts in the application is acceptable.

Further, CNSC states that the next step in their process is to determine what "offset measures will be implemented". This was reiterated and confirmed yesterday in CNSC's oral presentation. By this, CNSC appears to have already concluded that it will not require consideration of mitigation measures as part of the *Fisheries Act* authorization process. This decision and approach appears to be inconsistent with DFO policy and guidance. I wish to refer to a *Fisheries Protection Policy Statement*. And I apologize for not getting the Commission a copy, but if I can I would like to read a section. From page 10 of that statement on October 2013:

"The Minister must consider whether measures and standards have been applied by proponents to avoid, mitigate or offset serious harm to fish that results from their projects. The fundamentals of 'avoid, mitigate and offset' build on a hierarchy that is internationally recognized as a best practice in reducing risks to biodiversity.... This hierarchy emphasizes that efforts should be made to prevent (avoid) impacts first. When avoidance is not possible, then efforts should be made to minimize (mitigate) impacts caused by the project in question. After these actions, any residual impacts would normally require authorization and should then be addressed by offsetting."

That statement goes on to describe mitigation as:

"... a measure to reduce the spatial scale, duration, or intensity of

serious harm to fish that cannot be completely avoided. The best available mitigation measures or standards should be implemented by proponents as much as is practically feasible."

As said in our opening, the avoidance in mitigation of harm that the Bruce facility may cause to Lake Huron is a fundamental objective of SON. CNSC appears to have foregone any consideration of such mitigation measures and offers no analysis, justification or rationale to support that decision. Another area of concern involves the appropriate scope of the assessment under *CEAA* and the *Fisheries Act*, specifically whether harm to fish should be assessed at the "population level".

We have raised similar issues many times before in respect to the follow-up monitoring program. However, CNSC seems to have imported the same problem into its proposed work under the *Fisheries Act*. CNSC has made consistent comment that under *CEAA* impacts to fish must be assessed at population levels, while under the *Fisheries Act* impacts must be assessed at local levels.

There are two potential problems with CNSC's characterization of the scope of review under both legislative schemes. One, CNSC's position again assumes

that there is only one population for a given species against which impacts can be measured. SON has consistently taken the position that this is an unjustified assumption and that there can be no final determination of the significance of impacts of the facility on the lake until we have a far better understanding of fish populations in Lake Huron that currently exist, including the ability to describe and discriminate between multiple potential populations of fish. This concern applies equally to the assessments under *CEAA* and the *Fisheries Act*. It is not clear to us how CNSC could assess significance of a "localized effect" to fish populations in the vicinity of the facility without a broader understanding of the fish populations of Lake Huron and how fish local to the facility relate to those populations.

A second related point is that CNSC's comment that "serious harm to fish under the *Fisheries Act* is a lower threshold and requires a consideration of local impacts", that that statement could be construed to require only an assessment of local impacts rather than system-wide effects or significance. We do not suggest that this is CNSC's position, but the point must be clarified.

The threshold of serious harm to fish assessed at the local level is only a trigger under the *Fisheries Act* for the requirement of an authorization under

section 35. Our understanding of the *Act* is that it requires a full description and assessment of the impacts of the facility on here, the Aboriginal fishery, in consideration of measures to address those measures. It is not just an assessment of local effects.

Again, we say these are the kinds of issues that need to be fully considered in a focused and credible way in the context of the upcoming *Fisheries Act* authorization process and that we should do nothing now in the context of these proceedings that would narrow the scope of that assessment.

Finally, I would like to address the question of timing and how new and important information will be dealt with in the context of the ongoing assessment of compliance with EA and license conditions, as well as in the context of the *Fisheries Act* authorization. There has been a very significant amount of new data analysis made available only in the last few months.

For example, a Tier 2 Preliminary Quantitative Risk Assessment submitted by Bruce Power on January 30, 2015; the Environmental Assessment Information Report for Bruce Power released January 5, 2015 and an update to that report released February 27, 2015.

Further, there is new and critical research and data that will be made available in the coming

months and years, including ongoing results from the EA follow up monitoring program, which is not scheduled to be completed until 2017, including new results from modified entrainment and impingement program which collected data from 2013 and 2014 and which CNSC states it is only now analysing.

And there is research under the Collaborative Lake Whitefish Research Program, some of which we heard about this morning, as well as results from the University of Guelph team relating specifically to population, discrimination and modelling. It goes without saying that these new data and analyses are essential to building our understanding of the impacts of the Bruce facility on the environment and ecology of Lake Huron. However, neither SON nor its technical advisors have yet had the opportunity to review or assess any of this new information. The SON communities have had no opportunities to learn about this new information or what it might say about the environment of their traditional territory.

Yes, this new information must be incorporated into the ongoing assessment of compliance with the environmental monitoring requirements, but it also must now be brought into the *Fisheries Act* process. We have seen no explanation to date of how CNSC proposes to do this and, as evidenced by CNSC's recent expedited timelines, SON

has a real concern that CNSC will not follow a process that will allow sufficient time for a careful and adaptable consideration of new data and research, will not permit SON's technical advisors sufficient time to fully and meaningfully engage in the process, it will not permit full and proper engagement between SON, Bruce Power and Crown representatives and, most importantly, it will not permit SON communities and harvesters time to understand and contribute to the process.

SON has been anxious to begin substantive work on the *Fisheries Act* authorization since its initial meeting with CNSC on the matter in February of 2014. We expected to have a draft from Bruce Power of the application in the fall of 2014 but, as you know, the application was only submitted in February of this year.

SON and Bruce Power have entered into a protocol agreement to provide capacity and a forum for the parties to address regulatory matters relating to the Bruce facility, but only since the filing of the application has a work plan and capacity relating to this work been folded into the agreement and only now is SON in a position to begin the substantive review of Bruce Power's draft application and to begin full technical engagement with Bruce Power, CNSC and others on these matters. Yet despite this, CNSC appears to be pushing ahead two advanced stages

with the *Fisheries Act* authorization process.

These are matters of the utmost importance to SON and its members and will directly affect their ability to exercise their rights now and into the future. In the case of the *Fisheries Act* authorization, this will represent the first explicit authorization by the Crown of harm to fish in Lake Huron by the Bruce facility and, consequently, explicit authorization of potential impacts to a proven SON right.

SON cannot accept a rushed or perfunctory determination in these matters and SON expects that the concerns we have raised today will be addressed in a timely and appropriate way to ensure the ongoing protection of SON territory and its environment, as well as SON rights and interests throughout the territory. Those are my submissions and thank you for allowing me to go long.

**THE PRESIDENT:** Thank you.

Who wants to start questions? Nobody wants to start?

--- Laughter / Rires

**THE PRESIDENT:** Dr. McEwan...?

**MEMBER MCEWAN:** Thank you for the presentation. Very clear. I'm just going to start with a couple of simple questions.

What is a SON sponsored, SON sponsored

faculty member?

**CHIEF KAHGEE:** Randall Kahgee, for the record.

Currently the Saugeen Ojibway Nation has three sponsored faculty positions at University of Guelph. Dr. Crawford is one of those sponsored faculty positions. This has come as a result of a long positive relationship both with the university and with faculty members like Dr. Crawford, so we have kind of -- it works almost like a partnership. There are certain understandings about how much work is dedicated to SON-specific files as well as how much time is dedicated to Dr. Crawford's responsibilities to the university and to his students.

**MEMBER MCEWAN:** So the sponsorship is in terms of salary through the university or funding for projects to support labs, to support students?

**CHIEF KAHGEE:** I think it's safe to characterize it's a combination of both. I think, to give a little bit of context, since the Jones and Nadjiwon, SON, which is the seminal case on the fishery, we have invested heavily in the science, in trying to first and foremost make sure that the fishery is sustainable for generations to come. So we saw a great value in reaching out and building that capacity and that came through a combination of experience working with Dr. Crawford, first as a

biologist and of course through the university.

**MEMBER MCEWAN:** So just a final question on that, to be clear.

So the University of Guelph team presumably will be a team led by Dr. Crawford in the Appendix A, I think -- yes -- and he would be doing these comments as an expert in the field.

**CHIEF KAHGEE:** Randall Kahgee, for the record. That's correct.

**THE PRESIDENT:** So just to follow up on it, maybe between Bruce and CNSC and maybe Dr. Crawford, can somebody explain to us what happened with these 260 comments on noncompliance? This kind of a debate has been going on for quite a while. Who wants to start on this?

Staff...? Okay.

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

I will pass it over to Patsy Thompson, but before I do, I just want to make a couple of comments on the SON submission. One of the things they said was the decision under the *Nuclear Safety and Control Act* should not prejudice the *Fisheries Act* authorization process and I just want to confirm that is our position.

The second, they had raised concerns on process, scope and timing and we want to acknowledge that and make it clear that we wanted to make sure we keep good

lines of communication and working together with them. The other thing they said; we do have some common ground which is good. We are trying to find common ground.

So with that I just wanted to set the stage that we are committed to the process and I will now ask Patsy Thompson to comment on the questions.

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

I will start giving some information at a high level and then ask Andrew McAllister to provide some of the details.

So following the environmental assessment decision by the Commission, there was a request from the Commission to work with the SON and other stakeholders in developing the follow-up monitoring program and so a working group was established to develop elements of the follow-up program, including the elements related to fish impacts, entrainment and impingement and others. Through that work a number of stakeholders reviewed the proposal, the proposed approach, provided comments. The work was finalized.

At some point the SON essentially withdrew from participation and sent comments at a later date which were addressed, we were given to understand, by Bruce Power. The SON subsequently provided us their comments and

we requested at that time that Bruce Power address them in writing.

CNSC staff also did a review of the comments made by the SON against the proposal that essentially was implemented by Bruce Power to monitor and we found -- we have essentially addressed -- some of the comments were essentially more in terms of principles and theory and not have a real impact on the approach that was implemented and in other cases we found that those comments should be addressed at a later phase.

But I will ask Andrew McAllister to provide the details.

**MR. A. MCALLISTER:** Thank you, Dr. Thompson. Andrew McAllister, Acting Director for the Environmental Risk Assessment Division.

So to pick up the thread that Dr. Thompson laid out, in December 2013 Bruce Power had responded or dispositioned the August 2012 submission that SON had attached to their CMD. That was in your package.

Not too long after that, the dialogue started up again in between the Saugeen Ojibway Nation and CNSC staff through a series of meetings that have been identified in the submission by the Saugeen Ojibway Nation. One of those things was to get a better handle on what those issues were.

We have looked at their comments and we have also looked against what Bruce Power had in its final disposition, how it treated them. We are generally comfortable with that, but noted that there were some things that would warrant further discussion and that really set the stage for this additional dialogue that we have been having. As you can guess, with 296 comments, that is a large pool and we are trying to get it down to a reasonable number of topics to look at.

That really became the focus of discussions that we had in October of this past year with them to get a better understanding from both perspectives on those matters. The take away from that was that we had our views on what those themes should be. The Saugeen Ojibway Nation and their technical supporters led by Dr. Crawford felt they were in a better position to put them in buckets, so to speak, and to have that then become the basis for further discussions. So we continue the dialogue with the Saugeen Ojibway Nation and that narrowing or focusing of those comments into those themes will serve as the basis for those discussions moving forward.

**DR. THOMPSON:** Perhaps if I could add before perhaps others speak, as Mr. McAllister mentioned that technical -- the first workshop took place in October and there was a commitment then by the SON to submit the

comments in buckets, as Mr. McAllister just mentioned. We haven't received that proposal yet so we haven't moved forward with scheduling a workshop, but in the interim, what I would like to re-emphasize is that the entrainment/impingement methodology that has been adopted by Bruce Power was reviewed and it is essentially very well aligned with best industry practices and aligns with the methodology that a large number of other facilities have used and has been shown to be robust and reliable.

**MR. SAUNDERS:** Yeah, I think the ground has been covered fairly well. Frank Saunders, for the record.

I think just a few points. In 2007, you know, the SON expressed concern that the follow-up program wasn't going to meet their needs entirely and that they had some special concerns they wanted to look at, so we did agree to fund a program through the University -- through the SON and the University of Guelph to look more specifically at their concerns. So that work proceeded at the same time as the follow-up program proceeded.

We did look at the comments from Dr. Crawford. Some of them we did agree were relevant and we implemented them; others may be relevant and in fact impact the research directly and so we set them aside at this point in time.

You know, and I think a lot of experts want expertise involved in setting up this program and there's one thing I've learned from the experts is you'll get a lot of different views of exactly what the program should look like, but we did need to move ahead and do the work and research allows you the opportunity to go back and do other things again if you find out you don't answer all the problems. And so we proceeded to get the work done.

**THE PRESIDENT:** So just on this particular item, as we move forward, I'm trying to figure out where we are, where's the -- is there remaining disagreement? Maybe Dr. Crawford can clue us in as to what needs to be done now to get all the parties to agree on a way ahead.

**MR. MONEM:** Perhaps before Dr. Crawford -- Alex Monem, for the record. Perhaps before Dr. Crawford addresses that in a finer grain detail, I think the way CNSC has described the process is accurate insofar as that from SON's perspective the next step is that we should have a technical workshop to explain to the CNSC the nature of our concerns.

Two ninety-six is a very large number. We do intend to try to streamline that by putting the concerns into categories or buckets, as was described. I'd like to re-emphasize, we've just now got capacity to do that, and so this work will proceed.

But to your overall point, Mr. President, the next stage from our perspective is a technical workshop with CNSC.

And perhaps I'll ask Dr. Crawford if he has anything to add.

**DR. CRAWFORD:** My name is Steve Crawford. I'm a sponsored faculty member at the University of Guelph in the Department of Integrative Biology.

As Alex and Randall have mentioned, SON-sponsored in this context means that prior to 2005 I was an employee of the Chippewas and Nawash working in fisheries management/fisheries ecology. We always maintained an active research program with the University of Guelph and Chippewas of Nawash entered into an agreement with the university.

Basically both parties stood to gain by having bits and pieces of me and my time, so for the university I do under graduate and graduate teaching and for the Nawash and SON I'm responsible for strategic and tactical evaluation and planning; and then for both, I engage in a research program that has three major research themes.

First is fisheries ecology; second is improving the role of science in management decision-making; and the third is improving communication

between western science and indigenous knowledge systems.

The work that I was doing prior to the relationship between SON and Bruce Power was strictly as a Nawash strategist, as an ecological strategist trying to understand how the CNSC was managing nuclear files and it was as a result of that that the very first submission with Chief Akiwenzie and myself -- and this is back 10 years now with the Commission and it was specifically at that level with the Bruce A re-start -- and Chief Akiwenzie spoke on the cultural and political and social significance and I spoke on behalf of the science side and said, listen, I mean, important things here are being overlooked. So for instance, lake white fish weren't even a valued ecosystem component, they fell off the table, so they weren't assessed in any way and it was difficult for SON at that point to accept the conclusion that the re-start was going to have no significant effect.

It was, as I was told by Chief Akiwenzie later, in part -- in large part as a result of that presentation to the Commission that the Commissioners decided that there was going to be a white fish follow-up monitoring program after the Bruce A re-start approval.

And so we were going from a period where things were broken in terms of the EA from SON's perspective and then the follow-up monitoring program was

going to be created in a collaborative sense, it was going to be inclusive.

And we went on for about a year in that follow-up program and it appeared fairly clearly after about a year that there were some significant interactions between people because it wasn't just SON and CNSC and Bruce Power that were involved, the Commercial Fisheries Association, the Ministry of Natural Resources which at the time Nawash and Saugeen were duking it out over fisheries, co-governance issues, so it was a complex environment politically.

The complexities of that political environment got to the point where SON made a decision to say, listen, we're not getting our issues addressed here the way that we want them to, so they withdrew from the follow-up monitoring program. That was a political decision on their part.

In the absence then there was basically radio silence and there was no interaction between SON and either CNSC or Bruce Power on technical or ecological issues.

There was, however, political -- high level political engagement and as a result of that high level political engagement myself, as at that point an

SON-sponsored faculty member at the

University of Guelph and Doug Boreham, who was at that point a Bruce Power-sponsored faculty, we were both tasked by our sponsors to get together and identify what would it take to create a collaborative research program that would address the SON's concerns.

And we did that and we came up with a pre-proposal that was known in the circles as the six-pager and there were five key ecological uncertainties that were identified between myself and Dr. Boreham.

The first one was population discrimination because we are at a very high degree of uncertainty regarding the distribution and abundance of lake white fish in that lake and, as a matter of fact, just yesterday I was in a technically facilitated session with the Province of Ontario on that specific issue because we've been fighting with the Province of Ontario that their fisheries management program equally needs to understand population discrimination to make those population level decisions. It's exactly the same argument for scale and EA effects as it is for the Bruce Power file.

So key ecological uncertainty is population discrimination, number one.

Population modelling in terms of having quantitative models that will help you to predict the consequences of harvesting and/or management or mitigation

and evaluate the effects of things like the sources of mortality that are natural, mortality that comes from the fishery and mortality that is associated with the Bruce Power facility.

The three other key uncertainties were mortality by the plant with regards to entrainment and impingement, the sucking in of either the small or large fish; mortality due to thermal effects; and mortality due to contaminants whether they were conventional or radionuclides.

In that case then there were going to be five research projects and the McMaster Regina team and the University of Guelph team were going to be responsible for taking the different pieces.

Guelph was assigned population discrimination, population modelling and entrainment/impingement; McMaster Regina was assigned thermal and contaminants and we were supposed to work together as a team and we did so for approximately a year and something happened -- and I cannot tell you what because I don't understand really -- but there was a breakdown of epic proportions in terms of the research program.

The collaborative research program, we actually anticipated that there might be some hiccups,

there might be some problems in terms of the relationship, so we built in to the terms of reference a technical facilitator and, for reasons that I have never received an explanation of really, Bruce Power unilaterally terminated the position -- the person and the position.

And at the last meeting that I was at where there was any substantive discussion about research at all, it was explained to me by Bruce Power that collaboration in this sense now meant collaboration amongst the Bruce Power-sponsored research program at McMaster Regina and it was at that level that collaboration was going to exist and not at the higher level.

So when I say a failure, I don't mean to be kind of blowing on sour grapes because it is what it is and I knew from the beginning that there were political relationships and political dollars, and so the most important thing that I was supposed to be responsible for was, as the principal investigator for the University of Guelph team, was to keep -- well, Vice-President Mancuso said, you do everything that you possibly can as a researcher to satisfy the deliverables in the research contract and make sure that you do it in such a way that an independent third-party review that comes in afterwards will be able to say, yes, you made the appropriate decisions.

So -- and just to get back to a previous comment that was made, throughout this time we added two sponsored faculty position members at the University of Guelph, one was Dr. Rooney in the School of Environmental Science and he's like me, he has teaching, research and service responsibilities; and Dr. Gillis in the School of Computing Science and he's a math/stats guy.

Dr. Gillis and myself were on the University of Guelph side of the research team as well as Dr. Hanner who was not a sponsored faculty member, he's responsible for genetic analysis and identification of larval fishes, and Dr. Andy Binns who at that time was a postdoc in hydrodynamics with us because we needed to understand water flow and he's currently at University of Waterloo.

I sort of apologize for taking the long way around in describing the context, but I think the first question was a very good one because what is a sponsored faculty member in this context when, in fact, there were two and they were deeply involved in the development of the collaborative research program as originally envisioned which morphed into two different research programs that are, as of two and a half years ago, independent.

So the first time that I've heard from my colleagues at McMaster and Regina about the research that

they're doing in a capacity like this, I mean, it's today.

Are there any questions or comments regarding that part of the story?

**THE PRESIDENT:** Oh, I'm sure there's lots.  
--- Laughter / Rires

**THE PRESIDENT:** And I don't want to dominate here, I just want to -- thank you, by the way, for sharing the history, I think it's the first time I hear all the ins and outs in this, and without dwelling too much about the past, I'd like to hear from Bruce, so this -- what the future would look like, but trying to get all the parties collaborating on the science.

We are not in the political arena here. We are into the science, and that is really what we are interested in, how to move forward on this.

So first Bruce, maybe then Staff, and then maybe a view as to how do we move forward on this?

**MR. SAUNDERS:** Yes. We have introduced a number of different subjects there, so I am not quite sure which one to start on.

In terms of the collaborative Lake Whitefish Program, we provided the funds both to McMaster and to the SON, and the SON managed that program to Guelph. There was no real politics in it as far as I was concerned. They were two research programs and, as much as possible,

worked together.

We became dissatisfied with the level of work we were seeing in the one program and we couldn't reach any concurrence or agreement on that so, yes, the relationship soured a little bit. We were spending a lot of money, we weren't seeing the results, and those concerns just weren't being addressed.

However, it is our intention to continue to fund research. I think you have seen from our efforts so far that we are keenly interested in understanding the science much better, because with science comes understanding, and that understanding allows you to, you know, take action, and predict the future and do things that are concrete.

Whereas, you know, when you are guessing at what the problem is you are also guessing at what the solution is. So the science is appropriate and we will continue to fund it. Our only requirement is that it be good science, produce work and can do things that are useful for us.

**THE PRESIDENT:** Staff?

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

You have heard some of the history in terms of the issues in terms of participation in various

aspects of the work.

And so for the CNSC and the direction given to CNSC Staff by the Commission at the time was to work collaboratively to develop a follow-up monitoring program that would meet the requirements of the environmental assessment legislation and would provide information to the CNSC on whether the impacts were the same or greater or less than what had been predicted during the EA.

We believe that the work that has been done meets the requirements of the legislation and has provided information data that we can use to make recommendations to the Commission in terms of the level and significance of impacts of the Bruce facility.

Ideally, all stakeholders would have continued to participate. But there comes a time where, as the SON have mentioned, that they did not see that participation would serve their interests.

We have, over the years, continued to work with the SON as much as possible. We have kept the relationship, I believe a respectful one. We have attempted to deal with both policy issue and technical issues, and we will continue to do so.

But in the interim, we have seen this morning the results of the NSERC funded research. We are

aware of the research that Bruce Power is co-funding, we are tracking the results of that research.

But to date, the information and the methods that have been used to do the assessments both under the NSCA and the *Fisheries Act*, in our view, are sufficient to make the types of conclusions and the types of recommendations that are needed under the legislation.

We would, as we would with any other research, continue to monitor the research. There has been a number of occasions, the Commission is aware, that when new science has come to the forefront that we have made different recommendations and we have required additional mitigation measures or changes to the processes.

To date, the information that we are seeing out of those research programs is not leading us to believe that the assessments that we have made using the data generated by Bruce are wrong.

We still believe that, you know, the level of impact from the Bruce station is understood and is of a level and nature that is not causing either significant harm or unreasonable risk to the environment.

We will continue to work. Some of the issues that were brought up by Dr. Crawford was the lack of inclusion, for example, of lake white fish in one of the old EAs that were done.

At the time, the valued ecosystem components were identified through stakeholder workshops. The fish species that had been selected were both sensitive to heat, to thermal discharges, and were being entrained and impinged.

So from an EA point of view, the data allowed us to make conclusions on both thermal impacts and, more generally, on fish. We did agree and we did move forward with the follow-up monitoring program to include lake white fish as an additional valued ecosystem component to address the SON's concerns.

And so we will try to address their concerns as much as we can. But at some point we have to weigh the evidence in front of us and the data needed to move forward with decisions that the Commission has to make.

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

Just to compliment Dr. Thompson's answer. From a regulatory decision perspective, do we have enough information to render a regulatory decision and recommendation to the Commission? The answer is yes.

As research goes on and the progress with respect to the information that is being provided, as Dr. Thompson mentioned, we have to look at the science and the methodology and what is being produced.

So I would just like to summarize two things from regulatory position perspective. Staff recommendation to the Commission is solid with respect to the currently available information.

Based on Dr. Crawford's testimony this morning, it is evident that we have to press the reset button here with respect to collaboration on the research itself. And we will be updating the Commission in due course through the annual report.

But again, I would like to summarize the fact that as we stand today from a regulatory decision perspective and the information we have, we do have a solid recommendation for the Commission based on the impact, the assessment, and the validation with respect to the *Nuclear Safety Control Act* and the protection to the environment.

**THE PRESIDENT:** I would like to open the floor our commissioners on this particular subject.

Ms Velshi?

**MEMBER VELSHI:** Is there anything that the Commission can do to facilitate this collaboration moving forward? Everyone says, yes, we should, but where is the impetus to make it happen? And I am looking at all three to see how do we make this happen?

**MR. SAUNDERS:** Frank Saunders, for the record.

You know, we fully intend to engage with the Saugeen Ojibway Nation, especially on the EA follow-up some more and on the -- because as it produces results, you know, we produce those results, we distribute them and discuss them.

And on the DFO application in particular. We have I think a strong and healthy relationship. That doesn't mean that we agree with everything or we agree on everything, but we will continue to press forward. I don't think any of us are going to go back in our corner and stop talking.

So, you know, that work will happen and, as we move down the engagement process with DFO it is all on the same subject area, quite frankly, so I think there will be a natural impetus to move forward there.

**MR. MONEM:** From the SON science perspective, I would think it is reasonable for us to have come to the conclusion that we have lost confidence in the ability of the SON/Bruce Power direct relationship to work in terms of providing reliable knowledge about the predicted consequences of the operations of the facility.

More recently, I think we have become -- we are concerned that our relationship with the CNSC Staff regarding the implementation of science and the EA methodology is not directly workable either.

Because we have expressed concerns directly to them at the meeting that was referenced at Nawash in November. It was basically a turning point for us, because it became clear at that point that CNSC had basically dismissed the University of Guelph team's science EA comments about the proposal about the follow-up monitoring program.

And at that point we kind of asked them, well, what is really the point in having a discussion if you have already approved Bruce Power's dispositions and effectively dismissed the 296 comments?

I guess where I am trying to get to, in the most concrete way possible, I think we are in desperate need of competent independent science EA facilitation in this case. I think we have four parties; I think we have Bruce Power, CNSC, SON, and competent independent science EA facilitation.

**THE PRESIDENT:** How does MNR fit into all of this?

**DR. CRAWFORD:** I am sorry, can you please restate?

**THE PRESIDENT:** The Ontario Government.

**DR. CRAWFORD:** Ministry of Natural Resources and the Saugeen Ojibway Nation are in a co-governance agreement regarding the management of the

fisheries.

And so when I described in a general sense the environmental assessment has to take into account all sources of mortality, so there has to be an assessment evaluation of natural mortality. And then the fisheries mortality, which is the SON fisheries. And then the Bruce Power operation and/or development mortality.

So all three of those have to be combined in an assessment of this nature.

The Ministry of Natural Resources clearly recognizes the critical importance of population discrimination and population modelling, as we do here, but for their fisheries management purposes.

**THE PRESIDENT:** So it seems to me that they have their own scientists, right? So you have the Ministry of Natural Resources, you have the Fisheries and Oceans, you have the University of Guelph, you have Regina/McMaster team, you have CNSC, all scientists.

You are telling me you guys cannot get together and agree on a move forward?

**DR. CRAWFORD:** I am telling you that we can.

**THE PRESIDENT:** You can or cannot?

**DR. CRAWFORD:** We can, in the affirmative.

**THE PRESIDENT:** Okay. Oh, I thought you

were really negative about ever going in and you want to bring in a fifth person, like an independent.

**DR. CRAWFORD:** To guide the discussion, because that is where it was breaking down; we were either not having discussions or the discussions were falling apart.

**THE PRESIDENT:** Okay.

Ms Velshi?

**MEMBER VELSHI:** I think that is fine for now on that.

But if we can pull out slide 7 from the CNSC's presentation of last night, I would like to get the SON's reaction to that.

This on the environmental impact on all species in Lake Huron from Bruce Power's operation.

Yes, that one.

In your submission you had said that you believe that CNSC staff have been premature in concluding that there has been negligible impact. Can you comment on that slide, and what your thoughts are on that, please?

**DR. CRAWFORD:** Comments from the SON's science side are basically -- it was triggered by what Mr. Monem had said previously. From a science EA perspective, we have serious problems with the way that the impingement and entrainment monitoring program is designed as a method.

There are assumptions that are made that should not be.  
There are factors that are in there that should not be.

We have a great deal of concern that it's low-balled: the numbers of larvae that are being represented as a result of this program and the impingement of larger fish. We believe that they are grossly underrepresentative of the impingement and entrainment -- likely to be underrepresented given those concerns.

**MEMBER VELSHI:** If those numbers were accurate, the 6,100 or so kilograms, would you agree with the conclusion that's a negligible reduction in fish population?

**DR. CRAWFORD:** Well, I think you said the magic word there, because the word "population" doesn't show up. It's simply a pile of dead fish. It has to be put into a population ecological context in order for the kind of evaluation that you seek to have any meaning. Simply to say that it's a certain number of fish, or even that it's a certain proportion of the catch, doesn't really get at the ecological assessment that you seek.

**MEMBER MCEWAN:** But if the quota is set on science -- and you've just said it is -- you've implied that it is, I'm sorry -- then there must be some validity to those data.

**DR. CRAWFORD:** That was the subject of

approximately half of yesterday's discussion, because the Ministry of Natural Resources has finally come to the recognition that their quota management areas do not reflect populations, they're administrative areas only.

**THE PRESIDENT:** So what are they going to do about it?

**DR. CRAWFORD:** We've entered into independent science technically facilitated discussions, and we are going to fix that system.

**THE PRESIDENT:** But how? Are they going go down to population discrimination and all this stuff? How are they going to do that?

**DR. CRAWFORD:** That is currently what we're doing. I spent approximately two-and-a-half months compiling all of the science primary technical information regarding population discrimination of Lake whitefish in Lake Huron and I spent approximately three months collecting the single-most comprehensive assessment of spawning phases like whitefish in all three basins, and that is available for analysis.

We are in a very good situation to do this work.

**THE PRESIDENT:** Could you share this material also with everybody? CNSC? Bruce?

**DR. CRAWFORD:** It is available. Yes, it

is part of the product of our University of Guelph research project for SON and Bruce Power.

**THE PRESIDENT:** Just so I understand, according to you, you are able to have some hard data on population discrimination, and thereby argue with the Ministry of Natural Resources what the new quota should be?

**DR. CRAWFORD:** All of these things, yes. We're in very good shape for that.

**THE PRESIDENT:** CNSC, do you have access to this data?

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

I'd like to make a number of points.

Our assessment is based on data that has been collected over a number of years. The methodologies have changed over time. The most recent approach used for monitoring is the one -- and I've been told a few minutes to avoid the acronyms, and earlier I said EPRI. It's the Electricity Producers' Research Institute and methodology for entrainment and impingement monitoring.

We've used that data, and essentially that program is backed by a number of scientific papers. The calculations, in terms of the amount of fish that is killed, is also, we believe, fairly robust. CNSC staff did inspect -- in addition to approving Bruce Power's program,

we also did inspections to make sure that the program was well implemented, and we've had additional discussions on it.

In terms of the issues that are being raised in terms of having facilitated an EA technical discussion or a scientific EA science discussion, CNSC's approach is essentially scientifically validated. It is an approach that has been used and is based on guidance documents that have been published by many national organizations. It's a tiered approach, and, as in any tier program, we look at the level of impact to move from tier to the other.

Dr. Crawford is right: population modelling can be important and can be necessary when the level of impacts are significant enough that we have to judge whether they have a potential to impact significantly a population. In this case the numbers have always been very low, and so, in our view, population modelling is not necessary. If the Bruce station was having an impact on local populations, we would not be discussing EA science, we would be discussing compliance and enforcement.

We're not seeing the impacts that population levels would be impacted. We have reviewed this information for years. We have compared it to the quota, and we've also compared it to the SON's harvest, in terms

of the fisheries. Our understanding is that the quota are based on having sustainable fisheries' resources over the long term.

I also believe the SON are responsible in terms of fish harvesting and the proportion entrained and impinged by the station is a small percentage of both the quota and the SON's harvest.

From that perspective, we believe that the impacts are low and would not be having an impact on populations. We would definitely go to a higher tier of assessment, including population modelling, if it was required.

**THE PRESIDENT:** Any -- Dr. McDill?

**MEMBER McDILL:** I have some other questions as well, but I'll just come back.

I think I am -- excuse me -- I think I'm the only commissioner today who was there then. Without the transcript in front of me, I can't recall precisely what the direction was to make a follow up monitoring program, a FMP.

What I would express is my disappointment that anybody withdrew at any time without coming back to the place the follow up monitoring program initiated. There have been opportunities for staff and for Bruce and for the SON to come back here, and I don't know why that

didn't happen.

My question is, at this point, without -- we can't undo history, but did it not come back to the Commission?

**MR. SAUNDERS:** Frank Saunders, for Bruce Power.

The follow-up program composition wasn't the specific requirement. We put it together and we agreed with staff what the composition would look like. When the SON expressed a desire to withdraw and do something differently, you know, staff was informed and well aware of that. None of this was being done in secret or behind closed doors.

The intent was to provide SON with the specific opportunity they wanted to look at a number of issues, and population discrimination, and understanding the population in general, was one of the big factors that they discussed, so we felt that all the things we were doing here were an enhancement to the EA follow-up program, not a detraction from it, so...because the program certainly never envisioned the level of research that we've undertaken. It was simply to be a monitoring program, looking at, you know, what the actual temperatures were and what the impingement and entrainment.

In our view, we went well beyond what the

actual committed requirements were to do this work.

**MEMBER MCDILL:** Staff?

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

Your memory is quite good. The specific direction from the Commission was to engage the SON and other stakeholder in the development of the program. Having said that, no one can force people to stay at the table. Should we have reported it to the Commission? Maybe. Obviously, we didn't to your satisfaction.

Having said that, there's been a number of opportunities over time to have access to the information and to make comment. The SON did provide comments, and we have done our best to review them and disposition them. The fact that we felt that some comments were valid and had been addressed by Bruce Power -- some comments, we felt, should have been addressed, and can be addressed in another phase of the program, and we've identified those. In some cases we felt the comments, although valid to some extent, were not necessarily of a nature that would have an impact on both the monitoring program and interpretation of the results.

That's where we're at. We've identified in the fall our willingness to continue to work through those issues. We agree that a technical workshop,

facilitated workshop would be useful. Having said that, we, you know, can't force people to follow through on their commitments.

That's the first time I've heard today that, from the SON's point of view, they see no value in continuing the work in terms of consolidating comments in categories that we can have a discussion on. Our understanding was that they were working on categorizing and we would have a workshop.

**MEMBER MCDILL:** That brings me back to the middle table, the SON.

**MR. MONEM:** Alex Monem, for the record.

Just to clarify, Dr. Thompson's last comment, I did not intend to say that. We see a great deal of value in proceeding with a technical workshop on those 296 comments, and we intend to proceed with organizing those so that we can have an efficient discussion of those comments.

What I said is we are only now in a position to be able to provide the support to the University of Guelph researchers they need to carry out, which is -- which will turn out to be a fairly significant body of work. So I wanted to clarify that.

On your comment why didn't we come back, in -- during the Bruce Units 1 and 2 refuel and restart

hearings, SON did make submissions on this, and very helpfully, the Commission recognized the issue and wrote in its decision that the parties should work together to continue to address the concerns of SON.

And I think it's fair to say that, out of that direction was born the Cumulative Lake Whitefish Research Program.

And to your previous question, what can the Commission do now, I think that was a very effective approach, and maybe it could have been more effective if we had check-ins to keep everyone's feet to the fire.

And if I could make that submission that this would be an effective way for the Commission to retain some oversight over this to ensure that all the parties are working together, it would be of high value to the SON.

**THE PRESIDENT:** Mr. Jammal?

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

As the Commission is aware, as part of our licensing reform and now the annual report that we provide to the Commission on an annual basis, that is regulatory in nature, so we will commit to the Commission to provide you an update on annual basis with respect to the progress associated with the way forward according to what we just heard today.

**THE PRESIDENT:** Right. I think it's a good time to ask our friends from DFO to come forward because they introduced the DFO requirement now, and I'd like to hear from them their view about whether the population -- you know, measuring the impact on the population is large, will be sufficient, or will they require discriminatory -- the way I see it, I'm looking for a way ahead.

If Ministry of Natural Resources of Ontario going to change the quota system on -- based on some science that puts population discriminatory in -- as a fundamental concept, then Bruce and CNSC would have to take into account some of this stuff.

My question is, is DFO moving along the same line?

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

And yeah, several points were brought up here. And so first one I'll start with, you know, the question along whether impingement-entrainment numbers are correct.

At this point in time, we've been reviewing the impingement-entrainment numbers, providing support to CNSC through the MOU that we now have with you guys.

For me at this stage, the impingement-entrainment numbers are more than enough to tell us that they've met the discrimination of serious harm, in other words, death of fish that requires an authorization. So we've now got into, you know, a process of developing an authorization.

The -- one point that the Saugeen brought up as well was along the issue of concern that the *Fisheries Act* authorization would be static or it's not adaptable or would change with the knowledge and science that comes in the future, and so we can do that.

And this, I think, goes back to more answering clearly what you've just asked me about if the science in the future results in a change within the quota system and, therefore, it would need to be looked at and decisions we'd need to make if the authorization in itself, as it stands, is still valid and whether changes need to be made within it.

So our authorizations are not static. They will be set for a specific period of time. We have adapted -- we have sections in there which specifically speak to monitoring. It also speaks to contingencies, so if we find out that the monitoring is not really doing what we need to do, there's contingencies that allow us to change the monitoring process.

There's -- we talk about avoidance, we talk about mitigation, we talk about offsetting within the authorization. Each one of those as well have the potential to have contingency options put with them as well, so if certain targets are met, a new contingency must be put in place.

So again, the authorization will be developed or will be designed in a manner that does allow for acceptance of a new science.

**THE PRESIDENT:** Does it make sense to require annual reporting on progress here?

**MR. HOGGARTH:** There -- yeah, there is, typically, annual reporting in all authorizations, so there will be reporting mechanisms within it that will then be used for making decisions as we move forward with contingencies within the authorization.

**THE PRESIDENT:** Thank you.

Ms. Velshi?

**MEMBER VELSHI:** I have a question for staff that's a little more general, and it's around funding of science projects. And I had wanted to ask it this morning when McMaster and University of Regina were here, whether the funding was coming from Bruce Power or co-funded by them.

And then it was more on perceptions of

that, but now that you'd said that funding for the Guelph research was cancelled because the results weren't coming in or they weren't good or whatever. And it was when there is science that is being developed that other stakeholders depend on, what's the general sentiment around a proponent funding that directly?

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

The CNSC, we have the research program, and as you've seen there the research collaboration between CNSC and COG, so it's CNSC, as a matter of fact, triggered, and then industry driven the research, as the proponents.

Through our research program, we, as staff, can initiate the request for funding for the research program itself, and we are looking at -- the primary investigators within the CNSC will go through the process and, at the same time, we'll look at the research that will support regulatory decision making.

So we hear the discussion this morning, and definitely we're going to take it back and then determine the fact if it's what will be our next steps with our colleagues from Dr. Thompson and her directorate, for us to look at the feasibility of the research, is there a need for funding from the CNSC in order to expedite the process or make sure that we have a sound regulatory

decision.

So the research is always in support of our regulatory decision-making process, but we don't have a big pot of money, so it's based on priority.

But we are considering now -- based on this discussion, we'll look at the -- what needs to be done from a research perspective.

But again, as we stand today, from regulatory decision making, impingement, entrainment on the methodology being used is based on the best available, best practice as Dr. Thompson mentioned. And so we have enough information for us, as DFO has mentioned in their presentation and the discussion.

As we stand today, we are making the regulatory decision based on the best available information we've got, and then we will work towards the future. But we will definitely look into a research element and the feasibility of the research for our regulatory decision.

**DR. THOMPSON:** Perhaps if I could add, Ms. Velshi, to speak more in terms of the fact that it's industry funded.

What we've done, for example, there's work that has been initiated by COG to deal with some of the thermal issues that we've talked about for a number of years where the study that provided us the change in

temperature that could affect egg survival, for example, was dated. And so COG had undertaken to do that work, and essentially, industry has said that they would update their assessment once the COG research was available.

And so for us, the requirement was that when -- the study would be well designed, that we were able to independently review it. And it's one of the requirements that if the proponent, the applicant to licensing, will use research, regardless of where it comes from, to support their application, it has to be available to us so that we can independently and critically review it.

**MEMBER VELSHI:** Thank you.

So I understood that, the independent verification, but maybe I can ask Bruce Power on your decision-making process, which would this be funded by us directly or would it have greater credibility if we were to find another way of funding it, through COG or CNSC.

**MR. SAUNDERS:** Yeah, Frank Saunders, for the record.

First, I should just correct something you said. We didn't cancel the funding for the Guelph project, approximately 800,000 of the not quite \$1 million, has been paid and the rest is just waiting on the report. What soured a bit, perhaps, was the relationship and the level

of back and forth, but the project is still being funded.

So in general, I think --

**MEMBER VELSHI:** Wait. I'm sorry.

So what, exactly, got cancelled, then?

Nothing got --

**MR. SAUNDERS:** Nothing got cancelled, in my view, at any rate. We didn't cancel anything.

**THE PRESIDENT:** Wait a second. I heard that there was supposed to be an independent third party mediator of some sort. That was cancelled, if I understood correctly.

Dr. Crawford, did I get it right?

**DR. CRAWFORD:** Yes, you did get it correct.

**MR. SAUNDERS:** Not specifically part of the contract, and we did talk a number of times on putting the names back and forth. We never actually managed to successfully come up with an individual to do that.

However, you know, like I say, that water is sort of under the bridge.

I think that the larger issue, then, of funding projects -- and it's a struggle for us as a private company, right. We want to be able to do the science, we want to be able to compare with good data so that we can draw the right conclusions. But when you look, then, to us

and say, "Well, we don't really understand enough what's going on in Lake Huron and Georgian Bay with the entire population", as a private company, we say, "Well, you know, that looks like kind of a big chunk to bite off, you know, for us to do on our own".

So we're very happy to co-fund and to help and encourage groups like in SERC and others to help participate in that funding, and we would dearly love to see, I think, given the predictions of climate change and where the -- where we think the lakes in the world may be going to see a lot more interest in funding this research and understanding exactly what those differences would be. And we certainly are out there trying to encourage people to do that.

I think some leadership from some government agencies would be most welcome and most helpful in this area is my personal belief because I think it's much more than one private company on the east side of Lake Huron can possibly manage on their own.

**MEMBER MCEWAN:** So the McMaster project was a formal industry-NSERC collaborative externally reviewed grant?

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

There's two McMaster projects. The initial project has come out of the collaborative program

we discussed with the Saugeen Ojibway, and based on that work -- that was about \$1-million program on its own -- based on that work, we were able to apply, and supported McMaster too, for an NSERC grant which provided a little over another \$1 million, and that million was more focused on the Round Whitefish. The first program was focused on the Lake Whitefish.

**MEMBER MCEWAN:** So I'm going to try to make a very simplistic characterization of what I think I understand, that reading through the 296 comments I found it very, very difficult to understand which of those comments were critical and which were important, and which were less important and may be related to a minor issue. That was certainly, for a lay person, very difficult to work out.

But if I understand this conversation correctly, we are now at a stage where the process so far is being judged, Dr. Thompson said, by current science, current methodologies built upon this science. Your concern is that current science and current methodologies may not be sufficient to understand both the local and the broad population effects; have I got that correct?

**DR. CRAWFORD:** Yes, you have it correct. This is a process issue. It has always been a process issue. So the 296 comments that were submitted in our

report, that was a direct response to the CNSC Follow-up Monitoring Program. This is after Bruce Power and SON had normalized in their relationships.

So the McMaster-Regina Team was invited to the workshop that created the draft of the Follow-Up Monitoring Program. Our team, for whatever reason, was not but we received the draft and we felt that it was -- because we have been assigned responsibility for population modelling, discrimination and entrainment impingement especially, that we generated a report that gave those concerns.

The 296 comments that you see is in direct response to a document that was provided by Bruce Power. So that's why it's kind of out of context and needs binning. So the 296 comments then are directly related to that process and the Follow-up Monitoring Program specifically.

**MEMBER MCEWAN:** So, again, if I understand the implication of what you said in those 296 comments, what you are proposing is -- some of the changes that you're proposing would be based upon what you believe will be the findings from, if I can call it simplistically, the new science as opposed to the current scientific understanding?

So the research that you've done so far,

which sounds like an awful lot of data gathering and an awful lot of understanding the relative distribution of those data, will ultimately lead presumably to publications that will start defining what this new science could be?

**DR. CRAWFORD:** That is exactly the case. I believe that we're at a crossroads right now with regards to EA and science methodology in this country.

For instance, the reference back to the EPRI Standards that the CNSC staff were making, those are methodologies that are developed by the power industry in the United States of America and this is now a United States government that has decided in their final rule from 316(b), their administrative power regulation, that they no longer require population level ecological assessment.

I think the Canadians have a different norm, a different standard. We say that's still very much part of our discussion. So there's a huge flux in terms of where science and the environmental assessment methodology is right now but more importantly where it's going to be.

**MEMBER MCEWAN:** So, from our point of view, from my point of view as a Commissioner, how do I then square the circle of a requirement to provide a decision on best available science now as opposed to what may well be best available science that is different from current science in one year, two years or four years

forward? How do we square that circle because you've raised the question but you haven't provided us with a pathway to answering it?

**DR. CRAWFORD:** In my recommendation that there be an all-party forum with appropriate independent science EA facilitation, I think that we address those first two questions amongst ourselves: how do we reconcile our work that needs to be done now with the existing methodologies and how should the future methodologies be developed.

**THE PRESIDENT:** So, just to follow up on this, just to follow up because we really want to come up with a practical way ahead, the new methodology, to just use the same -- the new science has to be seen to have a new impact. We're looking at the impact on fish. So I don't care if it's old science or new science, I want to know what is the impact on fish and how it relates to DFO authorization. So it seems to me if you've done all this research, it should be a simple matter for all the scientists to get together in one of those things and agree as to what is the impact, and given those impacts, are there any mitigations possible. Is that a way ahead?

**DR. CRAWFORD:** I believe that that is a reasonable proposal from the science side of things.

**THE PRESIDENT:** Okay.

You want to comment on that?

**MR. SAUNDERS:** Not on that in particular but I think you see a little bit from the discussion the quandary that we find ourselves in as an operator and a private company trying to, at the one end, prove to yourselves and DFO and Environment Canada and MOE and Natural Resources Ontario that we have a sense of what's going on and what the thing is. At the same time, the science is changing and the climate is changing and we need to be able to quantify it today, as you say. Otherwise, we get stuck in never doing anything.

And it's the same with the EA follow-up. We can stop and talk about it forever and a day but with the plants restarting and we needed the data before they started and after they started in order to do the comparison. So at some point, you have to go ahead and actually do the work, right, and get the science. And if the science changes, then you go back and you do it again and you keep adjusting and understanding that it's a living effort.

And from my point of view, I suspect we'll be doing environmental research for as long as the plants operate and I think that's the philosophy we need to have. We do need to do the work today. We need to make the best judgments we can today, you know, being as conservative and

realistic as possible, and at the same time move ahead with research.

And still, as a private company, that research has to be reasonable that we could obtain it, right? I don't think it's reasonable to say that, you know, Bruce Power ought to support the whole understanding of Lake Huron and Lake Superior and Georgian Bay and that whole combination of fishery.

We're certainly willing to do our part and I think, compared to most companies, we do more than our part, and we're willing to lead and push this thing along but I do think it's going to take something more than just us to make all that happen.

**THE PRESIDENT:** Dr. McDill.

**MEMBER MCDILL:** I think Dr. McEwan (off microphone) what I was going to come to next, so that's fine.

But I would like the SON, if possible, to answer the question: Why did you not come back to the Commission? If I may ask the SON to answer the question. Thank you.

**CHIEF KAHGEE:** Randall Kahgee for the record.

It's a good question and I really don't have an appropriate answer for you. I apologize for that.

What I would say is this, if I can.

Listening to all of this, there's a lot of history to this issue and these issues. Some of it is not a good history, some of it is a good history. There's certainly been some efforts to try and work through these issues, not always to either party's satisfaction. There's always going to be disagreements.

What I do know is this. Our people fought to have that right recognized for over 150 years. We knew it was something that was always inherent of us, a part of who we were as a people and a part of our relationship to the Territory.

What we know now and what we've always had concerns with is the ongoing interaction not only with Bruce Power but the industry's operations within the Territory and its interaction with the waters and the fishery. I think it needs context, if I can.

We don't have the luxury of what ifs. We need to know with absolute certainty, the best we can, the best precision we can, whether or not the facility is having a negative impact on that right or not. So there's a real sense of urgency to this issue for our people and for our communities. That victory did not come without a hard fight and it was a long road to get to that decision in *Jones and Nadjiwon*.

So I sit here today and I'm listening to all this history and I'm also concerned about what is the path forward for this. And correctly, as Mr. Saunders said, there is a lot of water that's gone under the bridge. I don't necessarily agree with everything he said. I sat there in my capacity as Chief for eight years and I'm quite knowledgeable about what the history was and what it wasn't.

But I'm more focused on what the path forward is because today as we sit here, irrespective of what the CNSC says, irrespective of what Bruce Power says, I still don't have that certainty. Our people still don't have that certainty and they demand it because this is a fundamental part of who we are and our relationship to this Territory.

This is not about having a conversation. The issue is, as Mr. Monem framed it early in his submissions, you have a potential infringement on that right. I want to make that point very clear. This is not something that has been asserted. This is something we have fought 150 years to have recognized in Canadian court, that that Aboriginal treaty right exists. Our concern, is it being infringed upon? If it is, what is the appropriate way to make sure that that right is protected and the fisheries sustainable for future generations?

So my frustration in all of this is in the urgency of having these questions answered. And there is another part of that conversation that is not in this. We should all be humbled by that because we get caught up in the glorification and beauty of our Western science and there is the knowledge our people bring to this conversation and that has yet to be reconciled in this conversation.

So I am a little bit frustrated and I am not interested in pointing fingers about what could have and should have happened. I am more interested in what the path forward is. And I will say this for the purpose of the CNSC, given what I have just said, the process is important. We will have to have confidence in that process, that it is going to be robust enough to take into full consideration our concerns, and that we are fundamentally a part of shaping that process so that we can have confidence in whatever the mitigations need to be. This is not an exercise where conclusions are made and where they come back and were addressed afterwards.

What are your thoughts on the offsets? What are your thoughts about the mitigation? That is a recipe for conflict and I will predict if that is the process in which we are going to find ourselves, we will be here five years from now having the same conversation. So

that's what I would say.

--- Applause / Applaudissements

**THE PRESIDENT:** So I think Dr. McDill's question was exactly about your last points, that we were surprised you didn't come to this forum earlier and say you are not happy with the process. Because we are, if you like, the overseers of the process and that's why we now instituted this annual report where many of those issues -- they are comments on progress or lack of progress, which brings it to our attention and then forces us to take a decision on how to fix some of those issues. So we have the same objective, the same urgency.

**CHIEF KAHGEE:** Randall Kahgee, for the record.

I can assure you now that we are fully aware that that opportunity is available to us we will exercise it to the fullest.

**THE PRESIDENT:** Thank you.

Dr. McDill...?

**MEMBER MCDILL:** There are two contributions coming from here.

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

We are cognizant of probably what the SON would characterize as a process break down and lack on

occasion of being able to work effectively together. I have on more than one occasion mentioned to both Mr. Monem and Mr. Kahgee that having a process where the SON are engaged with CNSC for periods and then then they go off and work with licensees for a period and then come back when things may not be going well isn't conducive to a straightforward process where, essentially, the CNSC can discharge its crown duty to consult and, if needed, accommodate. And so I agree the process is important, but there has to be a process that all parties agree to and that is followed through even when it becomes difficult.

In terms of the issues that have been discussed and a potential path forward, I see it in two ways. We keep talking about the 296 comments on the EA follow-up. We have made it clear that the EA follow-up program had -- and Mr. Saunders mentioned it as well -- there were requirements to implement the monitoring program for a period and then should refurbishment go ahead there are other phases in the follow-up program that will need to be implemented.

And so we had been clear with the SON that, you know, the program that has been wrapped up we can't do anything about. The program that is to come, we can still work with them to understand what the issues are and try to adapt and modify the program to the extent

practical. So I see that is one track for a path forward.

The other track would be Dr. Crawford mentioned while he was raising some issues and discussing about the MNR and SON relationship in terms of fisheries management that he has been collecting and compiling new data and so if that new data is germane to the discussions and the ability to look at population level impacts and look at the impacts of the Bruce station in a different way, we would need to have access to that information so we can review it, make sure that, as we do for any other science, that it is credible, well done and we can trust the data. Once we have done that analysis, it can be done with the SON, then perhaps we can move forward in that fashion, as well to look at station impacts in a different way.

**MR. MONEM:** Alex Monem, for the record.

In response to comments Dr. Thompson just made, we understand, SON understands that decisions have to be taken at points in time. We also understand that there is nothing you can do about that program as it was implemented four years ago, but where I would suggest we do have an opportunity prior to refurbishment to reconsider the quality and completeness of that data that came from the follow-up monitoring program is now in the context of the *Fisheries Act* authorization and from our understanding

that data is just being imported without question into that new process and it is for this reason we understood CNSC to be coming to us now to discuss our concerns in that 296 comment document.

That is why we have said that it is critical that we do that now. We understand it so everybody, CNSC, DFO and others, can have an understanding about the quality and completeness of that data using current understandings of the status of the research and status of methodologies. So I would not want us to blunder into another round of another term of regulatory review without assessing the quality of that data.

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

I understand the point being made. I would disagree that we have just adopted the data without questioning it and looking at validity, but I don't think we can get any further today on this, but I think if you would allow us, Ms Caroline Ducros, who is the Acting Director of the Environmental Assessment Division -- she is also responsible for the *Fisheries Act* authorization and process -- she would like to address some of the points that have been discussed so far.

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

I just want to go back to one of the points that Mr. Monem made in the SON submission about the process that we are following for the *Fisheries Act* application. I think the understanding is that an application has been received and I wanted to clarify that we haven't received a draft application for the *Fisheries Act*. What we received on February 2, 2015 from Bruce Power was a draft self-assessment on whether or not there was a need for a *Fisheries Act* application. So it was an assessment on whether the impingement and entrainment numbers constituted serious harm.

We went back and spoke with Bruce Power on March 6 to talk about those numbers and some of the assumptions that were made in coming to the estimates that they had submitted and there were some -- there were some assumptions that we needed clarification on, there were some outstanding issues that we wanted more honing in on what the number really was, and then on March 31 we received a revised draft assessment of the number.

So we haven't made any final conclusions on any application aspect yet. It is our expectation that Bruce Power does engage with the Saugeen Ojibway Nation on those numbers and on March 31 we received a letter from Bruce Power committing to doing that. So there hasn't been any rubberstamp final conclusions.

I know in our presentation we said we were comfortable with those kind of numbers, it is an iterative process and there are still some outstanding elements that we would like to clarify a bit, but we also do want Bruce Power to be engaging with SON on those numbers. So I just wanted to clarify, there hasn't been a draft application submitted yet.

And I guess another aspect that I wouldn't mind clarifying, if you will let me, and I think DFO, Tom Hoggarth mentioned this a little bit, but I just wanted to clarify, in terms of -- and I agree with what Mr. Monem said, the process is that you check avoidance, then mitigation, then offset measures. And we have every intention of doing that.

The application process requires that Bruce Power puts in what avoidance measures, what mitigation measures they have before and then the final residual impacts for serious harm is what happens after avoidance and mitigation. It is an existing facility and there is an existing facility policy statement and if you need more clarification on that I think I would pass that over to DFO.

But some of the mitigation measures that Bruce Power has put in place are available, including deep water intakes, velocity caps, chain rope barriers to deter

fish, but those will be clarified in a draft application when we get one. And I think that's it.

**THE PRESIDENT:** Bruce...?

**MR. HAWTHORNE:** For the record, Duncan Hawthorne for Bruce Power.

I obviously have arrived just now and I have been watching the podcast with interest and listening to the submissions on this topic and I wanted to make a couple of points clear on behalf of Bruce Power.

First, I kind of view this thing as the 3Rs. The first "R" is the requirements. We had requirements from the EA. We had requirements to do follow-up monitoring, which we have done. We had requirements to add to that a whitefish sampling program, which we funded and supported and we have continued to meet those requirements.

The second "R" is related to the results from those surveys. We have provided results. We have provided supporting data. As you heard from some of the early presentations there are still ongoing activities and analysis and although it all looks promising it is still in process.

And the final "R" is related to relationship. I would tell you that we are very keen and doing all of this in a collaborative manner. We understand

these are very important topics to the SON, as they are to Bruce Power. We have a reputation for doing as little environmental harm as we can in all of our operations and so it is important that we do that and we want to do it in a constructive way.

Having said all of that, for a decade I have been asked to fund a full Lake Ontario -- sorry, a Lake Huron survey to characterize the fish population on an entire lake. We will not do that. That is not a requirement of our facility. We are happy to participate with other things. It goes far beyond the requirements and it is not a reasonable request of us. If the Minister of Natural Resources, if Ontario wish to do that, then of course we will participate and do our part. But what is not reasonable for us is to stretch their requirements far beyond the activities of our facility.

So some of the tension that I hear here is actually a function of how big and how wide and how much should we do that goes beyond the requirements. We have met the requirements. We have gone beyond their requirements in many ways, frankly, to enhance a relationship, because that relationship is important to us in so many ways. I continue to believe that is the case, more than happy and in fact encourage collaboration.

As someone mentioned earlier, scientists

all have their own view of things and they like to be precise. And I understand that there will be different views, but everyone has their pure intentions in that scientific piece of work and I have always said that facts are our friend. So if you get in a room with goodwill, then common results will be available and shared and owned.

But what I also think one of the issues is here is that there is a discussion to be had about what is a reasonable scope for an operator on a portion of Lake Huron to deal with, with respect to the entire ecological environment around us. I know there has been many requests and I'm sure Dr. Crawford can comment himself on the validity and value in doing a full characterizing of Lake Huron. I am not going to argue on that because he is the expert, but what I am going to say is that is not Bruce Power's obligation. It is not our sole obligation to do that and that is, frankly, where we sit.

Happy to collaborate and happy to participate, but to own the entire environment of Lake Huron is an unrealistic expectation of Bruce Power.

**THE PRESIDENT:** I think there is good news here that Dr. Crawford said he has done all this work, if I understand correctly --

--- Laughter / Rires

**THE PRESIDENT:** -- or at least modelled

this work to the point that the Ministry of Natural Resources now is buying into this particular research and are able to actually tinker with the quarter system. Did I not understand this correctly?

**DR. CRAWFORD:** Two points of clarification, sir.

**THE PRESIDENT:** Please.

**DR. CRAWFORD:** First of all, I agree with Mr. Hawthorne.

It is not reasonable to expect Bruce Power to carry the freight on this. This is something which is big. It includes our American partners. This is truly a multiplayer venture and I believe, as I said before, that if we can get some good facilitation, some science EA facilitation on this we have the players, we have the motivation, we have the means, we will get this done.

**THE PRESIDENT:** So it seems to me that we are all in violent agreement on one thing and that you get all the scientists in one room and you lock the door and you don't get out until you come up with a way forward on some of those issues and, if there is disagreement, then please raise it up so we all understand what the disagreements are because you have two regulators here, if you like, the CNSC and DFO, with maybe different requirements, even though I still believe it wouldn't make

sense for both of them to disagree with each other.

So we have to find a way forward that both organizations can agree as to the way ahead. I think we have now heard enough about that particular topic to have a feeling about what needs to be done. Does anybody want to add?

Oh, yeah, I'm just trying to close this particular item. Go ahead.

**MEMBER MCEWAN:** Just one more on this topic, because there was something very, very important said that I was surprised it had only come up right at the end and that, how do you incorporate -- I mean this probably is a question for Dr. Crawford. How do you incorporate traditional knowledge into a discussion where we have been talking this morning about microsattelites, entrainment, embryo? So how do you do that in a way which actually utilizes the best of the traditional knowledge as well as the best of current science?

**DR. CRAWFORD:** I would invite you to the University of Guelph on June 9th. There is an SON-sponsored research symposium. It is a public symposium and it is attracting attention from the federal and provincial governments, from academia, from industry. It is specifically focused on translating the duty to consult from a legal context to a practical knowledge system

engagement concept and it addresses exactly which you had raised it right then.

**MEMBER MCDILL:** Maybe I can ask if anyone from CNSC is attending.

Yes, thank you.

**THE PRESIDENT:** Okay. Any other question on this particular topic before we raise a few other topics.

Okay, Dr. McDill...?

**MEMBER MCDILL:** I hope three relatively quick questions. On page 26 of 40 there is a reference to some of the hyperlinks and e-documents and I brought some of that up in the first meeting. Have those links been addressed, fixed, sorted out? Is there work around that?

**DR. THOMPSON:** I'm going to look like a deer with headlights, you know that expression. I was talking while you started your question, so my apologies.

**MEMBER MCDILL:** No problem, I will say it again.

On page 26 of 40 the submission makes reference to -- it is actually down in the footnotes, along with some ibids about hyperlinks and challenges with the referencing, one of which I brought up at the first meeting, so have -- when people click on links now, will they get through?

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

Maybe not clicking on links, but in terms of with the SON, Jeff Stevenson can address some of the information that we provided.

**MR. STEVENSON:** Jeff Stevenson, for the record.

So yes, following the Part 1 discussions that we had that you raised these issues, we did go through and put together a package of information for interveners that contain all the references in the CMD and they were sent out upon request. In addition to that, given the SON's intervention and their frustrations expressed in their intervention about the lack of information, we tried to give them the information as soon as we knew that there was -- that frustration existed.

So as the CNSC, obviously, we encourage if people are looking for information to come in contact us and we will do our best to provide that information where available.

**MEMBER MCDILL:** Thank you. Is that sufficient for the SON?

**MR. MONEM:** Alex Monem, for the record.

I think the intention of CNSC is going in the right direction and Mr. Stevenson did provide us with some documents. We haven't gone through to determine

whether or not those are all the documents we are interested in and there was a caveat in the email that some of these documents are not publicly available and so we still have work to do to ensure that there is, from our perspective, sufficient access to information and sufficient transparency to give SON its government and its community's confidence.

**MEMBER MCDILL:** Okay. Will you know at some particular point in time if you have sufficient information?

**MR. MONEM:** Yes. Alex Monem, yes, we will.

**MEMBER MCDILL:** Can we narrow the focus down a little bit? Days, weeks, months, years?

**MR. SAUNDERS:** Well, we could do that in even a shorter period of time, in a week's time.

And again, if this is an aspect of the relationship that the Commission is offering to retain oversight of, we would appreciate that. CNSC has expressed, as Mr. Stevenson has just stated, a willingness to ensure that we have access and we will send a list of the documents that we feel are still necessary for our analysis to CNSC.

But if there are issues that cannot be resolved, purely bilaterally between SON and CNSC, we would

appreciate Commission assistance.

**MEMBER MCDILL:** I would imagine some documents are Bruce documents and CNSC can't do anything about Bruce documents.

The next question, again largely I think administrative in nature, on page 37 there is a reference to coordination of KI with the SON communities. Can I ask Bruce for an update on where that stands?

**MR. SAUNDERS:** Yes. As you know, we will be distributing out the 10 kilometres in the next -- well, we are starting now essentially, so it is going out. As soon as we do the 10 kilometres then we will be moving the 10 to the 50 kilometres and we will be engaging all the communities out in that range, which includes the SON, so that engagement will happen shortly.

**MEMBER MCDILL:** I will ask you the same question; days, weeks, months?

**MR. SAUNDERS:** About I would say a month, a month and a half, something in that ballpark, yes. It won't be very long. We just need a little bit of time. Obviously we want to do the 10 kilometre zone first because that is the one that is really of primary interest here.

**MEMBER MCDILL:** Thank you. Mr. Chair. I will hold the other one if maybe none of my colleagues get it.

**THE PRESIDENT:** Anybody? Any other questions?

Ms Velshi...?

**MEMBER VELSHI:** I'll continue with the one on emergency management and the lack of engagement that SON feel about that. It wasn't just KI pills, I think they go on further on just overall emergency management, fire protection and so on.

So any comments on that, on greater involvement and what that may look like?

**MR. SAUNDERS:** We have no issue with greater involvement. I didn't realize there was a desire for more, but when we did Huron challenge and the others, we invited the SON to participate just like everybody else.

So it's not an issue on our end. That was the first time I heard that that was a concern, but we'll certainly address it. That's not a problem.

**MEMBER VELSHI:** Well, maybe, I can ask SON, what more would you like to see from Bruce Power in this regard. Again, it's from pages 36 to 38 in your submission.

**CHIEF KAHGEE:** Randall Kahgee, for the record.

Certainly we would welcome more participation, as Mr. Saunders said, that I'm glad to hear

that Bruce Power is open to that. I think that it's something we will explore.

Certainly this will be something that's very important to going a long way to strengthen our relationship, but also give the communities the confidence in terms of getting a better understanding of the facility's interaction, but also in the event there is an emergency, ensuring that we're involved in that.

**MEMBER VELSHI:** Do you have regular meetings with Bruce Power and senior management to talk about mutual issues?

**CHIEF KAHGEE:** Randall Kahgee, for the record.

Certainly, yes, there's been a number of meetings over the years and we have formalized, as Mr. Monem said earlier, a protocol. Initially we had a protocol that was stemmed from -- at the time their application for a new build we realized that needed to go in another direction, more relationship focus and we have formalized that protocol.

So yes, there is regular meetings and as issues arise we try and address them the best we can.

**MR. HAWTHORNE:** For the record -- can I just speak to this thing? Duncan Hawthorne, for the record.

Up until that conversation I've heard this morning I would have said the relationship is very strong between ourself and SON. I had a meeting just two weeks ago with Chief Roote as part of a kind of catch-up. We asked specifically if there were any issues on the table that people wanted to raise. The one that we spoke about was about employment, employment opportunities and relationships, et cetera and how to promote that.

So you know, like Frank, I didn't hear any concern raised there about emergency management and the lack of interaction there.

But having said that, Chief Roote spoke to me last evening saying that the presentation that he saw provided by Mr. Saunders and Mr. Newman he found to be very informative and suggested that maybe we could take that into the community and I was more than happy to do so.

And I said to him last evening, what I said to him when I met him two weeks ago which is, I don't want to be in your face thrusting things on you, presuming to think that I know what you need, you need to tell me because I do not want to be disrespectful and come into your community and force feed you stuff that may or may not be of interest.

We agreed that that was the appropriate way for me to act when I'm on his traditional territories,

I respect that, but what I did say to the Chief and Chief Kahgee would hopefully reinforce that is, I've always been willing to meet with the community and it's very respectful for me as the CEO to take time to meet with the Chief, not to send other people to do that. In the same way, it's respectful for me to come in front of this Commission and not ask other people to do my job for you.

But I can absolutely guarantee an entire willingness on our part to meet as and when to discuss any topic and we shouldn't have to wait to CNSC hearings to bring those topics up.

I mean, the whole idea of the protocol agreement is to establish an ongoing productive helpful dialogue. And you know, quite honestly, disappointing to me that if there's something missing that I only hear about it when I'm in a hearing.

**THE PRESIDENT:** Do I understand you don't like the CNSC meetings?

--- Laughter / Rires

**MR. HAWTHORNE:** I don't like that question, Mr. Chair.

**THE PRESIDENT:** Don't answer.

But it's very interesting you would say that because the submission started by saying that they had an accident monitoring concern, environmental concern and

I'm very surprised that there is no standing pre-ordered kind of a meeting that goes in at the working level to try to deal with some of those things.

**MR. SCONGACK:** James Scongack, for the record.

So I think it's probably helpful to build on Duncan's comments and just explain a little bit on the protocol agreement we have with SON that Mr. Kahgee raised.

This has been a protocol agreement that has been in place for many years and it's exactly designed to do what you just articulated, Mr. President.

So the protocol agreement establishes a regular forum in which Bruce Power and the SON meet on a regular basis. It enables capacity to SON, of course, recognizing that there's a wide range of proponents engaging in the community, so it provides capacity to SON to ensure they have the resources necessary to engage in those discussions and it's designed to carry a wide range of issues of interest to both sides.

We've talked a bit here about emergency management and building comfort with the site and I can just give you two examples out of conversations through that protocol agreement that I think will help deal with some of those.

For example, one of the items of the

protocol agreement is to talk about not only mutual aid arrangements, but how the organizations can work together, and you'll note that in the video we showed last night, Bruce Power post-Fukushima upgraded a lot of our emergency response equipment on the site and through our collaboration with SON it was identified that while we were upgrading some of our equipment on site that some of the various fire trucks, et cetera, we had on site that were no longer needed that those could be of use to the community.

And so those are the kind of things we work together on. You know, through the fire chief both at Saugeen and on site availability of our new fire training facilities.

So you know, I don't want to leave people with the impression that there isn't an active dialogue, that's the purpose of the protocol agreement.

We just recently had a conversation, the meeting that Duncan's alluding to, about employment and a range of items. Actually one of the things we've been carrying out for a large number -- a number of years with SON is a workshop day with SON youth so they can understand about what opportunities are available for employment at Bruce Power, and one of the suggestions that youth had was that actually we should have those sessions on site and provide them an opportunity for an in-plant tour.

So it is a very active dialogue. I just wanted to share a couple of examples that I think are relevant and certainly don't want to leave people with the impression that the only time we do communicate is through these hearings because it's a very robust relationship, very active communications and, unfortunately, sometimes in these scenarios it's those few points of differentiation that tend to get the focus.

**THE PRESIDENT:** Thank you.

Questions? Dr. McEwan...?

**MEMBER MCEWAN:** So can I just follow up on the employment. We talked about it a little bit earlier.

On page 32 your first paragraph is a very, very powerful paragraph and, in particular, the third sentence. Are you happy that there are appropriate plans going forward to try and remedy that situation and to try and build on it?

I remember at a previous hearing in La Ronge that there was clearly over the years a build-up of capacity within the Aboriginal community in terms of employment and business development.

Do you feel that things are moving in that direction for your communities?

**CHIEF KAHGEE:** Randall Kahgee, for the record.

The short answer is yes, I think there has been some positive movements towards bettering that.

I recall my first meeting with Mr. Hawthorne, I think it was 10 years ago now, and he certainly said that, you know, we want to build a better relationship and my response was, well, be careful how you use the word because you've inherited a legacy of 50 years of operation and territory that has predominantly excluded our people in every aspect.

And we certainly have not benefited in the way that others have and there's still roughly only a handful of our members that are permanently employed at that facility.

So you know, one of the things we stress in our submissions, we need to double down on that. There's been some good work by Thibault which flows out of the work through the protocol that Mr. Scongack has talked about.

And last February Mr. Hawthorne reaffirmed that commitment to SON, that he wanted to see more improvements on the employment side. I know he spoke to some of those last evening.

So there has been some positive progress. Is it where it needs to be? Absolutely not. Are we going to get there? I have every confidence we will, but like

the other conversation, there's some urgency to get that because the longer that goes, I really do think that creates an optics within our communities when they see that, they see an operator that's a source of benefits and employment to the region, when they don't see that flowing to them in their territory that sends all of the wrong messages.

But I would say that, yes, there has been some positive movement there and Mr. Hawthorne and Bruce Power are committed to doing that. And as I said, there's some urgency to see that happen.

**THE PRESIDENT:** Anybody else?

Maybe last kind of comment about -- you were talking about -- in your 30 or 40 you were talking about you don't like the DRL, this is the derived release limits.

What's the concern? I mean, and maybe more general, is it really a community-wide concern about the environmental safety; given all the information and data that Bruce is posting, et cetera, what is the real true concern?

**MR. MONEM:** Alex Monem, for the record.

I'm completely unqualified to answer this, but I'll give it a shot all the same. I as legal counsel have stood before the communities and I am not asked about

derived release limits, I am not, but I am asked, are we at risk? Is that facility being watched over carefully?

So it falls to technical advisors to sift through the mechanisms that can allow people like me to give a straight answer. And I'm not qualified to speak to where these DRLs have to go, but I do know that our technical advisors felt that this was a limit without function in the case of the tritium and that kind of thing does not arm leadership of the community or its advisors to go into the community and give the community confidence that limits are achieving their intended function, even in the case where the actual releases are much lower than the limits. If that's the case, we should toughen up the limits so that they actually perform function and we can say that to the communities.

**THE PRESIDENT:** We hear a lot about that kind of a concept, the limits are too high given their performance.

Staff, maybe you want to address -- how do you explain the difference between the regulatory limit and the health or impact -- environmental impact, which are two different concepts?

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

You will recall the submission identifies

it as well. The CNSC issued for public review a discussion paper where we essentially put forward proposals on revising the approach to setting limits on emissions so that they would serve a control purpose.

And so the current process is that they're administrative and action levels set below the derived release limits and then the derived release limit for each radionuclide is equal to 1 mSv.

That process is seen by CNSC staff, by international organizations as being perhaps not an appropriate way of putting limits that control operations.

Traditionally it's been set at 1 mSv because it's equal to the public dose limit which, as you've mentioned, is a limit set based on off and on optimization on having a level that has no impact on health of members of the public where essentially the epidemiological studies and other signs shows that we would not expect to see health effects below approximately 100 mSv per year from chronic exposures.

We are in the process of reviewing our approach. We issued the discussion paper. We held a technical workshop with people who had commented on the discussion paper.

The IAEA has recently put out a document for member state comments that looks at an approach similar

to what we had proposed, and so in the next few months we would be approaching our management committee with a proposal based on the public review and what is being done nationally and internationally.

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

Any final...? Any final comment?

No. Okay. Thank you. Thank you very much.

--- Upon recessing at 12:40 p.m. /

Suspension à 12 h 40

--- Upon resuming at 1:42 p.m. /

Reprise à 13 h 42

**MR. LEBLANC:** We are ready to continue.

**THE PRESIDENT:** Okay. We are proceeding now to the next submission, which is an oral presentation by the Sustainability Toolkit as outlined in CMD 15-H2.5.

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

**CMD 15-H2.5**

**Oral presentation by the Sustainability Toolkit**

**MR. BOLES:** Thank you all for having me

here.

Dear Members of the Canadian Nuclear Safety Commission, my name is Stephen Boles and I am here to speak on behalf of the Sustainability Toolkit support of Bruce Power's application for an operating licence renewal for its A and B generating stations in Tiverton, Ontario.

The Sustainability Toolkit is a collaborative effort between two Southern Ontario-based companies that provides tools and expertise to help businesses manage their sustainability.

The Sustainability Toolkit ensures that all relevant risks to a business and its stakeholders are considered and addressed within the areas of environment, operating practices, community, products and services.

For the past 18 months we have been working with Bruce Power in the development and implementation of their corporate sustainability management program.

The Sustainability Toolkit is based on the continuous improvement approach that is inherent in management systems and, thus, is an excellent compliment to Bruce Power's longstanding commitment to the environment and continuous improvement that is evident from their environmental management systems certified to the rigorous ISO 14001 Standard.

The Sustainability Toolkit has been used to establish a consistent and repeatable process for Bruce Power to identify, prioritize, and manage its sustainability risks.

The Sustainability Toolkit framework is initially being used to develop an energy management program within Bruce Power that will result in a more focused and efficient use of energy within their operations.

These efforts will further contribute to Bruce Power's position as a key contributor to Ontario's improved air quality and reduced greenhouse gas emissions.

Additionally, Bruce Power has used the Sustainability Toolkit to shape their sustainability program at a high level using the toolkit's four sustainability criteria to organize each section of its first inaugural sustainability report that was published earlier this year.

Over the years we have worked with many clients on sustainability-related projects, and Bruce Power stands out as one of the best examples of leadership in this field.

As a company, it is abundantly clear that Bruce Power understands the critical importance of being a sustainable organization. Their dedication to

sustainability, including their commitment to the wellbeing of the community in which they operate, to the health and safety of their employees, and to the environment starts at the highest levels of management in the company.

Bruce Power consistently communicates these key priorities within the organization and to the community such as through the recent release of their first sustainability report.

We at the Sustainability Toolkit are very much in favour of Bruce Power and supporting their licence renewal. And I would like to open the floor for questions at this time.

Thank you.

**THE PRESIDENT:** Thank you.

Questions? Dr. McEwan?

**MEMBER MCEWAN:** This is a really simple and naïve question.

You used the word sustainability about 14 times in your presentation. Can you define it? Can you give some framework to what it is generically and specifically what it is with Bruce please?

**MR. BOLES:** Well, I did use it a lot. It is a word that is used a lot these days. It is kind of a hot buzz word these days in all kinds of businesses.

But sustainability really means

understanding and managing for what an organization's risks and opportunities are so that they are in the best position to prosper going forward.

A lot of people kind of associate sustainability just with the environment, but that is really just one part of the whole puzzle.

Sustainability is making sure that you are a really good community, you know, host, and supporter of the community in which you operate. It is making sure that you are taking care of the people and the operations that you manage, and the environment is also a really big part of it too.

And a big part of sustainability is making sure that you consider all of these different factors in your business decisions going forward. So it is understanding what your relevant and material aspects are, and Bruce Power has done a really good job of going through the process of prioritizing and understanding what their impacts are and starting to take steps to address those.

**THE PRESIDENT:** Ms Velshi?

**MEMBER VELSHI:** Question for Staff.

As you look at the different SCAs, where would this fit in in the fourteen areas that we have? Is this sort of augmenting the management system or is it...? I am just quite not sure. Is this a way of doing business

or is it a specific initiative?

**MR. LAFRENIÈRE:** Ken Lafrenière, for the record.

That is a difficult question to answer. This effort touches on several safety and control areas; business planning, management system, environment, et cetera.

I think it is safe to say that this is an effort above and beyond our regulatory requirements.

**THE PRESIDENT:** Can somebody come forward to try to help you on this?

**MR. LAHAIE:** Thank you. Pierre Lahaie, for the record.

It actually is represented in the regulatory framework. The licensee is expected to have a management system that meets requirements.

And the N286 Standard by which we measure the licensee's compliance does state at a high level that the business is to be defined, planned, and controlled. And within that requirement, that risk to objectives be identified and managed as well as assessed and reported back.

So there is a high-level requirement in management systems that deal with aspects of sustainability.

**THE PRESIDENT:** Anybody else?

**MR. SAUNDERS:** I was just going to say, I think from our point of view it is a pretty simple approach, right? It is part of our environmental policy and part of our direction.

I see ourselves as a very long-term business, we plan to be there for a long time. So you want to not just, you know, meet the regulatory requirements, but actually provide a sustainable environment to foster both the people that live around you and the business in general.

So is it a hard regulatory requirement? No. But it makes sense for a business to do that, and so it is part of our environmental policy and our direction.

**THE PRESIDENT:** Thank you.

A quick question. Everybody says toolkit, is that a software application?

**MR. BOLES:** It is a software application that is currently being developed with Fanshawe College into a web-based tool that is modelled on the ISO 14001 cycle of continuous improvement and it has kind of merged ISO 14001 with many of the other principles of sustainability beyond the environmental aspects.

So it is taking a system and an approach that Bruce Power has already mastered and been certified to

in the environmental sphere through ISO 14001, and it is applying those same kind of principles and approaches to many of the other aspects of sustainability beyond the environment.

**THE PRESIDENT:** But it is your property, is it? If I understand correctly, you are going to try to apply it elsewhere besides Bruce?

**MR. BOLES:** That is correct, yes. We have other organizations that are also working with the Sustainability Toolkit as well. Bruce Power is one of the first ones that worked with it when the toolkit was developed, and they are one of our longest partners in this initiative.

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

Any final comment?

Thank you for the presentation.

**MR. BOLES:** Thank you, folks.

**THE PRESIDENT:** The next submission is an oral presentation by Canadian Council for Aboriginal Business, as outlined in CMD 15-H2.48 and 15-H2.48A.

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

**CMD 15-H2.48/CMD 15-H2.48A**

**Oral presentation by the**

**Canadian Council for Aboriginal Business**

**MR. GLADU:** Thank you.

I just wanted to take a moment to walk you through the Canadian Council for Aboriginal Business so you understand the longevity and the credibility of the organization and the relationship with Bruce Power.

So we are actually over 31 years old, founded by Murray Koffler, founder of Shoppers Drug Mart, and his vision at the time, and still is, is about building business relationships between corporate Canada and aboriginal businesses and communities for their mutual benefit.

I think we can all agree, in some of the comments earlier this morning, when we have prosperous aboriginal communities all of Canada prospers.

So we are a membership-driven organization. What is important is that we are not political. We drive revenue through memberships as well as our events. And the way we build business relationships is through a number of programs that we have, events and research.

One of the programs that I want to talk

about today in relation to Bruce Power is our PAR Program. Given it is almost golf season, you might think PAR has something to do with golf, but it is actually Progressive Aboriginal Relations, because we have to progress this relationship forward because it has been, as many know, fragmented for a very long time.

So the PAR history. We have had over 14 years engaging Canada's corporate companies across the country in every sector. It is essentially about building better relationships with Canada's aboriginal people and it is about raising the bar, it is about being up-to-date on best practices and knowing that those best practices are going to continue to evolve. And it is really all about building those relationships.

So Bruce Power, actually they have been a member of ours for about five or six years now. And as they got to know more about our organization they understood the power of PAR to actually -- used as a framework to better the relationships with aboriginal people and used in their strategic planning.

And the other end of the spectrum is that aboriginal communities, many look at the PAR program or companies that subscribe and work through the PAR process as companies that maybe aren't always getting it right, but they are trying everyday to make a better relationship with

the communities. And you got to see some of that today, earlier this morning.

So they have taken a very proactive productive approach to their aboriginal relations and SON is one of those communities, and the Métis Nation as well.

And I would even suggest, and they have the data to show it, that they also hire aboriginal people from across the country. But they understand the importance of local community engagement, involvement, and building those relationships.

So just a quick look at our PAR program. There are three certification levels -- well, actually there is four; there is the community level and then there is bronze, silver and gold. Bruce Power came in at the silver level with their initial application, and over a few years they refined their processes and they understood where the gaps were.

We look at a number of areas, which I am going to walk through now. And through perseverance and good leadership, they were able to achieve a gold standard this last September, and we are very proud of their efforts.

So they have set goals for their employment. You heard earlier this morning it was not very strong at the beginning and, you know, 10 years ago what

they have been able to achieve from then to now, they do employ over -- 2.3 per cent of their workforce is aboriginal people from across the country.

It is noted that the company recognizes that they have a ways to go when it comes to employing aboriginal local people, but they are setting goals. They have a strong employee network, they have short-term, long-term hiring strategies for aboriginal people and, you know, they are committed to working with those communities and expanding the employment opportunities.

There are four pillars. So the second one I am talking about is business development. To quote a famous chief in this country, Chief Clarence Louie from Osoyoos Indian Band, "If you want to support aboriginal people in this country, buy aboriginal." And so they do have very strong procurement policies to get their goods and services from aboriginal businesses.

The challenge though when you are a company that deals with, you know, the high-grade uranium and all of those processes, there is not very many aboriginal businesses that compete on that level.

So they have actually made some strong commitments and they work with their suppliers to make sure that they have policies or at least that they are working towards developing policies and building better

relationships by hiring aboriginal businesses.

So it is about education with their suppliers, it is also about education with the communities in which they work. But at the end of the day, it is about nurturing a better understanding and always getting to that table. Like Duncan said this morning, let's find out where we can go together and sit down and talk and continually engage.

So they do have a very proactive approach in this area and I know that it continues to grow.

The other thing they have, I think I have addressed most of this, but they also have a website for aboriginal companies to introduce themselves through Bruce Power. And so it is a self-identification as aboriginal businesses move forward and are looking for business opportunities.

It is increasing its internal education on aboriginal issues as well. So they make sure that their staff understand what the issues are in working with aboriginal communities and where the opportunities are so that they can get everybody within the organization, and you can see it and you can hear the passion in Duncan's voice, right from the top down to the frontline staff, and that is important in any organization if you are going to build successful relations with aboriginal peoples and

communities.

You know, parting thoughts, that the foundation, you know, really is in place with Bruce Power and it is not perfect with the communities, but it continues to improve year after year. It takes time. We think about the over 100 plus years of fragmentation, as I mentioned, in the relationship with Canada and its aboriginal communities. So it is a ways to go, but they are making significant strides and we are very much in support of Bruce Power's five-year relicensing application.

I want to thank you for your time. Any questions?

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

**MEMBER TOLGYESI:** You are saying that we have several decades of history. Who or what is the criteria to become a member of Aboriginal Council? Should it be the company or should be located in aboriginal territories or have aboriginal employees or aboriginal owners, or how it works?

**MR. GLADU:** Thank you for the question.  
So our organization doesn't discriminate against pretty much any organization, except for alcohol and tobacco companies, perhaps for obvious reasons to most of us.

We actually have over 400 corporate members, and aboriginal business members as well, from across the country and coast to coast to coast, right from the FP 500 companies to individual entrepreneurs working at their table.

But people/organizations come to our organization because they understand that the CCAB has over three decades of credibility and understanding in building business relationships. As this country continues to turn -- or the world turns, this country is understanding that they have to work harder at the relationships with its aboriginal peoples, where a lot of the resource projects, which this country is very much built upon, its natural resources, are going to become uncertain, and uncertainty is not good for anybody.

The organization -- and it's maybe a little bit more information than you asked for -- is very accepting of any organized company that is looking to progress relationships with its aboriginal peoples.

**MR. SCONGACK:** Hi, James Scongack, for the record.

Just to add from a company point of view a little bit of our rationale behind not only joining CCAB, but, more importantly, advancing through the progressive aboriginal relations program, one of the things that's a

very strong characteristic of the nuclear industry -- and you see it through the work with our upcoming OSART mission, through WANO/INPO, through CANDU Owners Group -- is how we share information and how we share best practice and always strive towards meeting gaps to excellence.

One of the things that the PAR program offered Bruce Power was the ability to, frankly, benchmark our aboriginal relations program against some of the best in the country. Although we really do appreciate moving from the silver to the gold designation, and we're happy to be moving in the right direction, the real benefit that we get as a company and being a member of CCAB and participating in the process is the audit that CCAB comes and does of our program independent every year.

In that audit they review the areas that J-P just articulated, but, more importantly, they identify areas for improvement and, where possible, try to align you with other companies -- and they may not be companies in the energy sector necessarily -- who have done some of these things very well.

So it's a really good -- you know, with my nuclear hat on, you know, similar to the approach we take as an industry in a wide range of things. I do actually think it's an invaluable program, and one that I know the executive team at Bruce Power is -- how should I say it? --

actively encouraging all of our suppliers at Bruce Power to go through the PAR program.

Because it's not just about what we as a company are doing, it's about anybody who's doing business with Bruce Power, you know, we think these are the types of things that they should be concerned about as well.

**MEMBER TOLGYESI:** M'hmm.

And my last, you were saying that you have 400 members --

**MR. GLADU:** M'hmm.

**MEMBER TOLGYESI:** -- plus individual entrepreneurs who are members also.

**MR. GLADU:** They're inclusive in that 400 --

**MEMBER TOLGYESI:** Okay.

**MR. GLADU:** Yes.

**MEMBER TOLGYESI:** Uh-huh.

You were saying that you have a gold, silver and bronze level. How many of those 400 they have these levels, so remaining -- the count.

**MR. GLADU:** Right. That's a great question.

Right now, formally, we have over 41 companies that -- and there's -- I mean just to name some of the gold standards: Bruce Power, TD Bank, Bank of

Montreal, Syncrude, Alberta-Pacific Forestry Company, Higgins Executive Search Firm, Nexen. So there are some very large firms.

The PAR program really does cater to the corporate side of the equation to help them develop better practices and helping them get in line more with community expectations and building those relationships.

So we do have 46. There's a good contingency of silver-based companies, and then we have one at bronze right now, a junior mining company, and we have about -- I think about 18 companies right now that are the committed level. At the committed level they have about three years to get all their data and reporting in place, and then they can advance.

So this is not something that you do overnight. This is a long-term commitment to the aboriginal community and a long-term commitment of an organization. A company like Bruce Power, they recognize, and companies that are at this level understand that these relationships take a long time to develop and they're ever-evolving.

It's a long-term view.

**MEMBER TOLGYESI:** Thanks.

**THE PRESIDENT:** Anybody else?

I just have a -- I'd like some numbers. I

like numbers.

**MR. GLADU:** Okay.

**THE PRESIDENT:** So how many aboriginal businesses are there in Bruce County, anybody knows?

**MR. GLADU:** This is one of the challenges that all of us actually face, not only Bruce Power, but even an aboriginal business organization, so we've done research. Unfortunately, we're basing a lot of our numbers on 2006 data, back at the last census.

There were 37,000 aboriginal businesses across the country. Most of the businesses are weighted in western Canada in response to a lot of the resource development. In this county area, I don't have a definitive number for you. I know that it --

**THE PRESIDENT:** So, Bruce, would you know how many of your suppliers, let's say, of any kind?

**MR. SCONGACK:** Sure. James Scongack, for the record.

I would answer that question in two ways, Mr. President. The first being there's about half-a-dozen or so, anywhere from small- to medium-size aboriginal businesses probably in the Bruce County area that we would engage with.

However, I think, more importantly -- one of the products that you get as a member of the Canadian

Council for Aboriginal Business is they produce a guide of aboriginal businesses from across the country. What we've done, and working with our supply chain group, is carried out a review of that and determined -- obviously, some of our larger suppliers, as you know, from a CNSC perspective, need to be qualified to meet certain CNSC requirements, but there's a range of other services.

One I'm just thinking off the top of my head is we recently acquired a new supplier who provides bottled water to the site. It's an aboriginally owned business in the Midland area. Working with CCAB, what we've tried to do is, not just in the Bruce County area, but broadly throughout the province, identify potential aboriginal suppliers and reach out to those suppliers and see if we can make a cost-effective arrangement.

But certainly it's a goal of the supply chain to not only directly give business to aboriginal firms, but encourage our suppliers when they're thinking of their various procurement techniques to take those things into account.

Of course, one of the things that's a very significant procurement line for our business, the single greatest single thing we procure in our operation, is the fuel for our units. It's about 7 to 8 per cent of our cost. If you look at the entire process, primarily driven

by Cameco, of the production of our fuel from the mining in the ground, you know, you're talking anywhere in the range -- and J-P would know better than me -- but about 50 to 60 per cent of the people involved in the development of our fuel from mining in the ground to in our reactor are aboriginal people.

So those are the kind of things we look at. It's really the full value chain.

**THE PRESIDENT:** Thank you.

Anything else?

**MR. SCONGACK:** That's it.

**THE PRESIDENT:** Any final comment?

**MR. GLADU:** Really, again, just since I have a couple of minutes, I'll use them, the PAR program, many of us believe that it should be the industry standard for any corporation that's operating in Canada's natural resources. Because anywhere you step in this country you're going to be in the back doors of a community or two or three or four or a dozen, so understanding the importance of developing strong, lasting relationships is going to advance the country's interests.

**THE PRESIDENT:** Thank you.

**MR. GLADU:** Thank you.

**THE PRESIDENT:** Okay.

The next submission is an oral

presentation by the Bruce County Federation of Agriculture, as outlined in CMD 15-H2.139.

I understand that Mr. Jilesen is making the presentation.

Please proceed.

**CMD 15-H2-139**

**Oral presentation by the  
Bruce County Federation of Agriculture**

**MR. JILESEN:** Thank you, Mr. President.

My name is Patrick Jilesen. I'm the president of the Bruce County Federation of Agriculture. I'm here to support the Bruce Power's application to renew its power reactor operating licence.

The Bruce County Federation of Agriculture represents the interests of over 1,400 members in our county. One of our objectives for our organization is to "promote and support initiatives which benefit the agricultural industry and the community of Bruce County." Bruce Power fits into that category and provides a number of benefits locally and provincially, and that's why we're offering our support. We'd like to highlight a few of those benefits if we could.

Cost of electricity: Farmers and rural

businesses have a heavy reliance on electricity, and we need affordable, competitive rates. We're large energy users and we'd like to be able to pay for it.

While there is a large perception among some that large capital requirements for nuclear projects also equate to a high price of power for consumers, this just isn't the case. Because nuclear plants generate a large volume of electricity with a high degree of reliability, the costs are spread over huge amounts of generation, meaning the cost to ratepayers is affordable. The average price for electricity from Bruce Power last year was about 6.2 cents per kilowatt hour, which is the lowest of all forms except for hydroelectric.

On the safety side of things, we recognize that Bruce Power's focus on safety, it's the same focus we in the agriculture industry share. Bruce Power has made a number of safety improvements to a plant that has always operated safely. We recognize that. These improvements ensure that it can continue to successfully control the reactors and operate during a natural disaster for example.

We have even heard Bruce Power's president and CEO, Duncan Hawthorne, refer to the improvements made as "farmer smart instead of Harvard smart," and we appreciate the recognition.

Bruce Power has a proven track record in

safety and has the necessary capabilities to protect the public safety.

Environment: Bruce Power and our organization also have a shared interest in protecting the environment. Bruce Power has a strong record of complying with legislation, regulations and other requirements. The company works to minimize its environmental footprint by protecting, conserving and restoring its resources through energy conservation, reducing water consumption and by reusing and recycling materials.

Bruce Power has demonstrated leadership in promoting initiatives that encourage environmental stewardship and awareness at work, in the community and across Ontario. Every year Bruce Power monitors all aspects of the environment surrounding their facility, including the air, water, land, vegetable gardens, wild animals, including fish, and even milk and meat from local livestock, to ensure they are being the best neighbour possible.

Just like us on our farms, they live and work in the same place that they consume their products and drink the water. They have to stay there just like we do. Our nearest water supply is on our farm and we're always very careful of what we do around our area and where we work.

And, of course, that all leads to social responsibility.

Bruce Power has demonstrated a responsibility to help worthwhile causes here in Bruce County. The company donates more than \$1 million a year to support programs that focus on health and wellness, community, youth development as well as military, veterans and first responders.

The company and employees also have a close relationship with the United way of Bruce Grey, donating more than \$200,000 to the organization in 2012 through corporate donations and payroll deductions.

Since 2003, nearly \$2 million has been donated to the non-profit group.

Bruce Power connects with the community, just like farmers do, in an open and in a meaningful way, which is one of the reasons it has earned the support of its neighbouring communities. It's a company that conducts its business ethically, safely and with professionalism, and we offer our support for the renewal of the operating licence.

Thank you, and if there's any questions, I'll try to answer them.

**THE PRESIDENT:** Thank you.

Questions?

Dr. Barriault.

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

Does the fact of having a nuclear plant in your area have a negative impact on selling of your crops or livestock or whatever?

**MR. JILESEN:** That has not been my experience. I just certainly have not had that experience or heard anything like that personally, no.

**MEMBER BARRIAULT:** Thank you.

That's all, Mr. Chair. Thank you.

**THE PRESIDENT:** Thank you.

Dr. McEwan?

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

So again, just to get the environmental piece, we heard from Bruce Power yesterday how they have this voluntary sampling program to ensure that they understand what the local environment is.

Have you worked with them in ensuring that there are appropriate volunteers and appropriate distribution of volunteers to make sure that that program works as effectively as possible?

**MR. JILESEN:** I can speak to what we do as farmers when it comes to voluntarily looking after water supplies. They can probably answer that better than I can, but as farmers, we do voluntarily engage in a program in

the past called the Environmental Farm Plan, and it was a program the government helped subsidize, but farmers put in just as much money.

It was a voluntary program. It didn't mean it was free.

Now, what we had to do in that program and what farmers did, and a lot of them did -- you've probably seen some of the signs outside the farms that say "Environmental Farm Program. We had to take a course and be there for a day or two and do an audit of our own farm.

And a lot of that had to do with the water supplies and how it was managed on our farms in relation to any pollution sources and continued monitoring as well of our water supply.

Like I said, our wells are right next to our houses and our farms depend on those water supplies, and so do we, so we manage them as best we can voluntarily, which like I said, it wasn't free.

So what I'm saying is when the government put in \$1, farmers across Ontario put in \$2. For every million dollars the government put in, farmers demonstrated an ability to adapt and put in \$2 million.

**THE PRESIDENT:** Question?

So just on the same topic, when Bruce Power comes up with their environmental data on an annual

basis, do you and your membership take a look at them to understand them, compare them to your knowledge of what's going on?

**MR. JILESEN:** I would say any data that they provide is obviously available to the public, so our members would certainly look at it.

I haven't heard anything back from our members with any concerns, and so in that regard, I'm comfortable with the -- what they've put out publicly and I'm comfortable with saying that our members are probably very much aware of the water supply and are happy with it.

**THE PRESIDENT:** Thank you.

Any final comment?

**MR. JILESEN:** No. Thank you for the opportunity.

**THE PRESIDENT:** Thank you.

The next submission is an oral presentation by the Canadian Nuclear Association as outlined in CMD 15-H2.69, and I understand Dr. Barrett will make the presentation.

Dr. Barrett, the floor is yours.

**DR. BARRETT:** Thank you, Mr. President.  
Good afternoon, Commission members.

My name is John Barrett, and I'm President and CEO of the Canadian Nuclear Association. I'm here

today along with Peter Poruks, our Manager of Regulatory Affairs.

And we're here to speak to you today on behalf of the 60,000 Canadians who work directly or indirectly in the nuclear industry. These men and women mine and mill uranium, manufacture fuel, generate electricity and advance medicine through life-saving diagnostics and therapies.

Our members maintain a deep commitment to the safety of their workplace and their communities, and to the protection of the environment. We are here today to help provide information to the Commission and to the public as you deliberate on the application before you.

I would like to begin by stating our support for Bruce Power to renew its power reactor operating licence for the Bruce Nuclear Generation Stations A and B located in Kincardine.

We'd start by acknowledging the outstanding safety record of the Bruce Power facility. All safety control areas have received "fully satisfactory" or "satisfactory" ratings in the CNSC staff assessment of station performance.

The operating performance of Bruce Power is impressive by any measure, continually achieving top metrics for nuclear and conventional safety and operation

and environmental performance. The benchmarking occupational safety data between Bruce and other large scale industrial activities such as electricity, oil and gas and forestry shows injury rates at Bruce 10 to 20 times lower than the industrial norm.

In 2010, the company's employees surpassed 22 million hours without a lost time injury and followed up with over 15 million hours in 2013.

During the current licensing period, workplace radiological exposures have been kept well below regulatory limits. Many enhancements to the radiation protection program have been implemented, and contamination control has been improved. And personnel contamination monitoring standards have been increased to an industry best level.

Bruce Power has recently undertaken a number of emergency response upgrades, making the existing high level of safety even higher. This was done in response to the accident at Fukushima Daiichi, following which many nuclear operators implemented lessons learned at their own plants.

Firefighting capacity on site was significantly increased. Bruce Power's fleet of fire trucks can now also provide a continuous flow of cooling water to plant systems, and additional emergency water

pumping and electrical power equipment is stored near the site.

In 2012, Bruce Power participated in a four-day full-scale emergency response exercise as proof of concept of post-Fukushima improvements conducted by Emergency Management Ontario. More than 70 agencies and government organizations were involved in the exercise, which successfully tested interconnectivity and coordination of the multiple agencies.

Bruce Power engages with the local community effectively through a wide variety of media, including Twitter and Facebook, LinkedIn, and a specialty app for the iPad and iPhone.

In January 2014, the company held a virtual town hall meeting, which was a live forum allowing for a conversation with thousands of individuals simultaneously. Over 10,000 homes took advantage of being part of the virtual town hall, and a company update for the previous year was given, along with a look ahead to the next year.

More outreach was undertaken, with information sessions held at Bruce Power's visitor centre. Two community newsletters were mailed directly to more than 53,000 households in the surrounding area in 2014, sharing important information about the activities on site and in

the community.

Bruce Power is an efficiently and safely run nuclear power plant whose operations place high regard for the environment.

I would like to acknowledge and underline the key role that Bruce Power played in allowing the Province of Ontario to stop generating electricity from burning coal. Burning coal results in sulfur dioxide, nitrogen oxide and carbon dioxide emissions, all of which contribute to poor air quality and global warming.

In 2001, coal plants released as much air pollution as 6.2 million cars.

Coal-fired generating stations were the number 1 and number 2 air polluters in the country.

In the early 2000s, the Ontario government promised to phase out coal by 2015. This target was achieved, bringing cleaner air to the province of Ontario.

Helping to make this milestone occur was Bruce Power, whose reliable operations provided the needed power as coal-fired assets were taken offline. The bulk of the generation, 70 percent of what was needed to shut down coal, came from the Bruce Power site as they restarted four dormant reactors over this time.

Thank you for the opportunity to be here today to draw your attention to just some of the many

benefits brought by Bruce Power to the local community and to the province of Ontario.

And I would be pleased to answer any questions that you may have. Thank you.

**THE PRESIDENT:** Thank you.

Questions?

Dr. McEwan?

**MEMBER MCEWAN:** Thank you for the presentation.

You mentioned you're impressed with the Huron challenge exercise that was performed and the way in which it integrated. What struck me yesterday when we looked at the Bruce Power presentation on that, there was no snow, and it was obviously warm.

So do you think that that as an exercise is adequate, or do you think that there are advantages in looking at different scenarios to try and understand just how well that service works under all of the extreme weather conditions we have in Canada?

**DR. BARRETT:** Well, I'd have to perhaps answer by saying that I'm not a particular expert in that kind of exercises, but in the industry -- well, I found it interesting that I attended the exercise that was conducted last year at Darlington. There was a four-day exercise which, again, tried to simulate realistic conditions, and

realistic in the sense that they can be entertained.

I'm not sure that there's -- personally speaking, there's a great value in entertaining risk scenarios and possibilities that are so far-fetched that they're hard, really, to develop a response to because they -- if you're not living in a seismic zone such as Fukushima Daiichi, the seismic aspects do take on a different colouration, et cetera.

In this case, at the Darlington, they worked hard to fabricate something that was realistic, at least in the context of an exercise, and it was a combination of things going wrong. You know, you started with a sudden tempest and storm that hit and then something else got knocked out and that led to another problem, et cetera.

And I think that those types of exercises are really quite valuable because it's the unexpected connection of one item to another. So you don't see the straight causality of, say, a meteorological event and the whole thing is affected but it's something which has knocked out something else, et cetera.

In the Fukushima, I had an opportunity to visit the site a couple of years ago and there you could see where the big power line was knocked out, which was really the beginning of a lot of the problems afterwards

after the waters had hit, the tsunami.

On the Huron question, I wasn't -- I haven't been really apprised enough of how it was conducted. But again, so much of it in the experience of the discussion at Fukushima when I was in Vienna at the Atomic Energy Agency, you could see how much of it relied on the cooling aspect.

And so any exercise that starts to focus on or lessons learned that develop this continuous supply of water for the cooling is absolutely necessary and I think this is -- when I look at what Bruce Power has done after the Fukushima accident to take their lessons learned, I see a lot of activity in that, ensuring that there will be a constant supply of water to cool.

**MR. SAUNDERS:** Frank Saunders for the record.

I mean it's always one of the interesting challenges about how realistic do you make exercises. You know, I spent my time in the military, so I had firsthand experience with winter exercises that were really winter exercises and they're cold.

On site it's really not too much of a problem for us to exercise in the winter or spring, summer or whatever, and we do. And our equipment runs 12 months of the year, so we deploy fire trucks winter and summer,

they're all the same. So we know how to run the equipment and how it works.

Where you run into problems with the winter exercises is getting the volunteers from other places who may want to come and participate. They're not so keen at minus 20, right? So that's the challenge, right?

I mean we can do our bit, and we do tests, right? We recognize we live in the winter and especially in Bruce County we know we live in the snow and so we know how to get around. We have our own snowploughs and we can manipulate and move on the site. And we do deploy our trucks in that kind of weather. So we know how to do it.

It's always an interesting challenge to run an exercise in very challenging climatic conditions but if you're -- you know, it takes a lot of effort to be prepared to do that on the part of the volunteer agencies in the way they get people out and so forth. So not as simple a challenge as it would sound sometimes on the surface.

**THE PRESIDENT:** Is that a reply that you will never do a winter exercise? I mean we're talking about Kincardine here where I know -- I've seen pictures of the roads totally wiped out and you cannot get stuff on site. So, you know, in my doomsday scenario, if all that

happens all at the same time in a winter, roadblocks, are you really going to test your fire trucks going through the snow piles and all?

**MR. SAUNDERS:** Yeah. Like I say, we have a long history of it in Bruce County and one of the reasons we have our snowploughs, there was a time when we used to actually plough the roads between Port Elgin and Kincardine in a big storm to take the buses in with staff. At some point the roads people became worried about the liability and so forth of us ploughing the roads and they stopped us doing that.

But when I was first on site it wasn't unusual to be on the bus coming in, in the morning, with one of the Bruce Power ploughs in front of you going down the road. So we can do that.

We still have snowploughs and tractors today and of course we have the cooperation with the community and the county and if we need them we can use them.

The challenge to do that in an exercise is kind of twofold.

One, you have to pick the exercise when the weather is bad. That might sound like it's not that big a challenge in Bruce County but the weather has a way of not cooperating with you when you want it to.

And secondly, there's some risk when you do that, right, some risk that people will get hurt or things will go astray, and while that's acceptable in a real emergency, it's not always so acceptable in a practice.

So I'm pretty comfortable that we know how to do that certainly and certainly you can always get through. We do have snowmobiles and all those sorts of things as well and we've never got to the point where we can't really do something we have to do. We just don't really want to put people at risk when it's not necessary to do that.

**THE PRESIDENT:** Thank you.

Dr. McDill.

**MEMBER MCDILL:** So, I'm going to follow up and that was one of my questions from yesterday that we had to wait till this round, I guess.

But since it's been raised, have you run your makeup water trucks, the hoses out at, say, a nice brisk minus 35? Do the hoses fold out nice and soft like they do in that warm picture? And when the folks have to pull them and try and do clip-ups on -- you know, the demonstration was -- I think he had bare hands to attach -- have those exercises, not the big exercise but have those small exercises been run in the winter or freezing rain for

that matter?

**MR. SAUNDERS:** The short answer is yes, we've done it in all kinds of weather, quite frankly. The hoses come out very easily. It's after they're wet that's a problem. So putting them away, a bit of a challenge. You have to get them into a building.

But getting them out of the back, the hoses are designed to work at various temperatures. Firefighters have to work no matter what the temperature is and the hoses are designed for that. And once you start the water flowing, life is good. If you shut the water off and let it sit, of course it's problematic if the weather is cold. But we do know that and we know how to work the hoses. So you wouldn't fill them until you're ready to use them.

And yes, we did it in the rain and we've done it all kinds of times, much to the sometimes unhappiness of the people doing it. And that exercise wasn't really that warm. We did have a nice day. That was the end of October. So we did have a nice sunny day and we took some of those pictures, which was nice, but it wasn't exactly a tropical time of year.

**MEMBER MCDILL:** Staff, have you witnessed any of that?

**MR. LAFRENIÈRE:** Ken Lafrenière for the

record.

Yes, we do witness those things and I as the Regulatory Program Director probably get more calls than I need to get that there's a test going on for some facet of the emergency program.

**THE PRESIDENT:** Ms Velshi.

**MEMBER VELSHI:** As we've looked at both Fukushima and the CNSC's Follow-up Action Plan and the licensees, has the CNA done a lessons learned to see what you as an Association would do anything different after Fukushima?

**DR. BARRETT:** Thank you for the question. I wish I could answer fully because I took up my position a year and a half ago, so it was not at the time when it occurred. So I'd have to rely on my predecessors or perhaps my colleagues who would remember that.

But I think -- if I may, I would like to introduce something that is related and that is the international --  
 --- Technical difficulties

**DR. BARRETT:** I'm not sure it comes up so often in these discussions but having been the Canadian Ambassador to the Atomic Energy Agency and during the time of Fukushima, so from 2009 to 2013, and I had an opportunity to chair the Board of Governors there, so a

good view on what was happening at that time from an international perspective, what other countries were doing and how they were reacting, et cetera.

And I can say -- because I'm quite happy to put that on the record -- that the utilities and power generators like Bruce Power and Ontario Power Generation were stood up as really strong examples of how safety is really conducted, with the support of course of the CNSC. And from a Canadian perspective, that gave us a lot of substance and content to go into the international environment and work to raise the safety standards.

And I know your President was very active but also you could count on the work of Bruce Power in contributing to, first of all when Fukushima happened, the Canadian reaction.

They were advisors to the Canadian government, along with other government departments, as we formed this big interdepartmental team to work very quickly, you know, what would be the impact on Canada, would there be any danger here, and then start the process of let's look at ourselves, could this happen here, could there be any types of accidents that are similar or do we have such a different technology, a different type of regulator, a different seismic environment, et cetera, et cetera.

And these resulted in an international standing which, personally, I find that we have not -- in a modest, maybe too modest way as Canadians -- have not capitalized on enough, is that we can go internationally and say, if you want a real record of safety with no fatalities over the years, 60 years of nuclear power generation, if you want to show the high safety standards and the technology that actually aids and abets that safety and a regulator that keeps everyone on their toes, then we do that.

And I think it's something that has been recognized because with both OPG and Bruce Power, they have international standing.

So I just wanted to bring that to the Commission's attention, is that these two companies, I think we're quite proud of, but we can be proud of from a Canadian perspective because of that international impact.

And so the safety experiences and lessons learned by, for example, Bruce Power in its licensing and relicensing, they move into the international sphere, where we can use that also to say, here are some lessons, here are some good practices, here are best practices.

And WANO -- you may have heard of that organization -- WANO has also recognized the contribution of Bruce as one of the outstanding power plants in the

world.

**MEMBER VELSHI:** I really do want to get to the national scene and the role that the CNA can play. So even with the previous presentation we had around Aboriginal relations and Bruce Power saying one of the benefits they had from joining that group was the benchmarking opportunity.

Does the CNA say that, hey, you know, the power producers are really good at this site and perhaps the nuclear medicine folks can learn? I mean, you know, there's the regulator that can do that but does the Association play a role in that? And I just wondered if there was --

**DR. BARRETT:** Well, the Association can cast its net quite widely into what it can plan to do and is always hampered by how many resources you have and how many people you have at hand to conduct that.

We look at education, for example, and we've designed a downloadable curriculum for high school students. For science teachers in any province of Canada that wants to teach something about nuclear energy, they can download this. So there's an educational dimension and a communications dimension of course by informing the public in public talks, et cetera.

But we work also in trying to support

government decision-making by bringing the contribution. The industry can stand on its own feet, the individual companies, but sometimes there is a need for a perspective that shows how important the technology is to many walks of life. Like very few people understand and have seen, and they usually react with, "Oh, I didn't know that", when they hear how much there is of nuclear technology and the spinoffs from it that play into everyday life.

I have been asked too if there is such a thing as the Nuclear Industry Summit which meets every two years and I have been asked to prepare -- in one of the working groups to chair and prepare a paper that actually goes along those lines and shows that if you look at the purification of a desalination of water, if you look at the contribution to nutrition, the contribution of isotopes that have been derived from nuclear technology, the applications to advanced manufacturing, very few people know that when they do quality testing for the rotor blades of jet engines.

This is non-destructive testing. You can't cut things open and say, "Is the weld good?" You have to look at it from outside and this type of technology is applied more and more widely.

I didn't know -- and here is me saying I didn't know that, but there is a lot I can say too. That

heavy water, you think heavy water has one application. It's in heavy water plants, power plants. There is a company in Ontario I think not too far from here in Collingwood and they are looking at the applications in pharmaceuticals of deuterium in a new area. So there is an innovative dimension.

So we work to show, as best as possible, that there are -- that in the wider knowledge economy of Ontario and of Canada the innovative science and technology dimension which is so important to our collective future has an R&D side with commercial applications that benefit many people. That is the real role to play. The industry folks will say how they do it and I don't want to get into that because I lose ground very quickly. They are the experts.

But I think putting it together in an understandable narrative is really what's missing and this is what I have tried to do at the CNA.

**THE PRESIDENT:** Well, to just piggyback on the same thing, do you have any kind of formal or maybe informal relationship with other countries industry associations?

**DR. BARRETT:** Yes.

**THE PRESIDENT:** Is there such an industry association and nuclear space to meet?

**DR. BARRETT:** There is not a formal like Mehta Association, if I can put it that way, an association of associations, but there are other like-minded -- for example in the United States the Nuclear Energy Institute and we have good relations with them, again learning from how they deal with things.

The different technologies and the different jurisdictions and how they handle the regulatory affairs is sometimes different enough that we come close in comparing, but sometimes have to show the differences. With the British, they have it; the French.

I have been working to develop these connections also in Asia because, as we know, that is an area where there will be more nuclear plants built and it is certainly in our national interest to ensure that there is safety wherever nuclear power plants are. So we want to also connect, connecting with the Korean Nuclear Association, Chinese and others in Asia.

So maybe that is something that will be my next challenge, to kind of spearhead that, but there are exchanges going on and these sometimes culminate in bigger meetings like the World Nuclear Association that is held in the UK in September every year. That's where a lot of us meet and compare notes.

**THE PRESIDENT:** Thank you.

Anybody? Any other questions? I'm sorry?

**MR. SCONGACK:** Could I just --

**THE PRESIDENT:** Go ahead.

**MR. SCONGACK:** James Scongack, for the record.

Just to add some more colour, if it's acceptable to do so with respect to your question, Mr. President, on how do member organizations of the CNA like Bruce Power participate on the international scene? This is something obviously that CNA facilitates and we are also members of the World Nuclear Association.

I happen to chair the World Nuclear Association Communications and Public Outreach function and this is a forum in which, to John's point, operators from around the world can share best practices in a lot of these areas and where some of the emerging nuclear countries can learn from those of us that have been in operation for a long time.

I can just give you two concrete examples. Over the last couple of years we have had a group visit us from both South Korea and Japan to actually benchmark the work that both CNA and its members do, in particular Bruce Power, with respect to public engagement. And one of the features I should say, and I think it is appropriate to mention, that they were very interested in, were the

requirements that came out, I believe, a couple of years ago by the CNSC on public disclosure and engagement. They very much have taken those standards back to their home countries to not only share with the regulators, but also to show how the operators have responded to those.

**THE PRESIDENT:** Okay, thank you. Any final comments? Okay.

**DR. BARRETT:** Thank you for the opportunity.

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

**CMD 15-H2.130**

**Oral Presentation by Chaitanya Kalevar**

**MR. LEBLANC:** The next submission was to be by Chaitanya Kalevar, but we have not gotten any news from Mr. Kalevar so we will consider his submission as a written intervention.

So we will go to the next submission, Mr. President.

**CMD 15-H2.109/15-H2.109A**

**Oral presentation by Canadian Nuclear Society**

**THE PRESIDENT:** The next submission is an oral presentation by the Canadian Nuclear Society, as outlined in CMDs 15-H2.109 and 15-H2.109A and I understand that President Plourde will make the presentation.

Go ahead, please.

**MR. PLOURDE:** Mr. President and Commissioners, good afternoon and thank you for giving the Canadian Nuclear Society the opportunity to speak to you today.

I have with me to help me out, Colin Hunt from the Secretary from the CNS and John Roberts as Past President of the CNS. Let's see if I can get the -- I didn't get the instructions I guess. Oh, there we go.

As a learned society of 1,100 members, we promote the safe and peaceful use of nuclear science and technology. We do this through advocacy such as today's intervention, through public education and outreach and by offering opportunities to our technical people to interchange and network. We believe that Bruce Power operates its nuclear facilities in a manner that is consistent with our objectives. In this brief presentation we would like to walk you through the key characteristics

of Bruce Power that support that claim.

In summary, these are the plant, the people, emergency preparedness post-Fukushima and community relations. Also, a crucial part of safe and peaceful operation is effective communication, both internally and externally, which is also a core objective of CNS.

It is impossible to talk about the physical plant without talking about the people who design, construct, operate, maintain and oversee it. Performance at Bruce Power has a lot to do with safety culture, whether you are talking about nuclear safety or conventional safety. Bruce Power employs from the top to the bottom of the organization. The employees understand and respect the energy contained in a reactor core. Evidence of this respect is obvious everywhere; adherence to procedures, strong oversight, both internal and external, environmental stewardship and use of industry best practices, just to name a few.

At Bruce, this healthy nuclear safety culture isn't limited to the safety of the core. It is ingrained in everything from radiation protection and working at heights to designing modifications. Needless to say that human performance is as important as equipment performance and I will talk a little bit more about that later.

The excellent nuclear safety performance at Bruce Power has been recognized by the international community. This is only achieved after all aspects of operations are scrutinized by industry peers and compared to standards representing the best practices of the industry from organizational effectiveness through maintenance and equipment reliability to industrial and radiological safety. Excellent performance doesn't mean that Bruce Power is sitting on its laurels. Continuous improvement is evident from the results of these periodic peer reviews and from the positive trend of the nuclear performance index at both Bruce A and B.

An important measure of overall plant performance is its reliability as an electricity producer. In 2014 all eight Bruce reactor units ran at a capacity factor averaging 84 percent and delivered one-third of Ontario's electricity needs. Bruce Power's goals of achieving high capacity factors goes hand in hand with that of achieving high performance in nuclear safety.

Look at the nuclear performance index for a minute. 30 percent of that index, 30 percent of that score is attributed to production performance. With that goal in mind, Bruce Power goes aggressively after its maintenance backlogs to reduce their risk to safety and production. It invests considerably in improvements to

equipment to increase reliability, address aging and combat obsolescence. It optimizes its outages to get the right work done at the right time, ensuring a reliable operation in between. Finally, it focuses on human performance to prevent errors.

All of these are focus areas that have proven effective over and over again in the industry at making the facility safe and highly reliable.

Now, more on Bruce Power people. Bruce Power clearly focuses on human performance, behaviours and expectations most particularly related to leadership in all areas and industrial safety and radiation protection. Since the return to service of Bruce A, Bruce Power has gradually shifted to a centre of site support structure where many functions like management, engineering, maintenance for example have been centralized. This is a powerful move that among other things, improves management oversight, improves teamwork and improves standardization, all of which increase safety and efficiency.

Human performance is very much impacted by changing demographics. At Bruce Power, in 2001 less than 15 percent of the staff was 36 years old or less. Today, about 40 percent is under 36. Yet, through comprehensive staffing and hiring plans the site has retained the expertise of the previous generations.

And, finally, at Bruce Power training is only one aspect of human performance. Data reinforcement in the workplace is the order of business. Human performance tools are provided, expectations are clearly stated and management at all levels from the first line manager to the Chief Nuclear Officer are in the field observing and coaching. Emergency preparedness is typically what the community uses as a measure of the nuclear operators' integrity and the performance of this facility.

Even before the Fukushima event, Bruce Power had embarked on a complete refurbishment of its emergency response capabilities for fire and radiological events. This has resulted in many enhancements, including new and upgraded emergency management facilities, upgraded emergency response capabilities, both equipment and personnel, enhanced communication within the site and with external agencies. That is very important, both internal and external communications, enhanced training and exercises for emergency situations.

History tells us that the most significant safety risk in nuclear accident, even a worst-case accident, is due to misunderstanding and poor communication. Through the above improvements, Bruce Power is effectively addressing this risk. Then there is the

Fukushima-Daiichi event to remind us that we can never be complacent. Canada's response to this event was next to none on the international scene and Bruce Power was an active player on the team. The Fukushima-Daiichi event was a total loss of site electrical power as a result of flooding from the tsunami.

At Bruce, as with all the other Canadian sites, it wasn't really possible to find a credible external event that could cause such a total loss of power, so the assumption was made that electrical power; normal, standby and emergency, could be totally lost anyway and measures were taken to ensure the fuel was cooled in the reactor cores and in the irradiated fuel base. These measures included emergency portable equipment, emergency engineering and hook-ups for these equipment and training, drills and exercises to ensure they were used effectively.

Transparency builds trust and trust is central to obtaining and maintaining social license to operate. After all, people are not truly safe until they feel safe and this means engagement of all demographic communities using any and all pathways available as technology advances and listening rather than telling.

Bruce has embraced this vital requirement of sustainable technological operation in the 21st century. In its endeavour to relate to the community, Bruce Power is

concentrating on employees, communities, First Nations, governments, media and investors. Various means of communications are in use, not only to reach out to these groups, but also to the general population through media, from local radio, television, to Twitter, Facebook, LinkedIn and using meetings with local organizations. In conclusion, safety excellence and high production performance are totally linked. The one feeds the other.

Bruce Power's facilities are internationally recognized as strong performers in both areas. Bruce Power serves as a high-technology focal point for Ontario. It provides highly skilled, highly paid jobs. It provides vendor and service provider opportunities and improvised partnerships with universities, colleges and other educational institutions.

And finally, remember that clean nuclear power means clean -- safe hospitals. The Bruce units produce cobalt-60 used in the sterilization of medical supplies. The Bruce site contributed significantly to a stable and reliable electrical power supply throughout Ontario.

This ends my presentation.

Thank you very much. Any questions?

**THE PRESIDENT:** Thank you.

Questions? Mr. Tolgyesi...?

**MEMBER TOLGYESI:** On your presentation page 6, one, two, third paragraph from the bottom you are saying:

"By contrast, the fatal accident rate for workers that Bruce Power and CANDU nuclear workers generally has been zero."

What does that mean, generally; it's 50 plus 1 percent, 99 percent? Where are you situated? I think it's maybe just a word which is not necessarily a good one. Page 6.

**MR. PLOURDE:** Which word?

**MEMBER TOLGYESI:** It says:

"The safety records of CANDU reactors..."

**MR. PLOURDE:** I will ask Colin to address this one as we try to find it.

**MR. HUNT:** Which paragraph are you looking at?

**MEMBER TOLGYESI:** CMD 15-H2.109, page 6, third paragraph from the bottom.

**MR. CLEWETT:** I think I can help with that. Len Clewett.

**MEMBER TOLGYESI:** And the last two lines.

**MR. HUNT:** Yes, okay. I think what that

implies is our typical lost time accident rate is zero. Most years, I think, as noted, we had between 2 million hours without a lost time and then followed by 13. We currently have 6 million hours, so typically year to year the LT<sub>i</sub> is zero and I think that is what is implied by that statement.

**MR. CLEWETT:** Yes.

**MEMBER TOLGYESI:** It is talking about fatal accidents, not lost time accidents.

**MR. HUNT:** Colin Hunt, for the record.

What was meant by that paragraph, if you look back over time, over three or four or five decades, there have been incidents of fatal injuries at nuclear plant sites across Canada, the usual sorts of things, falls, spills, drownings; those sorts of things.

When you look at -- however, what the point is, is that the fatal accident rate in Canada's nuclear industry across half a century has been so low that in most cases and most years the rate is zero and that by extension over the whole period the rate is -- the overall rate across five decades is so low as to be virtually zero. But to say it is zero for an extended period would be an incorrect statement.

**MEMBER TOLGYESI:** On the same page, just the paragraph above you are talking about:

"...there are clear differences between nuclear safety culture and safety culture generally within... any other industrial system."

What do you consider is a big difference? Why the safety culture in the nuclear industry is good or positive or performing compared to other industries or sectors? What don't they do right or what do they do wrong?

**MR. HUNT:** Colin Hunt, for the record.

That is an excellent question and it is worthy I think of a great deal of study and consideration as to why that is so.

It is true. You can look through just about any industrial or workplace accident index and you will consistently find nuclear power stations are consistently the lowest of all possible industrial accident listings within the electricity industry and the electricity industry in turn generally across OECD nations and in Canada is among the safest for workplace accidents, lost time accident rates of all industrial activities and it's worth considering why that might be so. I could suggest on a speculative basis one or two reasons for that here today.

One of them and, I think, it clearly has

some weight is that the nuclear industry is a comprehensively regulated industry. It has a safety culture generally across all nations with nuclear power. It has a regulatory body which supervises essentially all aspects of nuclear power plant operations and procedures.

There are very few other industrial activities in the Western world which are as comprehensively regulated in terms of their day-to-day activity and their overall business plan and method of operations the way nuclear power is. I do not think you can readily separate those two.

**THE PRESIDENT:** Mr. Tolgyesi? You want to leave it for now, okay.

Ms Velshi...?

**MEMBER VELSHI:** How many of your members, the 1100 members are Bruce Power employees?

**MR. PLOURDE:** That is a good question. I didn't come furnished with all that information, but I would venture to say in the area of 30 to 50 of the 1100.

**MR. ROBERTS:** John Roberts, for the record. I would like to add that there are also pensioners from Bruce Power who are members.

**MR. PLOURDE:** Yes. Yes. So yes, so the membership in CNS over the years, over the last few years have been recognized as being fairly weak at the sites.

The sites and barked on - you know, all of the sites in Ontario and barked in a fairly comprehensive performance improvement plan over the years and basically distractions such as this CNS, because we are actually a society of individual members, this CNS was someone looked at as a distraction and membership to drop and it is something we recognize. We have introduced over the last couple of years a utility engagement initiative where we have people identify Bruce site at OPG who are our representatives are going to help us rebuild this membership base. So our membership right now is probably very close to one third retirees, one third students and the rest employees. That's where we probably stand right now, roughly, okay?

**MEMBER VELSHI:** Thank you. In your written submission on page 3 where you have, "CANDU nuclear reactor performance", I was quite surprised to see that the Canadian reactors were some of the worst performers, some of the worst performing Candu reactors globally and at least from the CNSC's perspective, are there any key contributors to that?

**MR. HUNT:** Colin Hunt, for the record.

I think you're referring to Table 1 in the written submission.

**MEMBER VELSHI:** Yes, I am.

**MR. HUNT:** Yeah, not CANDU reactors, I

think you're talking about Canadian reactors.

**MEMBER VELSHI:** Yes, my question was, why are the Canadian CANDU reactors marked the worst-performing CANDU reactors worldwide? This is a list of all CANDU reactors worldwide; correct?

**MR. HUNT:** That is correct.

**MEMBER VELSHI:** And so the Korean, you know, the Cernavodas, I mean they're all -- I mean, they're much better than the Canadian reactors.

**MR. HUNT:** I'd be happy to answer that. In general, if you look at the in-service dates in that same table, in general you will discover that the offshore CANDU reactors are newer, in many cases considerably newer than the Canadian CANDU reactors and, as part of that, and it will be built into these both in terms of the particular performance in any given year and, most particularly, in the lifetime performance if they've already gone through it, some of Canada's CANDU reactors have already gone through a refurbishment program and these can involve one to two years, or sometimes even more, in terms of an extended outage while the reactor is being reconstructed.

In most cases, the offshore reactors have not yet gone through that, with one exception and that is Wolsong 1. So in a sense the lifetime performance may decline over time.

As a reactor gets to the mid-point of its life or after a couple of decades it needs to go through an extensive refurbishment program so that it may continue operation for another couple of decades.

And so this is what is leading to the effect which you are talking about.

**MEMBER VELSHI:** But I look at the Darlington and the Bruce B units that have not gone through refurbishment and their performance is in the 80s, as was the 90s or even the very high 80s of the others, so it must be more than just a refurbishment factor.

**MR. CLEWITT:** I can add a little bit to that. Len Clewitt, for the record.

I think it's to note on the Bruce units, over the past five years the Bruce B units have actually been in the high 80s and have had really the best performance on the life and that's due a lot to equipment reliability and new performance improvements.

The Bruce 1 through 4 units, I think as we noted, obviously unit 1 and 2 were shut down for 15 years and then also 3 and 4 went through some life extension, some very long adages that impact that performance.

So I think it would be a better measure to even look at, you know, recent performance, especially the Bruce B unit and which have been running in the high 80s

and we fully expect to see the A units, in fact the A units have a very good run currently and we expect them to really catch up to that Bruce B performance in the next 12 to 18 months.

**MR. PLOURDE:** Jacques Plourde, for the record.

Just to add to that, I fully agree with what you were saying, Len. If I look at the Darlington numbers, for instance, being a former Darlington person myself, it's obvious that, yeah, numbers are pretty good except for unit 2 and unit 2, as you probably remember, carries the fuel problem, the N-12 problem of the early 90s which resulted in over one year of shutdown after the unit had been declared in-service. So that's being carried from now.

So I do agree that perhaps the best indicator here would have been to show the trend in capacity factor and compare using the trend both looking at the size and the direction the trend is taking.

**MEMBER VELSHI:** Yeah, I think that will be an interesting metric to see how we're comparing.

**MR. PLOURDE:** Yes.

**MEMBER VELSHI:** And my last question -- sorry.

**THE PRESIDENT:** Before we leave this. I

find this really interesting. Has anybody done such comparison between other technology, not only CANDU? I know it's difficult, but if you can compare apples to apples.

So did anybody do a comparison between the various designs running all over the world and find a way of comparing them and taking away age issues, refurbishment issues, life extension issues?

**MR. PLOURDE:** Nuclear Engineer

International, for instance, will actually attempt to do that and take these numbers. Unfortunately they do take some of the same types of numbers, so that it becomes very difficult to do a very highly technical comparison.

My personal experience in this area as a strategic planning manager a number of years ago was actually to use data from other technologies in the U.S. and other countries to come up with a force loss rate improvement program.

And we actually went through this and looked at every bit of information that we could get on the performance of that plant, looking at the performance, looking at the investment, taking the investments and converting them to the same -- putting them on the same playing field because obviously a pressure vessel is different from pressure tubes and so on, the problems were

different.

So we tried to do that so that we could see how much investment was being put in, what made up their backlog and could we actually compare apples and apples eventually, and we did and we came up with a model which was based on a benchmarking with outside technologies, not only CANDU.

And that model was actually implemented successfully at Darlington and proved its effectiveness and...

**THE PRESIDENT:** So how did CANDU fare under this model compared to other technologies?

**MR. PLOURDE:** CANDU fares very well. CANDU fares very well, it's a competitive technology where it actually wins in its robustness on the nuclear safety side in terms of the stability of the reactor itself, the redundancy we have there which prevents the number of SCRAMS, for instance, that the U.S. have on their plants.

So when we compare the two, we do much better in performance on the reactor side and we do basically as well as they do on the turbine side, right.

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

**MR. HUNT:** If I -- Colin Hunt, for the record.

There's one more issue while we're on that

topic that you raised, Michael, that is probably worth mentioning at this point at least in passing.

On a public basis it's becoming more and more difficult to get data in certain places and for certain types of machines. For example, for about five years -- at least five years running now, there's been no performance data available from the United Kingdom and there's no performance data available for Ukraine for 2014. The former, my speculation -- my informed speculation is that it's for commercial competitive reasons and, in the case of Ukraine, it's civil war related.

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

**MEMBER VELSHI:** The last one is a comment and it's based on your Slide 5 on the people, and we've heard -- essentially aimed at staff -- we've heard from a number of interveners why just the one licence for the site. And what I hadn't appreciated, I mean, you know, I've heard mostly from staff, is the justification for the one licence is consistency in requirements, the administrative streamlining and so on, but it was in this presentation that I saw that you've gone through some organizational changes and centralized the organization, which is what we'd heard on the Pickering site which seems to then make the alignment much better.

So I just wanted to say that it's only in

your presentation that it finally hit home that, oh yes, there's some structural changes as well that have happened on site that lends to put that argument being stronger.

**THE PRESIDENT:** Questions? Mr. Tolgyesi...?

**MEMBER TOLGYESI:** If I may come back to that safety culture. You were saying that there are two reasons; one is because it's highly regulated. What was the other one?

--- Laughter / Rires

**MR. HUNT:** Colin Hunt, for the record. That was in fact the principal reason, it's highly regulated and as a highly regulated industry it encourages, it mandates a strong safety culture and de-fosters the conditions for a safety culture and the economic and business conditions for a safety culture within a commercial entity.

And when you look at safety -- I'm going to use a rather poor simile. This isn't like a supermarket where you can pick and choose out of the vegetable bin, you have to take the whole shelf.

So it's not as though you have good radiation protection, you have a high industrial accident rate. If you have a good safety culture you have good solid ratings across the board. If you have a plant which

has difficulties with its safety culture it has difficulties in radiation protection, in workplace safety, in all of the aspects of safety. It's not as though you can improve one at a time selectively and strategically, you approach a safety culture by improving all of them.

**MEMBER TOLGYESI:** So, Bruce, if you were not so strongly regulated --

--- Laughter / Rires

**MEMBER TOLGYESI:** -- your safety culture will get a setback.

**MR. CLEWITT:** Len Clewitt, for the record.

I understand a little different perspective that regulation, you know, may play a part in it, but I think it's obvious that to be a nuclear operator safety has to be a core value and we can't be in this business without treating safety with the outmost respect whether it's, you know, reactor safety, rad safety.

So I think it's about a passion, you know, of the workforce and the leadership to always strive to be excellent in safety and I think that's what, you know, really drives your real safety culture more than anything else, a respect for the reactor and everything that goes with it.

**THE PRESIDENT:** I think CNSC want to say something about this.

**MR. BOUCHARD:** André Bouchard, Director HOPD, Human and Organization Performance Division, safety culture is under my responsibility at the CNSC.

The nuclear industry is a bit special in a kind, it is and it was born from a global initiative because of all kinds of reasons and it actually grew through its learning activities. Unfortunately, we remember Chernobyl and all these things, Two Mile Island, it forced the industry to create what we call OPEX and inter-exchanges between the individual companies even across countries as well and that is the greatest strength of the current nuclear industry is the fact -- the learning capacity that goes beyond the borders that is enabling this industry to actually confront many challenges and run them through.

The sharing of events across the organization is a key item, as an example, that was not present if we look at the oil rigs that actually blew up in the Gulf of Mexico. So that oil industry needed to share expertise. And this is an acquired thing for the nuclear industry for decades.

**MR. BOUCHER:** For the record, Paul Boucher.

Just to add to the discussion around nuclear safety culture versus safety culture. There is a

unique characteristic around nuclear power that we have to be mindful and make sure we remind all our staff, and that is the decay heat that is available in the fuel, the radioactive nature of, you know, the product we have, and also the amount of energy that is stored in our reactors.

So that is very important that we put that into discussions with all our staff so they understand that unique characteristic, especially with new staff or staff that have come from a different type of technology, different industry. So that is why we try to talk to nuclear safety culture as being different than just safety culture.

**MEMBER TOLGYESI:** That was something what I hope to hear, that it is because of enhanced situation to the industry, and what you should be -- you should be always alert. That is why your safety culture should be different probably.

**THE PRESIDENT:** Mr. Jammal?

**MR. JAMMAL:** Ramzi Jammal, for the record. The question that was asked, I think it was by you, Mr. President, with respect to the CANDU, how they fair against the international reactors.

In our annual report of the CNSC, page 13, we have compared the unplanned trips and shutdowns of the CANDU in Canada against WANO figures. From 2011, Canada

has been slightly lower than the WANO, but as you go to 2012 we are almost 60 per cent lower than the WANO unplanned trips.

So that gives you the average of all performance with respect to Canadian CANDUs against the international reactors.

**THE PRESIDENT:** Thank you. Anybody else?

I just have one question on your page 8 on your submission. You have an interesting section about changing demographics. And we had a presentation from the Young North American Engineers. If I look at this table, I think these are diminishing returns, given the demographic, unless they are going to allow some of the VPs here or honourable members in this.

I guess what I am trying to find is is the industry going to have a kind of attraction, attracting enough skill to (off microphone) future?

I am not sure how attractive the future looks for Canadian kids in the nuclear (off microphone). So is that going to be a challenge? Because I see a retirement of 1,700 over this -- during the last 14 years. I don't know where you are going to get your replacement skilled labour.

**MR. SAUNDERS:** Frank Saunders, for the record.

I think the challenge in that is actually just how fast it happens all at once. And it is not a challenge replacing people. We get many more people applying to our ads than we actually hire. We have never had a problem actually attracting people to work.

It is obviously a challenge for any industry if you have to hire too many brand new people all at the same time, and so we: a) try to spread it out; and, b) try to hire not only young people but people with, you know, a mixture of experiences and so forth so that you have a balance.

But there is no issue, at least there hasn't been in the last 10 years, about being able to hire staff. I think we are a competitive industry, we pay very competitive salaries, it is a pretty rewarding job. And of course this neck of the woods is a great place to live, except for a few people who want to live in Toronto, you know, it is pretty attractive.

So that has not been our challenge actually, finding people, not a challenge. The fact that we kind of have a lot of people retiring at once, I think that is a little more of a challenge in terms to make sure you keep the skill sets and so forth in place.

**THE PRESIDENT:** But is there enough involvement in universities, in the nuclear engineering

faculties, in the physics or not?

**MR. HUNT:** Colin Hunt, for the record.

Mr. President, you may remember 15 and 20 years ago, this would be the latter half of the 1990s, the principal demographic -- and Frank is going to correct me if I am wrong on any of this -- but the principal labour problem, expertise problem which the industry was facing in the late 1990s was looking at a very narrow age spectrum of its workers, and it was looking at a very advanced age spectrum of its workers.

In other words, it was looking at losing a lot of people to retirement, so over the course of the next 10 years. And were we even going to have the people who were coming along out of increasingly attenuated training and university programs to be able to maintain and even enhance the performance of the existing nuclear infrastructure, let alone any new nuclear infrastructure?

What I think this table foreshows is that the industry did surpass that problem of the 1990s. That was I think a much more severe problem than the one to which you are referring today.

It has become quite clear that Bruce Power, and Bruce Power will not be alone in this, it may be they have done it very successfully, but they will not be the only nuclear licensee of the CNSC which shows a similar

sort of demographic transition. And others will have been as successful as Bruce Power has been at transmitting the technical knowledge and expertise of the previous generation to the new and current one.

**DR. WHITLOCK:** Jeremy Whitlock, for the record.

Mr. President, just to add, to answer your question. Unfortunately, the nuclear industry does not stand alone in this. It is all industries worldwide have problems this way. So Bruce Power is doing extremely well in getting people in, but it is a challenge worldwide, all industry.

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

Any last questions?

Okay. Last comment?

**MR. PLOURDE:** No further comments, except thank you very much.

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

**MR. LEBLANC:** So the next submission was to be an oral presentation from Ms Janet McNeill, as outlined in CMD-15-H-2.128. However, Ms McNeill sends her regrets, she cannot attend today and has asked that her intervention be considered as a written submission, which we will do at a later time, either today or tomorrow.

Mr. President?

**THE PRESIDENT:** So we shall move to the next submission, which is an oral presentation by the Township of Huron-Kinloss, as outlined in CMD-15-H2.44.

And I understand that Mr. Twolan will make the presentation. Over to you.

**CMD 15-H2.44**

**Oral presentation by Township of Huron-Kinloss**

**MAYOR TWOLAN:** Thank you very much, Mr. Chair.

My name is Mitch Twolan and I am the Mayor of the Township of Huron-Kinloss and also the Warden of Bruce County. The Bruce Power site lies within Bruce County and is a neighbour of Huron-Kinloss. Bruce Power is a key contributor to our local economy and a vital member in the economic viability of Bruce County.

As Mayor of Huron-Kinloss I am here to show my support for Bruce Power's five-year licence renewal application. Bruce Power has consistently proven it can steadily supply large amounts of safe and reliable electricity with no adverse effects to the residents of the Huron-Kinloss Township or the County of Bruce.

I have been fortunate enough to tour the

Bruce site on numerous occasions and am always impressed with the cleanliness of the site, the open and honest way the company communicates with elected officials and members of the community and its ongoing commitment to the safety of employees, neighbouring communities, and to the environment.

Bruce Power is an important part of the Bruce community, providing thousands of high-paying secure jobs for residents which result in strong business sectors and healthy, well-educated residents.

The continued long-term growth of Bruce Power contributes vastly to our municipal and county-wide development initiatives. The company also gives generously to the community events, organizations and groups that are the lifeblood of our towns and villages.

Without these donations, about \$1.3 million annually, many non-profit community groups would cease to exist, leaving large gaps in services in our communities.

As a partner of Bruce Power, the Township of Huron-Kinloss looks forward to many more years of success for the company, and I urge the Canadian Nuclear Safety Commission to renew Bruce Power's five-year licence. Thank you.

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

Dr. Barriault?

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

Chairman.

During the emergency response planning, has your community been involved in this --

**MAYOR TWOLAN:** Yes.

**MEMBER BARRIAULT:** -- exercise? It has? Were you satisfied with the outcome?

**MAYOR TWOLAN:** Very. And actually, the whole process was a very educational process, to say the least. And what we found out, that where there was gaps is probably in the communication end of things between our local fire services, the emergency services of the county, and maybe a little more communication with Bruce Power as a whole with regards to that exercise.

But I know our fire chief was very satisfied with the exercise. And I would like to elaborate as well, we have many of our volunteer firefighters who are actually Bruce Power ERT members. So they bring that expertise to our local municipality as well.

**MEMBER BARRIAULT:** Thank you.

Bruce, has anything been done to improve the communication between the two?

**MR. SAUNDERS:** Yes. In fact, I mean one of the lessons learned out of this was that communication

is a struggle when you get seventy-some agencies involved, right? So we have gone to a much sort of broader situational awareness tool so that emergency centres in the counties and other places can bring up the tool on the web and get the communication that way, as well as by telephone or other means.

And we have enhanced our own system so that we are completely off the grid now, we can go via satellite to the network and by the phone so that we can talk with virtually everyone. We have radio communication if all else fails.

So one of the key learnings was really about the amount of data that is flowing when you get a lot of agencies involved and how you kind of pull all that together.

So I think we are in better shape today than we were. Not all of the emergency centres yet have backup power and the like in some of the county and townships. But that is a thing that we encourage people to do, because you need the power if you want to be able to communicate at the end of the day.

So I think we're better. We'll probably never be perfect, and I expect there's a lot more work to do, but we'll keep running the exercises and challenging the system and making it better.

**MEMBER BARRIAULT:** Is there any plan to retest the system that you've...?

**MR. SAUNDERS:** Yeah, next year, 2016.  
Yeah.

**MEMBER BARRIAULT:** Okay, thank you.

Thank you, Mr. Chair.

**THE PRESIDENT:** Any other questions?

Okay, thank you. Thank you for the presentation.

--- Off microphone / Sans microphone

**MR. LEBLANC:** The next submission was supposed to be an oral presentation from Ms Monica Whalley as outlined in CMD 15-H2.129. Ms Whalley has informed us that she will not be able to make it today and has asked that her presentation be considered as a written submission, which we will do either later today or tomorrow.

Mr. President.

**THE PRESIDENT:** The next submission is an oral presentation by AMEC Foster Wheeler, as outlined in CMD 15-H2.45.

I understand that Mr. Tulett will make the presentation.

Please proceed.

**CMD 15-H2.45**

**Oral presentation by AMEC Foster Wheeler**

**MR. TULETT:** Chairman Binder and members of the Commission, good afternoon.

For the record, my name is Martin Tulett.

Thank you for the opportunity to speak before you on behalf of the AMEC Foster Wheeler and Bruce Power on seeking its five-year licence.

As some of you may recognize, I spoke before this Commission as the deputy vice-president of Pickering in 2013 in defence of Pickering's five-year licence. That experience is actually what brings me here today.

Today I'd like to present you with some very simple factual measures that I think every industry should be judged on, basically safety, reliability, cost and environmental performance. I believe by every one of these objective measures I will show that nuclear provides better performance than the alternatives.

This first chart comes from IESO data, the Independent Electricity System Operator. It shows the generation mix in Ontario in 2014, last year. You can see that while nuclear is only about 37 per cent of the capacity, it supplied 62 per cent of the power in the

province.

By the same token, less than 5 per cent was generated by wind and solar despite an installed capacity of 3,700 megawatts. Thirty-seven hundred megawatts is larger than Darlington, and yet wind and solar produced one-third of the power that Darlington produced last year.

I will say that 90 per cent of the generation last year came from CO<sub>2</sub>-free emission sources, which I think is something Ontario can be very proud of.

What this data also shows is the utilization of the asset. For wind, what this is showing is that, if you take the total installed capacity and how much power was actually produced by the asset, it only actually produces about 30 per cent of the time, and that number is fairly common across the world. By comparison, nuclear is producing 84 per cent of the time. Essentially, it is about three times more reliable.

Because of the unreliability of wind, every megawatt of wind has to be backed up by a megawatt of gas, and that's very relevant to some of the other data I'm going to show you here in a second.

Installing the 3,700 megawatts of new capacity for solar and wind, and backed up by gas, comes at a cost. This is 2013 data, again, from the IESO and also

from OPG and Bruce Power's annual reports. What this shows is that there was 151 terawatt hours of power consumed in the province in 2013, and the average price the consumer paid was \$85.70 a megawatt-hour.

This is strictly generation cost. Your bill's a lot more than this. It does not include transmission costs. It does not include strands of data. It doesn't include other charges on your bill.

So \$85.70 a megawatt-hour was the average price paid by the consumer.

On the left here is the amount of generation produced by each generation type. So Bruce Power at the top, OPG nuclear, OPG hydraulic, and then the alternatives: gas, wind and solar.

From the Bruce Power annual report the average price that Bruce charged for the power was \$60 a megawatt-hour. For OPG nuclear, the average price was \$57.80 a megawatt-hour. So the consumer, on average, is paying about \$59 a megawatt-hour for nuclear, and 60 per cent of the generation came from nuclear.

For hydraulic, obviously it's the cheapest source of the power in the province, it's \$38.80 a megawatt-hour -- this is from OPG's annual report -- and it provided about 24 per cent of the generation.

The reason I'm showing you this is that if

you do the math on the remaining 16 per cent of generation, what the consumer actually paid for it was \$261 a megawatt-hour, over four times the price of nuclear. Four times.

So the notion that nuclear is expensive is a myth. The actual price paid by the consumer in the province is way below what they're paying for alternative forms of generation.

This next chart comes from the World Health Organization. I apologize, this is kind of a morbid statistic, but it's basically the number of deaths caused per terawatt-hour of electricity produced across the entire world. This includes Chernobyl. It includes Fukushima. What it's showing is that nuclear by far has the best safety record. It's three times better than wind, 10 times better than solar and 100 times better than gas, in terms of deaths per terawatt-hour.

Earlier we were talking about Canadian safety performance. There actually has never been a death caused by a commercial operation of nuclear power in the U.S. or Canada, so that number would be zero if you were looking at the Canadian performance. That's an outstanding safety record.

This is showing that nuclear is strong on costs, strong on safety.

Earlier we were talking about: why is it so strong on safety? We talked about the regulatory influence. I think that's certainly a contributor. There's self-regulation through the World Association of Nuclear Operators and MPL. I think that a long time ago nuclear management figured out that getting safety basics right was just part of good business: if you can't do the safety basics right, you can't run the business properly and you won't be profitable.

So getting the safety basics right results in a well-run business in nuclear power.

The next chart comes from the European Integrated Pollution Prevention and Control Bureau. It shows CO<sub>2</sub> emissions over the life cycle of a generating asset from construction, through operations, and decommissioning. Here nuclear is virtually tied with wind; however, when one considers that every megawatt of wind must be matched by gas generation, the actual performance of the combined two is shown with a purple bar.

Ontario's nuclear plants avert over 60 million tonnes of CO<sub>2</sub> emissions every year. Bruce Power alone counts for half of this amount. If every jurisdiction in North America and the rest of the world could claim the same, global warming would not be the crisis it is today.

These measures that I've shown you on safety -- reliability, cost, environmental performance -- has basically shown that nuclear power is the best alternative.

Finally, I'd like to make some comments about Bruce Power.

What I see with Bruce Power -- and obviously Bruce is a client of ours, so I've worked very hard at this presentation to make sure I've been objective. But what I can tell you, what I see about Bruce Power, is it's a company that really believes in its asset, and it's investing heavily in its asset. The facts supporting that are the output from the plant has doubled in the last nine years. That comes from bringing Units 1 and 2 back on line, but also in improvements to the capacity of the other operating units. It's equivalent to at least 30 million tonnes of CO<sub>2</sub> aversion annually.

The Bruce B units, their forced loss rate is world class, and I'm happy to see that this year the Bruce A Unit's, particularly Bruce 1 and 2, are starting to move in that direction. There's very good signs there. That comes from investment in the asset and just making sure that the asset is taken care of and is running properly and safely.

Many intervenors here have talked about

the outstanding safety performance: 22 million hours worked without a lost-time accident. You are safer in a nuclear power plant than you are in an office environment. That's a fact. It's safer than the majority of professions.

From a social economic perspective, Bruce Power has recruited 3,200 staff in the last 13 years and, as you've heard from many intervenors today, it's very actively engaged in community engagement programs.

By conclusion, I think by every objective measure that nuclear is a great choice: its safety record is at least three to 10 times better than it's alternatives; its cost, at least in this province, is one-quarter of the alternatives; its reliability is three times higher; and it's environmental performance, as I've shown here, that's 60 million metric tonnes at least of CO<sub>2</sub> averted each year.

I believe the public benefits from regulation. One of the things that I've learned, in moving over to the private sector and being part of the large worldwide organization, is that the CNSC is actually benchmarked as a regulator.

Alternative forms of generation are virtually non-regulated. I think that's part of the reason why you see the safety performance that you're seeing.

I believe Bruce Power is a responsible owner, it's safely delivering a product of immense value to society and I'd strongly recommend that you give Bruce Power a five-year licence.

Thank you.

**THE PRESIDENT:** Thank you.

Questions?

Do you want to start, Dr. Tolgyesi?

**MEMBER TOLGYESI:** On your slide number 4, you're talking about fatal accidents, death rate. It's for a specific period, say 2013 or 2012, or it's for a long period of time?

**MR. TULETT:** It's basically since the generation form has started, so it's cumulative, it's not annual.

**MEMBER TOLGYESI:** Now, you were saying also that historically in Canada there were no fatal accidents due to operations?

**MR. TULETT:** Due to commercial operations, correct.

**MEMBER TOLGYESI:** That means that there are some others which were related to the sites, for instance, construction or whatnot? Because if you say that it was not due to commercial operations, it means that it was something else, it could be something else.

**MR. TULETT:** Yeah. I mean I don't actually know that for a fact. I don't know the construction statistics. I only know the operational statistics. So I know the operational statistics are zero. I don't know what the construction numbers are.

This number, again, it's the whole world. So this includes Chernobyl, Fukushima and every nuclear facility basically that reports out on the data.

**THE PRESIDENT:** What's the date of this report?

**MR. TULETT:** Where is it from?

**THE PRESIDENT:** It's from the WHO?

**MR. TULETT:** Yes.

**THE PRESIDENT:** Which year? When was this study?

**MR. TULETT:** I think this study was published in 2009 but I'm not a hundred percent sure of that. There are other studies done by Centres for Disease Control, the National Academy of Science. This is the only one I could find that actually shows the whole world. Some of them are focused on one sector, some of them are focused on one country, but it shows similar data.

**THE PRESIDENT:** Staff, have you seen this report?

**MR. JAMIESON:** For the record, Terry

Jamieson, Vice-President of the Technical Support Branch.

There are a number of such studies. The WHO is one. Staff are very familiar with the Nuclear Agency study, which is actually worldwide and encompasses a few more energy sources than were shown on the intervenor's slide.

**THE PRESIDENT:** Thank you.

Monsieur Tolgyesi.

**MEMBER TOLGYESI:** No, that's it.

**THE PRESIDENT:** Anybody else?

**MEMBER MCDILL:** This would include -- for nuclear, would it include the uranium sector or is it just power generation?

**MR. TULETT:** That's a good question. I would be speculating if I gave you the answer. I don't know.

--- Pause

**THE PRESIDENT:** Sorry, are we waiting? I missed something here.

Okay, Dr. McEwan.

**MEMBER MCEWAN:** So you didn't discuss coal? I mean there's still a lot of --

**MR. TULETT:** No. I didn't actually show coal because it's not an alternative in Ontario. It's not available. Coal would dwarf all of this data. These forms

of generation are much safer than -- you know, hydraulics are dominated by a few dam failures, one in Italy. Coal is dominated by mine accidents and it would dwarf this data. I'm purely trying to show here how it compares to green alternatives.

**THE PRESIDENT:** Ms Velshi.

**MEMBER VELSHI:** I don't think this picture is complete in that the biggest concerns that we hear over and over again are the irradiated fuel, the waste that's around for zillions of years, severe accidents and the risks around that.

And so, I know these four factors, you have presented them as being key elements of decision-making. The two that are of the biggest concern, how would you try to capture those so that it's a full picture that's presented?

**MR. TULETT:** Yeah, I really haven't here. What I've done is -- I think there's lots of attention on those two issues and there's lots of data around those issues. I think one of the things I've observed is that we're kind of missing the really big picture and what I tried to do here is put the really big picture together.

**MEMBER VELSHI:** It's just that you fall into the same trap that it's not a full picture and you've been selective in which factors you have presented.

**MR. TULETT:** No. You know, I could talk about bird deaths and wind. I mean the point here is that from a big picture perspective it's -- yes, every form of generation has its clubfoot and each has its advantages and disadvantages but when you look at it from a big picture perspective, nuclear does look like a very good choice for society.

**THE PRESIDENT:** Anybody else?

On your slide 2, you know, on the cost -- sorry, on slide 3, on your cost.

**MR. TULETT:** Yeah.

**THE PRESIDENT:** One thing we always hear about in trying to compare costs is that we're not including all in, you know, the investment in the construction, et cetera, et cetera. Are these costs representing all-in costs?

**MR. TULETT:** Yeah. I mean the decommissioning costs and the waste costs are all built into the price of power. So from that respect, they are, they are all in. And as you know, that's regulated and it's watched and, you know, there's regulation to make sure that fund is kept up to the right level.

**THE PRESIDENT:** So this monthly rate, you know, bill about this -- I don't remember what it's called again --

**MR. TULETT:** Oh, the stranded debt cost?

**THE PRESIDENT:** Yes. Is that part all in it?

**MR. TULETT:** No. This is just strictly generation costs.

**THE PRESIDENT:** So the stranded debt, as the argument goes, was the historical investment in the construction, right?

**MR. TULETT:** Right.

**THE PRESIDENT:** It went over. So should it have been in or shouldn't it have been in?

**MR. TULETT:** There's all sorts of debate about that right now. The Auditor General pointed out that the stranded debt has actually been paid for and so why are we still paying for it. So from that respect, if you believe the Auditor General, those costs are gone and this is real life cost today.

**THE PRESIDENT:** Okay.

Anybody?

**MR. SCONGACK:** Hi. James Scongack for the record.

Mr. President, I just think -- just to maybe follow up on the question, maybe I can provide a bit more colour with respect to the cost issue that you're trying to get at in your question.

So I'll just speak to Bruce Power's price of power and what that includes because I think it's the best example than kind of a broader look.

So in 2014, we were paid just over 6 cents a kilowatt-hour for our output. As the gentleman mentioned, when we're looking at the cost of nuclear power, that accounts for all the management of low-, medium- and high-level waste, includes funding for the eventual decommissioning of the facility, which is a CNSC requirement, and in the case of Bruce Power, I like to say, has the mortgage on it, the money we spent on the facility, \$7 billion to extend the life, and that's at 6.2 cents. So that is in fact, as we would like to say, an all-in price paid to Bruce Power.

Just by comparative purposes, and I'm not going to reference other generation sources, but overall the average price for power paid in Ontario in 2014 was just over 9 cents a kilowatt-hour. So nuclear on average, and the Bruce and OPG numbers are quite similar, about 30 percent below the average cost of electricity.

So, you know, one of the big challenges I think that we have when we're communicating is we talk about billions of dollars of investment and people associate that with a very high price of power. So we've really tried our best to really focus in on what would it

mean on your bill.

And in fact, if you download our app -- and I am putting a bit of a plug-in for our app -- you can calculate the various energy sources and what impact that would have on your bill.

I hope that helps.

**THE PRESIDENT:** Thank you.

Any questions? Any further questions?

Monsieur Tolgyesi.

**MEMBER TOLGYESI:** It's just to make sure you were -- I'm going back to your slide number 4. When you are talking about death rates, gas, solar -- you said coal you don't consider because there's no coal generation now.

Now, you didn't include -- maybe you don't know if uranium mining is included in nuclear. And it's the same thing for -- I was asking for gas, you know, because there's two sides, one is production --

**MR. TULETT:** Right.

**MEMBER TOLGYESI:** -- the other one is generation of power, and that means probably in gas, you don't know either if it's --

**MR. TULETT:** Yeah. It's a good question. I just don't know if this data includes the entire lifecycle for these assets or whether it's just the

generation portion.

**MEMBER TOLGYESI:** Okay. Because when you're talking about solar or wind, it's simple to build the facility and to operate, whereas when you're talking about gas, it's production and transport --

**MR. TULETT:** Right.

**MEMBER TOLGYESI:** -- to the generation, then production of power and distribution. The same thing for nuclear. So just make sure that we compare apples to apples.

**MR. TULETT:** Yeah. Fair enough.

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

**MR. TULETT:** Thank you.

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

Any final comments or you're ready to go?

--- Laughter

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

I think we need to do a break here and we will reconvene at 4 o'clock.

--- Upon recessing at 3:46 p.m. /

Suspension à 15 h 46

--- Upon resuming at 4:02 p.m. /

Reprise à 16 h 02

**THE PRESIDENT:** Okay, we are ready to go.

**CMD 15-H2.49**

**Oral presentation by**

**Lake Huron Centre for Coastal Conservation**

**THE PRESIDENT:** The next submission is an oral presentation by the Lake Huron Centre for Coastal Conservation as outlined in CMD 15-H2.49. I understand that Mrs. Scharfe will make the presentation.

Please proceed.

**MS SCHARFE:** Thank you. Good afternoon, Mr. President and Commission Members.

For the record, I am Pamela Scharfe, Chair of the Lake Huron Coastal Centre, also known as the Coastal Centre. I am here today representing the Board of Directors and staff and appreciate the opportunity to speak in support of Bruce Power in the application to renew its operating license for the next five years.

The Coastal Centre is a nongovernmental organization dedicated to conservation and form stewardship of Lake Huron's coastal ecosystems. Formed in 1998, it has become a leader in research, education and community

stewardship outreach.

The objectives of the Coastal Centre are defined by our letters patent, which are to preserve, protect, restore and improve the natural resources environment of Lake Huron; to promote shoreline conservation through demonstration projects, education programs and local stewardship initiatives; to promote increased dialogue, communication and cooperation amongst levels of government, citizens and community groups in conserving the Lake Huron environment and to promote coastal related academic research be carried out along the Lake Huron shoreline.

The strategic direction of the organization is based on four environmental priorities which are biological diversity, climate change, coastal processes and water quality. The biological diversity of Lake Huron's coast is being compromised by over development, fragmentation of forest areas, the spread of alien invasive species and damage to sensitive coastal environments

Climate change, as we all know, has far-reaching implementations for the Lake Huron environment. All of us who work, rest or play along the Lake Huron coast will and are being affected.

Coastal processes like water level

fluctuations, flooding, erosion, coastal wetland processes and beach and dune systems are vital to the ecology of Lake Huron. The quality of our nearshore coastal waters and estuaries have become a point of concern for the Lake Huron community in recent years.

The Coastal Centre works locally at the grassroots level with many community partners, including local municipalities, conservation authorities, universities and organizations such as Freshwater Future and Living Lakes Canada.

The Coastal Centre has been formally recognized for its work in the environmental sector. In 2004 we were awarded the State of the Lakes Ecosystem Conference, also known as SOLEC, Award of Excellence by the Councils General of Canada and United States and in 2003 we were awarded the Ontario Minister of the Environment's Award of Excellence for our role in our coastal education and stewardship.

Our organization has been most fortunate to have developed a good working relationship with Bruce Power over many years. Bruce Power has shown great interest in the work of the Coastal Centre and has been able to support some of our major initiatives.

Notably, Bruce Power has been the major sponsor of the Coastal Centre's biannual conference which

is called, "Is the Coast Clear?" which has become one of the primary environmental conferences held in the Lake Huron region. The conference attracts approximately 150 delegates who were provided with the opportunity to hear from internationally recognized Great Lakes region experts on current and emerging environmental issues affecting our lake.

Along with its sponsorship, Bruce Power's staff participated in the conferences by moderating sessions, introducing keynote speakers and participating as delegates.

Recently, Bruce Power staff have engaged with the Coastal Centre to address some key environmental issues in our local community. Through a partnership with the Coastal Centre and the Municipality of Kincardine, Bruce Power assisted with the control of *Phragmites australis*, also known as a common reed, which is an invasive grass that has invaded the coastal wetlands in and around the Bruce Power site.

Bruce Power has also expressed an interest in assisting the Coastal Centre with the implementation of our updated strategic plan by offering their site and surrounding areas for a pilot study that will involve an improved data collection and biophysical features of coastal ecosystems.

Bruce Power has also involved the Coastal Centre with its own corporate initiatives such as the "Experience Green" event posted on site for their employees and the Eco-Mentors program that brings energy conservation and waste management education to the local schools. This all important work for the community would not happen without the support of Bruce Power.

We value the contributions and commitments of Bruce Power to the local environment and the many partnerships it has developed with organization's like ours, working to make long lasting improvements to the coast of Lake Huron. The Corporation regularly goes above and beyond expectations of support and our praiseworthy neighbours on the coast of Lake Huron.

We look forward to continuing with our good working relationship in the future and I appreciate on behalf of the Board this opportunity to speak this afternoon and I would be pleased to answer any questions.

**THE PRESIDENT:** Thank you.

Questions. Dr. Barriault...?

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

Thanks for your presentation. We heard yesterday that there has been a 1.2 meter drop in the water level at Lake Huron. What impact has that had on the

coast?

**MS SCHARFE:** The water -- the fluctuations up and down are actually good coastal processes that we like to see.

**MEMBER BARRIAULT:** Okay.

**MS SCHARFE:** Unfortunately what happens, the people who build right along the coast panic. So when the water is low they complain about that. When the water is high they complain about that. But from the Coastal Centre's perspective, it's like our native Indians always say never build on the water, come to the water during the season where you can appreciate and explore it.

But it is important from an ecosystem perspective. This is natural to see the high and low levels and it is important to the coastal ecosystems and people need to adapt and not be building right along the shoreline.

**MEMBER BARRIAULT:** Thank you.

Thank you, Mr. Chairman.

**THE PRESIDENT:** Question?

Dr. McEwan...?

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

So in the top of page 2 of your letter, in the first paragraph you discuss a data collection plan that Bruce is supporting. What are the outcomes of that? What

are you trying to achieve and is it likely to lead to anything bigger after pack up?

**MS SCHARFE:** It's early days. It's a new project that the staff have brought to the Board and it's part of our -- we have revised our strategic plan, but it is within looking at our four core priorities. So I don't have a lot of details about it.

It is early stages and we are just now talking to different universities that are also interested in the project and Bruce Power are excited about that opportunity to be able to partner with us.

**MR. SAUNDERS:** Yes. No, I don't think we -- I mean it's just part of our ongoing desire to gather information and understand what's going on. So people that are interested in doing that, then especially if they do it in a science-based sort of university fashion we are happy to support.

**THE PRESIDENT:** Question?

So following up on that, we have been hearing a lot from, you know, Aboriginal local residents. Do you have any interaction there? They are very much interested in conservation.

What kind of work do you do with this community?

**MS SCHARFE:** You're speaking of the First

Nations community?

**THE PRESIDENT:** First Nations.

**MS SCHARFE:** We have had conversations, typically we -- depending on wherever we have project sites, wherever the local within their jurisdiction -- typically you don't meet with them all at the table. You meet individually. So wherever we have projects and it's within a First Nation community, we always reach out to partner with them and they do the same with us as well too. And that has been the history since the inception of the organization in 1998.

**THE PRESIDENT:** So as an agency, a non-profit agency in the conservation business, how would you rate now the health of Lake Huron and the coast lines?

**MS SCHARFE:** With respect to the water quality, people will say that the water quality has degraded, but in fact if you look at historical water quality sample results from the three health units that are on this lakeshore, from Tobermory down to Sarnia, which is Grey Bruce Health Unit, Huron County Health Unit in the middle and Lambton County in the South, the water quality actually has not degraded.

There has been some spikes. We see it when we have heavy torrential rainfalls. It is usually whatever is on the land ends up -- it will go to the lake.

But historically in the last 30 to 40 years the water has not degraded, but it is keeping tabs on it. We have never had any algal blooms in terms of blue algae. There are sporadic algae problems up and down the lakeshore, but they are very specific to whatever is happening in that watershed.

But the coastal processes that we are most concerned about right now is the erosion that's happening. We have a lot of gullies. There is a lot of pressure that comes off the agricultural lands, also with peoples' septic systems. It's multifaceted with respect to the coast and the ecosystem that is impacting that. And right now one of our biggest issues is the erosion that is happening along the coast.

**THE PRESIDENT:** Okay. Thank you. Anybody else? Any final words?

**MS SCHARFE:** No. Just thank you again for the opportunity.

**THE PRESIDENT:** Thank you for the presentation.

**MS SCHARFE:** Thank you.

**CMD 15-H2.138**

**Oral presentation by Kinetic Knights Robotics, Team 781**

**THE PRESIDENT:** I would like to move now to the next submission, which is an oral presentation by the Kinetic Knights Robotics, Team 781, as outlined in CMD 15-H2.138.

I understand that two students will make this presentation and I understand that Mr. Courtney will start. Over to you.

**MR. COURTNEY:** Thank you, Mr. Chairman. I'm sorry. I just had to learn how the microphone works.

My name is Joel Courtney. I am the President of the Kinetic Knights Robotics Charitable Organization which funds Team 781, of whom we have two representatives seated here in front of me. Before we begin I would like to make just a quick statement about the written submission. There were a few quotations in there, one by which was -- they are all from students on the team and the value of the program, which are all true and they all greatly value the program. However, they wanted to clarify a few particulars. One is that they just would not like to be listed by name in that written submission, so I would like to have that removed. But I did promise their

family I would make a statement here and so I have made it.

About myself, I was on a robotics team when I was in high school down in Oakville and then now that I work here at Bruce Power I am also involved in a robotics team here. We very much support them in the community, just as they support us, and we support this submission for license renewal.

And to talk more on that, I will let the students in front of me introduce themselves and we will take it from there.

**MS WATTERWORTH:** Hello, I'm Darby Watterworth and this is Alex Pagnan.

We are representatives from Team 71, the Kinetic Knights, a community-based robotics team. Every year we work to teach youth skills and inspire them in science, technology, engineering and math. On behalf of Team 781 we are here to support Bruce Power's application for their license renewal.

Bruce Power founded our team in 2001 and since then has continued to be our leading donor. Through the last 13 years, Bruce Power has provided donations to Team 781, allowing us to continue our work of inspiring youth and stem, supporting our community and providing a safe, productive atmosphere for students to learn, as well as practice skills they have learned in school and in our

program. Bruce Power is also a source of guidance to our team, as roughly 65 percent of mentors are either current employees or retirees of Bruce Power. Our mentors are extremely important to our program and our students, providing us knowledge, guidance and training from communication skills to safety practices.

**MR. PAGNAN:** In 2004 Bruce Power was asked by FIRST Canada to create a safety program to be included at the Canadian regional competition. Bruce Power worked with Team 781 and tried the program at the regional that year. It was a huge success and Bruce Power then donated the program to be used in all first robotics competition events across the globe.

Bruce Power continues to provide safety values to all Canadian regional events today. As a result of the support Bruce Power gives Team 781, we have been able to help students grow and develop critical life skills, including teamwork, communication, leadership and problem solving. We encourage our students to use their knowledge and pursue further education and careers in both stem and non-stem related fields as 100 percent of team graduates in just the past five years have pursued postsecondary education.

We have had word from Team 781 alumni travelling the world for international co-op placements and

a number of secure positions in some of the world's leading stem companies, including Bruce Power. On behalf of Team 781, we support Bruce Power in their license renewal. Thank you.

**THE PRESIDENT:** That's it? I'm just checking.

--- Laughter / Rires

**THE PRESIDENT:** Okay.

Questions? Dr. McDill...?

**MEMBER MCDILL:** So tell me about the 2014 team that made it to the world championship.

**MS WATTERWORTH:** So recently we have competed in many different competitions, so one of them at the Greater Toronto Regional East at the UIT campus and Durham College and we also went to North Bay at the Nipissing and Canador College where we competed. We have recognition for being very well on safety. We have also received the gracious professionalism award, which means we have been providing help and guidance to other teams while in the midst of competition.

We have also recently won the Engineering Inspiration Award, which recognizes the team that continues to inspire members of the community and all of their endeavours in science, technology, engineering and math.

**MEMBER MCDILL:** Congratulations from all

of us.

**MS WATTERWORTH:** Thank you.

**MR. SAUNDERS:** Yeah, you actually should see what they can do with a bunch of robots that they made themselves. It's kind of -- it's really fun to watch and it's a big challenge for the students.

I should mention, though, that aside from just Bruce Power, our two unions were wholly involved in this, both the PW and the Society, so it was kind of a team effort to help do this and when we talked about the safety program it was a joint effort on our part to put that forward.

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

**MEMBER VELSHI:** So what is the origin of 781?

**MR. PAGNAN:** So the organization we are part of we're called FIRST Robotics, which stands for for inspiration and recognition of science and technology. Teams, they register and they get given a number. So we are the 781st team.

--- Laughter / Rires

**THE PRESIDENT:** Dr. Barriault...?

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

The robots, to you get them to use them in

an industrial setting and in and around the reactors or anything like that? No?

--- Laughter / Rires

**MS WATTERWORTH:** No, we do not.

--- Laughter / Rires

**MEMBER BARRIAULT:** No fun, eh. Okay.

Thank you.

**MR. SAUNDERS:** Not these ones, but we certainly use a lot of robots so we learn from the technology and Mr. Newman here probably has more robots than anybody in the world, I think.

--- Laughter / Rires

**THE PRESIDENT:** But it is a growth industry because we just saw the Japanese develop a whole new set of robotics to go into some of the cores to try to take a look.

**MR. SAUNDERS:** Yes, I mean it is. Robotics actually are an important part of our business, all kidding aside, and depending on what you view as robotics. I mean if you look at the advances we have made in being able to sample pressure tubes and these things, it's all because you can do it robotically and reduce the amount of exposure that people have to add to the dose, so you can do more, you can do it easier.

So it is a major part of the business of

piping, inspections at hard to get out places and things like that, and it has become a very kind of commonplace tool almost. They are not common, but they are used frequently, right.

**THE PRESIDENT:** Question? Mr. Tolgyesi...?

**MEMBER TOLGYESI:** Could you tell us, who are your members? Where they are coming from, Kincardine or from the area or from elsewhere? What is the age group that your members have?

**MS WATTERWORTH:** So we have -- our team consists of males and females between the ages of 12 to 19. We have students from Kincardine and surrounding areas such as Ripley, Tiverton. We have students that go to the Kincardine District Secondary School that are home schooled and one that -- actually two of them that went to Walkerton.

**MEMBER TOLGYESI:** And how -- what do you do when you go back to school? The Team 781, your members, when you are going back to your schools, respective schools, do you talk about, do you diffuse, do you transfer information or are you asked, you know, from other -- by other students as a kind of knowledge or source of information?

**MS WATTERWORTH:** So we do, do

demonstrations, at schools in our areas from JK -- from elementary schools to public schools and even at our high school. After the 2011 we were in the world championship finals. After that we did huge presentations in our area to all of the different schools trying to get them interested into our program.

Our team is currently 10 percent of the Kincardine District Secondary's population. We have also worked with students that are not just in our program, but we work with students on the student Council and OSAID and all different organizations within our schools.

**MEMBER TOLGYESI:** My last. Are there some Aboriginal schools in the area and, if so, do you have any members who are Aboriginal from Aboriginal communities?

**MS WATTERWORTH:** Our endeavours and focus within the next year are extending first and stem -related activities onto the reserves, as well as to Owen Sound. So that is one of our main focuses for the next year.

**THE PRESIDENT:** Okay. Anything else?

**MEMBER TOLGYESI:** No.

**THE PRESIDENT:** So without putting you on the spot, are you aspiring to become an employee of Bruce? Is that your target in life?

--- Laughter / Rires

**MS WATTERWORTH:** I'm going into supply

chain and logistics management and I hope to get a job as a purchaser at Bruce Power and as well I plan on going into project management and becoming a scheduler.

**MR. PAGNAN:** I plan to be going into mathematics next year, so we will see where that takes me.

--- Laughter / Rires

**THE PRESIDENT:** All the best to you guys. Thank you for the presentation.

**MS WATTERWORTH:** Thank you for having us.

**THE PRESIDENT:** Thanks.

--- Pause

**CMD 15-H2.64**

**Oral presentation by Rev. Ruth MacLean**

**THE PRESIDENT:** The next submission is an oral presentation from the Reverend Ruth MacLean, as outlined in CMD 15-H2.64.

Reverend MacLean, the floor is yours.

**REV. MacLEAN:** Thank you.

Mr. President and panel, I thank you for this opportunity to speak and it seems like I am the first fish swimming against the current. I am a resident in Kincardine and a third generational cottage owner about seven miles south of here in Huron-Kinloss. As a teenager

in the 1960s, I toured the new Douglas Point nuclear plant.

I love Lake Huron and I am concerned about the risk that the continued presence of Bruce Power, the largest nuclear plant in the world, imposes on this great Lake and many in our community share this concern.

What is a reasonable risk? The dictionary defines reasonable as having the power to sync connectedly and reach conclusions. The definition of risk is to take chances on, to speculate, to expose to danger or peril. Responsibility is a state of being answerable or accountable, both morally and legally. Indeed, Bruce Power, as a private industry is responsible for the whole of Lake Huron for they have the capacity to destroy the whole lake.

The CNSC's determination of reasonable risk is based on limited factors founded and manipulated by computer modelling. A major radiological release such as Fukushima or Chernobyl is predicted as a one in a million year event and therefore since it is considered an unlikely probability, is not even included within the parameters of your risk analysis, yet in actual reality the world has witnessed a major nuclear accident every 10 years, Three Mile Island, Chernobyl and Fukushima and many minor operational radioactive releases, including at the Bruce. To think connectedly means an inclusive, holistic approach.

It includes our moral obligation to protect the Great Lakes; health studies on the effects of radiation on those living near a nuclear power plant and also on our local food sources, including tritium; the irreversible environmental impact of a nuclear accident; the destructive effects of uranium mining on indigenous communities in Canada and globally, their health, land and water.

As 30 more years of nuclear power necessitates more uranium, to continue to cause harm to others is unethical and the unsolved problem of nuclear waste. Reasonable means a truthful realization of all these factors.

Risk. What would happen if a major radiological release, a Level 7 accident like Fukushima, which four years later is still releasing radioactive water into the Pacific Ocean were to happen here on Lake Huron? How would drinking water be supplied for the millions of people who live on the Great Lakes? What is your plan for this?

What would be your compensation for local farmers if their milk, meat and grains were contaminated and their lands rendered uninhabitable, if the winds blow and lake currents carry contamination beyond the 10 km zone to Kincardine or Bruce Beach or inland? Are we not included in your emergency measure plans?

What are your evacuation plans for this area if an accident happens in winter when Highways 21 and 9 are closed, as they often are, for a week or more.

As citizens we question the financial black hole which nuclear power plants have become. We are still paying off the debt retirement charge from the Bruce Plant. Spending \$60 billion or more on refurbishment cannot be justified when this money could create a safe future with renewable technologies.

Refurbishment of six reactors means more highly radioactive tubing and core reactor parts possibly buried in a DGR beside Lake Huron which OPG admits could leak into the lake. Indeed, how can 10 years of blasting and drilling on the site of eight nuclear reactors to build a DGR possibly be considered reasonable when we don't know what disturbances could happen? We object also because there is no acceptable solution to nuclear waste.

Huron-Kinloss and other nearby communities are being tempted by the end WMO to accept all of Canada's used fuel possibly buried at a DGR near Lake Huron. Thirty more years of maximum production greatly increases the amount of toxic or radioactive waste.

There has been no analysis of a large-scale accident with eight reactors on site. Your current assessment considers only one reactor. The impact

on the whole Bruce Power site, eight reactors, stored nuclear waste and a possible DGR must be considered. Indeed, a safety case must examine all factors involved in order to be complete and truthful.

We are not willing to accept the increasing exposure to nuclear danger for another 30 years, especially as aging reactors become less safe. It is only speculation that all will be well. A reasonable conclusion is that this, the risk is too great to impose on the Great Lakes and future generations.

I request that the Panel not grant a five year license to extend operation of both Bruce A and Bruce B. And though I understand it is not part of these hearings not to authorize refurbishment of six reactors, as human beings we need to wake up to the irreversible damage caused by nuclear radiation and decide that the risk is simply not acceptable. No amount of energy nor jobs nor economic benefits are worth such consequences.

Truly, we need not just science but our spirituality, not just our minds, but our hearts. We can and must make better choices for the future of our children and our planet.

Thank you.

**THE PRESIDENT:** Thank you.

Questions? Dr. McEwan...?

**MEMBER MCEWAN:** So, Reverend MacLean, thank you for that presentation.

On page one of your -- sorry, yes -- on page 1 you talk about reasonable risk based on limited factors bounded and manipulated by computer modelling. Those are quite striking words and they have very specific, to some minds pejorative meaning. Can you explain what you meant by that, because it really wasn't clear to me?

**REV. MacLEAN:** Well, I suppose my words are a little unsure of the content. However, health studies are not included. Nuclear waste is not included. I mean the factors -- I have listened to the DGR hearings and I know there it was discussed how the factors being used to analyse reasonable risk were based upon certain criteria and others were excluded, so that is what I am basing those comments on.

You need to look at all of the factors in a reasonable risk, including the possibility of a major nuclear accident, which to my understanding has not been included in the analysis of risk.

**THE PRESIDENT:** Staff...?

**MR. HOWDEN:** Barclay Howden.

In order for the plant to be licensed it has to have a robust safety case which includes all the items that are dealing with risk and potential risk to the

public. We have quite a robust system to do this but, I think, to boil it down into a couple of areas, the safety cases are built first on deterministic safety analysis which leads to the defence in depth, which we have explained quite a bit in detail; leads to your engineered barriers, safety systems, control systems and programmatic controls and emergency response.

The other part is the probabilistic safety analysis which complements it as part of the safety case and gives you a probabilistic model of the plant where you can examine potential vulnerabilities to your barriers and then you can focus your measures there. So I think those two together, along with the programs do give you actually a very holistic view of the safety case of the plant.

If you drive down into the details it can be very confusing at times because there is a lot of technical things that go in there, but holistically it all pulls together to show that the plant has a robust design. And when we come to the conclusion that when we make recommendations to yourself, we do make it on the basis that we believe that the plants don't pose an unreasonable risk to people, the environment, security and fulfilling the obligations that we have internationally. So that kind of rolls it up together.

**MEMBER MCEWAN:** So if I go to the Reverend

MacLean's sort of second point with respect to that, is the single unit risk and the multiple unit risk. How do you start building confidence that there is a comparability from the one to the other?

**MR. LAFRENIERE:** Ken Lafreniere, for the record.

So the original probabilistic safety assessments were on an estimate, a point estimate of a single unit. So as Mr. Howden said, it's one of the many multiple factors we take into account when we talk about safety.

When we narrow it down, we talk about risk, we use the PSAs on a single unit basis essentially so that we can look at risk differentiations with different accidents and different options.

There is some technology that we're working on now to look at the aggregation of the whole site. That work is ongoing and our technical specialists will fulfil the remaining part of the answer.

**MR. HOWDEN:** Yeah, I'm going to ask Ramzi Jammal just to tidy it up a bit, then pass it back to our specialist on the aggregation work. Thank you.

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

I will pass it on to Mr. Frappier, but the

question is very valid, what is usual risk?

The principle of safety cases was described as based on the defence in depth principle to start with, for each and every unit. So we'll put the emphasis on, for our intervener she can -- actually we can provide her with the information, it's the INSAG -- International Nuclear Safety Advisory Group at the IAEA itself and, as a matter of fact, the CNSC in Canada is the only regulator in the world that applies and implements the five levels of defence in depth which includes: the normal operations, events during normal operations or accidents potentially that occurs during normal operation recorded at level 1, level 2, level 3, level 4, level 5.

As we go down into the levels, we start to look at even the spent fuel bays, the irradiated fuel bays to take into consideration the waste, to take into consideration all of the elements associated with the operations.

So that is from the safety case principle of defence in depth. So we look at an accident within normal operation and accidents beyond the design basis which stresses the whole system with respect to the safety case itself.

But we've put the emphasis on each and every single station and then from there on we determine

the safety associated for every and each station.

I'll pass it on for Mr. Frappier with respect to his point of view as Director General for Directorate of Assessment.

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

A couple of things first. I think we're going to talk a lot about this tomorrow, but to give a little bit of a snapshot as to the particular intervener's concerns, I think we have to remember that what's been done in the past, what has been done up until now is to look to create and to design and to operate a reactor such that there's not going to be an incident at the reactor. So it's very focused on each individual reactor must be safe, as opposed to trying to have an aggregate look.

So for in each case the design approach has been, as was mentioned, heavy on defence in depth to make sure that the radioactivity -- the radioactivity in a given unit, in a given reactor has multiple barriers to ensure that it does not get to the outside environment.

We've looked at that from a deterministic safety assessment, the original designs, as was talked about yesterday I believe, where again you take an approach of looking at all the potential failures of significance and how you ensure that, again, the radioactivity would not

have -- would not be able to escape, will be contained. The risk associated with that accident is controlled and to the level of it being unreasonable to expect it to -- or to ensure that there is no unreasonable risk, rather.

And then a third set of analyses, it's a little bit more modern if you like, and as Mr. Jammal had mentioned that Canada actually is quite leading, is to approach it using probabilistic safety assessments.

Using a probabilistic safety assessment, you look at the probability of every single piece potential failure, how those combinations could lead to something that would be unreasonable, first of all, from the perspective of making sure the core does not get damaged and, secondly, to go through even further and take a look at what's called level 2 which is, if the core did get damaged, how would you still prevent the radioactivity from going out or what is the probability of having a large release.

So there's been multiple angles looked at here, and I do agree with the intervener's point that it's been focused on a unit and that's because we're trying to design that unit to ensure that it poses no unreasonable risks at all and that's been the main focus up until now.

The Commission has given us some directions to take a look at site-wide probabilistic safety

assessments and that is a new approach that we're going to be looking at over the next year or so.

**MR. SAUNDERS:** So I think there's a little bit of confusion that we should try to sort at this part because I've heard it a couple of times now.

There's a difference between what we calculate in a single unit event and what we mean by aggregating the site risk.

When we do a single unit calculation on PSA it includes all the common mode events, so it does include all the effects from the other units and, in fact, the release categories, if you look at the large release categories, the majority of that component is made up of multi-unit events. If it weren't for the multi-unit events that would mostly be zero.

So they've already calculated it in. We express this on a unit basis and that is why when people say, let's just add it up and get the site one, it doesn't really work because you're double counting it all, right. So that's why it's a little bit of a challenge to do.

So it's not true to say we don't consider multi-unit events, we do, they are in the release categories; it's when you want to create this new number that we haven't really defined yet about what a site risk looks like and start saying, well, what's the risk because

there's just more of them there, you know, the numbers weren't created for that purpose.

So it's a little bit more difficult to add it up, but when you look at the actual release categories it does include multi-unit accidents. That's part of that release.

**THE PRESIDENT:** We're going to spend a lot of time on some of the technical jargon associated with this tomorrow. So there's other issues that were raised by the intervener, I suggest we move to other issues.

Dr. McDill...?

**MEMBER MCDILL:** Only to say that the emergency management will be discussed on Thursday. So you have some questions about evacuation and Highway 21, hopefully we'll deal with those on Thursday. I hope you'll be here.

**THE PRESIDENT:** But I think we actually specifically asked -- maybe you should repeat what's going to happen on Highway 21 and 9 when they're completely snow-bound.

I think that's what the intervener implies.

**MR. SAUNDERS:** Yeah, I think there's issues of all kinds of things you have to prepare for in weather.

And I should start out by really just thanking the Reverend for her sincere thoughts because, I mean, it's important that we hear them and it's important that we have a discussion.

But we do think in terms of weather and other things in terms of how we can carry out emergencies. On site we do have plows, as do the counties and others, and we have coordination and efforts that we can move people if we need to move people away from the area using plows and other things to plow the road in front of you, if we need to.

We expect those are very low probabilities and not very likely to happen, and the farther you are away from the plant the less significant it would be at any rate.

So we haven't forgot about weather. Like you, we live in Bruce County so we're used to winter and we know the expectation, but over the next day hopefully you will hear some of this and be more convinced that we're safer than we sound sometimes when you just think of the word nuclear.

Certainly from a company point of view, it's in our great benefit to operate the plant safely.

We, too, have a lot invested in, have no great desire to have anything go wrong ever at the plant.

**THE PRESIDENT:** Other questions?

You have the last word.

**REV. MacLEAN:** Yes. What about the fact that you are generating more nuclear waste which we might be responsible for burying here in this community by continuing to produce nuclear power?

**THE PRESIDENT:** Are you asking us?

**REV. MacLEAN:** Well, I had the last question and that hadn't been responded to. Thank you.

**THE PRESIDENT:** Okay. Staff...?

You do know that this DGR is now in deliberation, this is the Panel and we'll have to wait until they come up with their own determination.

**REV. MacLEAN:** Yes.

**THE PRESIDENT:** And I guess it will at that time, but in the meantime you may want to talk about fuel waste for the future.

**REV. MacLEAN:** Excuse me, there's also here -- in Kinloss, there's the two DGRs in our community. So the more nuclear waste that's produced it comes here, possibly.

**THE PRESIDENT:** All right. Go ahead.

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

For each and every site as part of, as

mentioned before, that there is a safety case that encompasses the waste itself.

Regardless of what the decision is going to be, safety is paramount and the Commission when it gives its approval looks at the safety with respect to the existing process and procedure by the licensee to ensure that the handling of the waste is of safe manner and, in specific, the waste associated with a CANDU-produced reactor, which is completely different than the Fukushima.

So the CANDU burns natural uranium, hence the criticality and other factors associated with the irradiated fuel bays or what happened in Fukushima will not occur in a CANDU reactor.

However, as the President mentioned, that the deep geological repository panel is in deliberation with respect to their decision, but regardless of what the operator decides to do and the existing facilities and the waste management is an oversight by the CNSC to ensure that the operators, whatever they decide to do, is safe, otherwise we will not allow them to operate, we will shut them down. That's one element.

The other element with respect to the fuel waste for the future, Canadian utilities independently from the government, as part of their operation, must have in place financial guarantees for decommissioning and a

financial contribution with respect to long-term waste management, and that is an act under the Government of Canada where the future generations will not be burdened nor paying for the fuel waste generated now or in the future.

**THE PRESIDENT:** Okay. Thank you. Thank you for your presentation.

I would like to move now to the next submission, which is an oral presentation from Dr. Ulsh. If I am pronouncing it right?

**DR. ULSH:** Yes.

**THE PRESIDENT:** As outlined in  
CMD 15-H2.120.

Dr. Ulsh, the floor is yours.

**CMD 15-H2.120**

**Oral presentation by Brant A. Ulsh**

**DR. ULSH:** Thank you, President Binder.  
Good afternoon, my name is Brant Ulsh.  
And I would first like to thank the Commissioners and especially the participant funding program for allowing me to participate in this important hearing.

I will make every effort to do as good a job at speaking deliberately as the previously speaker did.

I am somewhat challenged in that regard, being an American, but I hope that you will overlook that handicap.

Also the agreement that I signed with the participant funding program made it very clear that I should speak in terms that the public would find understandable. Again, I am challenged in that regard, being a scientist, but I will do my best.

I too bring a different perspective from what you have heard up to this point perhaps. I am a certified health physicist and I am active in the International Radiation Protection Association. I am also President-Elect of the Health Physics Society's Environmental and Radon Committee.

However, I do need to make it clear that I am here as a member of the public, not as a representative of those organizations, so the opinions that I express are my own.

I also hold a Ph.D. in radiological health sciences, and from 2001 through 2003 I was a postdoctoral fellow at the McMaster Institute of Applied Radiation Sciences in Hamilton.

I tell you that just so you can evaluate my qualifications to give you a somewhat informed opinion today.

The focus of my research while I was at

McMaster and in the 10 years since has been the effects of low doses of radiation both on humans and on non-human species that are exposed in the environment.

My remarks will specifically focus on some research that I collaborated on recently that looked at the effects of low concentrations of tritium on fish. I know that that is a topic of great interest to the public. I will also conclude with some personal observations that I offer as a somewhat distant neighbour from the south.

So for the benefit of the public, I know that a lot of the -- certainly the Commissioners and the CNSC understand this, but just a brief few words on tritium.

It is a radioactive form of hydrogen that emits very weak radiation when it decays. It is a natural part of the environment and it is produced in the atmosphere by natural processes. It is also produced in CANDU reactors like Bruce.

And in the environment tritium is found mostly in the form of water, so anywhere that water goes tritium goes. And because it is radioactive, governments around the world have established limits on how much tritium is allowed to be in drinking water with the goal of protecting human health.

Internationally, these limits range from a

high of about 76,000 Bq/L in Australia to 7,000 Bq/L here in Canada, to 740 Bq/L where I am from, in the U.S.

And according to the latest environmental monitoring data available, tritium emissions from Bruce result in a maximum public dose of 0.0004 mSv per year. And to put this into perspective, this is about 2,500 times lower than the public dose limit in Canada, and it is about 250,000 times less than the lowest dose that we know can cause negative public health effects.

So from a human health perspective, the tritium from Bruce, at the levels that it is currently emitting, simply do not pose a human health hazard.

But what about non-human organisms like fish upon which the public and especially aboriginal people depend? Is the tritium from Bruce causing any negative impacts in these species? And we heard a very interesting presentation this morning about the whitefish research that is being conducted. I listened very attentively to that.

But answering this question was the goal of the research project that I mentioned earlier that I have been involved with recently. And over the past couple of years I have had the privilege of collaborating with researchers from the Canadian Nuclear Laboratory to investigate the effects of very low concentrations of tritium on fish species.

We exposed fish cells to concentrations of tritium ranging from natural background on the low end and the concentrations that one finds in the waters near the Bruce Power Plant that form the low end of the range that we looked at. And on the high end we looked at concentrations that were somewhat higher than the Australian standard.

And our goal here was to look at the adequacy of international drinking water standards for tritium. We performed eight distinct tests of biological effects. Due to time constraints, I won't go through all of the intimate details of those tests. But our approach was similar to that that is take by a doctor when he orders a panel of blood tests for a patient.

Each test is designed to tell the doctor a piece of information relating to the patient's health. And by analogy, each of the eight biological tests that we performed were designed to give us a more complete picture of the health of the cells that we were exposing to tritium.

These tests were designed to be very very sensitive to detect effects at the cellular level, which typically occur at far lower concentrations than you would begin to see effects in whole organisms or in populations of organisms.

For each test we compared the effects of cells that were exposed to varying concentrations of tritium, to the effects that we saw in controlled cells that were only exposed to natural background.

So what did we find? Well, as expected, we found the tritium does indeed cause breaks in the fish DNA. And this agrees with decades of research on biological effects of radiation and it would have been quite surprising if we saw any other result.

Now, this might seem like a cause for alarm. But it is important to remember that even normal activities, as mundane as breathing oxygen, cause thousands of DNA double-strand breaks in the cells in our body. And this is a completely normal occurrence and cells have evolved defence mechanisms to deal with this damage, if they didn't they wouldn't be here.

The question is, did this DNA damage have any negative health consequences for the cells? Well, the answer is no. And if anything, we saw just the opposite.

We found that tritium concentrations up to 100 times higher than the concentrations observed in fish near Bruce actually somewhat protected fish cells from dying. And we also found clear evidence that the cells were responding to tritium exposure by using energy, but it was less clear what the cells were using that energy to

accomplish. Of course, you can't really ask them.

Our results did not show that the cells were repairing the DNA damage and we saw no evidence the tritium concentrations, even 10,000 times higher than those in fish near Bruce, had any negative effects on the cells' abilities to reproduce.

So taken together, the results of our research show that, as expected, tritium causes breaks in fish DNA, but this tritium exposure appears to protect the cells from dying and it does not appear to be having any negative effects on the cells' ability to reproduce.

Our results are consistent with a large body of radioecology research that spans decades, and I believe that it shows that the levels of tritium in the water and in the fish near Bruce is far below those that cause negative effects in fish.

So now for some personal observations. I currently live in Cincinnati, Ohio. So, like I said, you can consider me a distant neighbour from the south. And I also come today not only because I have a professional interest, but I have two children, one of whom was born at the McMaster Medical Centre, so he has dual citizenship, he is a Canadian citizen. And I am a frequent visitor here.

Well, unfortunately, the American Lung Association has ranked the area where I live in Cincinnati

as having the eighth worst air quality in the United States, and there are a lot of factors that contribute to that. But one very significant contributor is the line of coal plants up and down the Ohio River where I live.

And in fact, I live just minutes from the Zimmer Power Plant. And history of that plant I think provides some interesting lessons for your deliberations here today. The Zimmer plant was originally scheduled to be a nuclear plant.

But in 1982 pressure was brought to bear on the regulator in the U.S., the U.S. Nuclear Regulatory Commission, to order a halt to construction. And very shortly after that the decision was made to convert Zimmer to a coal plant.

As a result of that decision everyday my family and I breathe air that is polluted with benzene, toluene, dioxins, lead, mercury and 79 other nasty compounds. So what should we do? How can my family and our neighbours have both a safe and reliable supply of electricity and clean air? Well, we don't have to look far to find the solution, we just have to look north.

According to the Ontario Ministry of Environment air quality in this province has significantly improved over the past 10 years with decreases in several pollutants.

How did you all do it here in Ontario? Well, by phasing out coal plants and replacing that electricity by bringing the laid up Bruce reactors back online.

Ontario's nuclear power plants now supply about 60 per cent of the electricity used in the province and coal supplies 0 per cent.

By contrast, 67 per cent of Ohio's electricity is supplied by coal and 12 per cent by nuclear. Ontario has clean air and Ohio has polluted air. It is really that simple.

Every time nuclear plants have been prematurely shutdown air pollution has increased; it has happened in Germany, it has happened in Japan, California, Wisconsin, Vermont, Maine, and I might add that at least those locations in the States where that has happened has been economically devastating for the communities that it affected.

Following a similar course would be snatching defeat from the jaws of victory.

I respectfully support the CNSC staff's decision to recommend a renewal of Bruce's operating licence for the sake of public health and a clean environment in Ontario.

I would be happy to take any questions the

commissioners might like to ask.

**THE PRESIDENT:** Thank you.

Questions. Who wants to start?

Dr. McEwan.

**MEMBER MCEWAN:** Thank you for the presentation.

**MR. ULSH:** Thank you.

**MEMBER MCEWAN:** Very interesting.

If I just look at the DNA repair data that you presented, page 13, you mentioned that breathing oxygen will induce a repair response.

If you were to look at any of us sitting in this room and look at the amount of gamma-H2AX -- maybe you could explain what that is too -- would we find levels that were measurable in whatever tissue samples we looked at?

**DR. ULSH:** Well, since I'm off the clock, I will take a crack at explaining what gamma-H2AX is.

Yeah, it's a protein that cells use to repair DNA damage, specifically double-strand breaks. We have a test where we can attach a fluorescent marker molecule where, when we shine the right kind of light on it, it gives us a little glowing signal. We can count the number of signals that we get in the cell and get some kind of an estimate of how much DNA repair is being accomplished

there.

To answer the second part of your question -- what levels would we expect to see in people just sitting here? -- yes, it would certainly be above zero because we all carry damaged DNA in our cells as a matter of course.

The data in the graphs that you're referring to, as I mentioned, compare the levels of repair in cells exposed to tritium compared to those that were not, and we did not find significant differences, which was somewhat of a surprising result to me. I expected them to perhaps be initiating repair.

But the more that I thought about it, until cells are challenged to divide, there's really no reason for them to repair that damage, as long as it's not so severe that their function is compromised. It's only when they begin to reproduce that it's important to repair that damage so that, well at least in humans, they don't become cancerous. I don't know that fish get cancer, but they certainly can get tumours, so...

--- Off microphone / Sans microphone

**THE PRESIDENT:** Ms Velshi.

**MEMBER VELSHI:** Thank you for your presentation.

The study that you have presented, has

that been peer reviewed and published, and is it publicly available?

**DR. ULSH:** It's in the process. With my colleagues, I've written a draft manuscript that we intend to submit for publication. We're very near that.

So the answer to your question is, no, not yet, but in the near future it will be.

**THE PRESIDENT:** Questions?

Let me ask you this -- and, again, I'll try to use layman's language here -- your conclusion here is that low-level radiation could be beneficial or -- let me ask you technically -- you don't believe in the linear model.

**DR. ULSH:** Well, a couple of points to make here.

The linear model, if you're talking about the linear no-threshold hypothesis, is a model that is used for human cancer, for regulatory purposes. It's very controversial even in that application. There's no de facto reason to assume that model would apply to a non-human species in a non-cancer endpoint.

From a statistical modelling standpoint, you might start with a linear model. That might be one that you would test. But my experience with the vast body of research on the effects of low doses of radiation would

certainly encourage me to include other models to test. Hormesis is one of those models. It's a theory that generates testable hypotheses, and I think that we should test it. It's nothing more and nothing less than that. Same with the linear no-threshold model: it generates testable hypotheses, and they should be tested.

Now to directly answer your question about whether or not our research shows that there's a protective effect, there is certainly some suggestion of that. The suggestion is stronger. In one of the cell lines that we looked at, it was statistically significant. In the other cell line, there was a suggestion of that, but it was not statistically significant. So I'm a bit more guarded in my conclusions on that second cell line.

But, yeah, there is some very -- there is some suggestion of a protective effect. But we're talking about very low levels of tritium, and so the effect was not a large one.

**THE PRESIDENT:** So talking about tritium, you know you put the chart of the different limits, the different countries are using. It's very interesting to see the range.

**DR. ULSH:** Yeah.

**THE PRESIDENT:** Is there a right number here?

We are getting a lot of representation that 7,000 in Canada is too high and some people are using -- rather than a limit, they're using kind of a target.

What's your view on that?

**DR. ULSH:** My view on that is, yes, there is a right answer, but there's not one right answer.

The limits are set in the countries, the individual countries, based in part on politics, value systems. You can't expect necessarily that those calculations would come up with the same answer here in Canada as they might in Australia. In Australia, they sure look to be a lot tougher than the rest of us because their limits are much higher.

From the results of my research that I've been talking about here, I would conclude that, from a public health standpoint, there's really no difference between Australia's limit, on the high end, and the limit in the European Union, and even that proposed by the Ontario Drinking Water Advisory Committee, much lower, I think 20 becquerels per litre.

Biologically speaking there's no benefit to that because we don't see an effect even at 100,000 becquerels per litre, but that's going to be a value judgment for Canadians to make.

**THE PRESIDENT:** Value judgment? I thought we were talking about a human-being. There's nothing wrong --

--- Laughter / Rires

**THE PRESIDENT:** There's not much difference between Australia and America and us.

**DR. ULSH:** Well, I can only speak as a scientist, and I can tell you that I don't see any evidence that people who live some place where the limit is 76,000 becquerels per litre are at any higher risk than those that live in a place where it is 740 or somewhat lower. The risk is -- it doesn't exist in either case, at least according to the data that I've seen.

**THE PRESIDENT:** Questions?

Dr. McDill?

**MEMBER MCDILL:** Maybe since we're in the Canadian context I could ask staff to briefly repeat the source of the 7,000 in Canada.

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

The 7,000 in Canada is a guideline derived by Health Canada from WHO recommendations, the World Health Organization recommendations. Environment Canada takes part in the WHO drinking water standards-setting working groups and have adopted, with some modifications, the WHO

recommendations.

As the intervenor has mentioned, most environmental standards in Canada and in other jurisdiction, be they for human health protection or environmental protection, are essentially policy decisions based, in part, on science and in part on the level of environmental protection/health protection that society expects and politicians expect, and so it is really a policy decision based both on science and societal expectations.

The science essentially points to no adverse health effects at these very low levels. From a socio-economic point of view, the work that is done by Health Canada, for example, in studying drinking water standards -- they do a cross-country survey identifying levels of various substances and municipal drinking water supplies, in wells that are used for communal drinking water supplies -- look at the science, and would look at how many, for example, drinking water supplies would need to be treated to meet a certain level and they do a cost-benefit in terms of the benefit, in terms of health protection versus the feasibility and cost of treatment. That's usually how the standards are set.

So there really are policy decisions that are based on, hopefully, good science, but also good policy

decisions.

**THE PRESIDENT:** Any questions?

Well, thank you. Thank you for the presentation.

--- Off microphone / Sans microphone

**THE PRESIDENT:** I'd like to move now to the next submission, which is an oral presentation by JGRchem.inc. as outlined in CMD 15-H2.47.

I understand Mr. Roberts will make the presentation.

Here you are again.

--- Laughter / Rires

**MR. ROBERTS:** Thank you, Dr. Binder.

**MR. ROBERTS:** I was supposed to change my tie so you'd say I wasn't the same person.

--- Laughter / Rires

**CMD 15-H2.47**

**Oral presentation by JGRchem.inc**

**MR. ROBERTS:** Anyway, good afternoon, Mr. President, Commissioners.

My name is John Roberts. I'm the president of JGRchem.inc. My consulting company offers services to the nuclear industry in the areas of chemistry,

materials, and related areas.

I'm a chemist, chartered through the Royal Institute of Chemistry. My background is in analytical chemistry and nuclear power station chemistry and materials. I have spent almost 45 years, initially in Magnox reactors, and later in CANDU reactors, on two continents, being accountable for station chemistry and environment.

I am here to answer any questions that the commissioners might have to ensure that they have an appropriate understanding of the crucial role played by hydrazine in not only protecting the long-term integrity of the assets, but, more importantly, protection of the environment with respect to controlling fish and product release.

**THE PRESIDENT:** Okay, who's going to start the discussion. Mr. Tolgyesi?

**MEMBER TOLGYESI:** You are quite positive about hydrazine?

**MR. ROBERTS:** Very much so. I first encountered it in 1970.

**MEMBER TOLGYESI:** So, tell me, to what extent the presence or absence of hydrazine may influence the probability of a kind of severe core damage or large release. Could it be related at all or absolutely not?

**MR. ROBERTS:** I never used the term "large release" in my presentation. However, the point is that if you have hot steam generator tubes, hot boiler tubes, and you get oxygen in there, the probability is you're going to pit those tubes.

The trouble with pitting corrosion is once it starts you never know when it's going to stop and then when it's going to start again. And so if you get pits, you can end up in the long term getting holes in your steam generator tubes and that is now a path for potentially fission products to get to the environment. So keeping hydrazine in the boilers is a very good thing.

You can move the other way around, and we had a very aggressive corrosion mechanism in plants near here in the early 2000s and it was successfully stopped by hydrazine. A term I didn't use in my presentation is that it's called a "cathodic depolarizer." Basically what it does, you put hydrazine in there in sufficient concentration, not high concentration, and it drops the potential. You drop the potential, you drop the corrosion rate, you stop the corrosion.

It does other good things as well, what we call "reduction," and changes the chemistry of various compounds in there. So it basically protects the plant and, as a result of protecting the plant, you end up not

releasing fission products.

**MEMBER TOLGYESI:** So, staff, was it included or it is included in the calculation of risk? When I was talking about this severe core damage or large release, severe release, it is included or it's not considered?

**MR. LAFRENIÈRE:** Ken Lafrenière for the record.

It is included indirectly in the failure rates of the components which come from actual data. So the assumption the intervenor is making, if I'm reading him correctly, is that with the use of hydrazine, the failure rates of components, pressure tubes, anything susceptible to rust, is diminished because of its use. So in that way, it is included in the overall risk estimates.

**MEMBER TOLGYESI:** But you don't know or we don't have an order of magnitude of how much is that? Because if you say, okay, there are some submissions where they were discussing hydrazine as a material to remove. So how will the risk increase if we do not use hydrazine?

**MR. LAFRENIÈRE:** Ken Lafrenière for the record.

Again, a very difficult question to answer. You would have to actually do some sort of experiment with and without the use of hydrazine.

But what I will say is that the regulatory oversight -- so if we talk about boiler tubes as an example, we have regulatory limits for instance on boiler tube failure leak rates that we monitor continuously. So in that sense, we monitor that risk whether or not the licensees are using hydrazine. So through inspections we confirm that the boiler tubes are not susceptible to some of the failure mechanisms that the hydrazine chemical is designed to protect against. But to quantify it would be extremely difficult.

**MR. HOWDEN:** Just to add a little bit and then I'm going to ask Dr. Thompson to speak.

I think the issue around hydrazine is it's very important for chemistry control within the plants because it does reduce corrosion, which is very important.

I think the issue that comes up is if hydrazine is released to the environment, what is the risk to the environment? So I don't think we're talking a lot about the risk to the plant, except that we know that hydrazine within the chemistry is extremely important and all nuclear plants use it. It's if it gets out of the system, what are the risks it could pose?

I'll ask Dr. Thompson to speak to that.

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

The Commission has been aware of *Fisheries Act* issues related to hydrazine discharges and we've worked with Environment Canada on some of those.

Environment Canada also, with Health Canada, conducted an assessment to determine whether hydrazine was toxic under the *Canadian Environmental Protection Act*. And so hydrazine has been found to be toxic for the purposes of the *Canadian Environmental Protection Act* and it has been put on Schedule 1 of CEPA, the *Canadian Environmental Protection Act*.

As a result of that work, CNSC staff has worked on a Working Group set up by Environment Canada to look at the ways in which hydrazine could either be reduced in terms of its use or better controlled in terms of environmental releases. And so there has been some work done in terms of optimization of the amount of hydrazine used.

And we've also looked at what has been done in other countries, where for newer plants there's actually a hydrazine destruction circuit that is put in place to manage the hydrazine from the boiler blowdowns, for example. Rather than being discharged directly to the environment, they're sent to a destruction circuit before being discharged.

And so there are ways of managing

hydrazine to both protect the assets of the plant and also be more environmentally responsible.

Recently, there has been a Canada Gazette I Notice for the requirement for industry to put in place pollution prevention plans and we've worked with Environment Canada in terms of the work that led to this Notice to make sure that the nuclear facilities that the CNSC regulates were well placed to respond to that Notice.

**MR. HOWDEN:** If you wanted more information in terms of chemistry to control within the plant, from a regulatory perspective we do have a specialist in Ottawa standing by if you have any questions.

**MEMBER TOLGYESI:** I will ask Bruce what your comments are regarding hydrazine.

**MR. NEWMAN:** Okay. For the record, Gary Newman.

So just like we've talked to you in the past about pressure tubes and lifecycle management is part of our asset management, we have a very extensive program that we similarly apply to our boilers. This is where the boiler tubes are that we're referring to.

As part of the chemistry control regime, we have very stringent requirements while we're operating the units, while we're shutting the units down and heating them up, and in particular when we lay them up during

inspection campaigns.

As Dr. Roberts already indicated, part of the role of the hydrazine is as oxygen scavenger and it keeps the oxygen out of the secondary side water or the light water and this maintains the integrity of the tubes. This is part of the normal chemistry regime that was touched on by our colleagues from the CNSC indicating how we manage this asset.

So I think the issue of how do we manage the waste product during blowdowns and so forth, as already discussed as well, is really the key focus here. The asset is being managed.

**MR. HOWDEN:** So I'd like to go to Ram in Ottawa to provide a bit more commentary on chemistry control and our regulatory thoughts on that.

**MR. KAMESWARAN:** Ram Kameswaran from Systems Engineering Division, Chemistry Specialist.

We at the CNSC staff conduct regular inspections, chemistry inspections, and we look at the way the samples are collected and analyzed. Especially for some of these critical parameters such as hydrazine, we have the action levels and action limits.

We also receive quarterly operating and performance report indicators, and the chemistry index and the chemistry compliance index are the two parameters that

we closely monitor.

And we do ensure during our inspections that Bruce Power utilizes all the quality control and management to provide us with accurate results. And what we have observed during the last licensing period is that the release and the hydrazine limits have been well within the specification and limits throughout.

**THE PRESIDENT:** Okay.

Dr. Barriault.

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

Chairman.

Correct me if I'm wrong, hydrazine 100 percent is a fuel for rockets, 30 percent is what you get when you order it but you dilute down. Now, if you want to increase the concentration of hydrazine in your boiler water, for example, how do you do it? Do you have to add more hydrazine to it, Bruce? And if you want to reduce the concentration, then what do you do with the hydrazine?

**MR. BOUCHER:** For the record, Paul Boucher for two parts of your question.

The first one, if we want to increase it, use metering pumps. We don't change the concentration, we just add more product.

Reducing it obviously heats our friend and reducing it. So heating just increases the speed at which

we burn off the hydrazine. And then if we're within specifications, we do blowdowns to get rid of some of the hydrazine through approved pathways.

**MEMBER BARRIAULT:** Now, when you blow down, you blow out steam?

**MR. BOUCHER:** It's a steam water mixture, yes.

**MEMBER BARRIAULT:** Into the atmosphere?

**MR. BOUCHER:** To the effluent water stream.

**MEMBER BARRIAULT:** So actually it's contained?

**MR. BOUCHER:** Into the discharge of water that leaves the plant.

**MEMBER BARRIAULT:** So actually you're discharging the hydrazine to the lake?

**MR. BOUCHER:** Correct, if we're within specifications.

**MEMBER BARRIAULT:** Okay. Do you neutralize before you do that?

**MR. BOUCHER:** We don't. We have approved limits set by the Ministry of the Environment and we pre-measure, pre-sample, and if we're within the guidelines, then we'll allow blowdowns.

**MEMBER BARRIAULT:** Okay. Thank you.

Thank you, Mr. Chairman.

**THE PRESIDENT:** Okay, Dr. McEwan.

**MEMBER MCEWAN:** In your submission you say that hydrazine is not persistent. What does that mean?

**MR. ROBERTS:** That is correct. Hydrazine will be consumed by oxygen and also with the sun, with ultraviolet, it will help promote the reaction. So nighttime it's not going to be quite as fast as during the daytime but if you've got a closed area like a condenser and you've got air being mixed in with water, you will be getting rid of that hydrazine as time goes by, as the hydrazine reacts with the oxygen.

**MEMBER MCEWAN:** So if it is discharged into the lake, presumably that reaction would continue. What sort of rate would it degrade the hydrazine at?

**MR. ROBERTS:** A good question. I cannot answer your question. I'm sorry, Dr. McEwan, I don't know the rate. I know it happens.

Well, let me put it another way. When we were commissioning the plant, the rate at which hydrazine was disappearing in the condensers because of mixing of water was extremely fast. And we were not talking parts per billion levels, which is normal for hot steam generator chemistry, we were talking tens of parts per million and that was dissipating very, very quickly.

So I would say it is a fast reaction, but I do not have any kinetics to be able to quote to you.

**MEMBER MCEWAN:** But order of magnitude; seconds, minutes, hours, days?

**MR. ROBERTS:** I would say probably minutes.

**THE PRESIDENT:** I think the good news, if I understand correctly, is that the Ministry of Environment, Environment Canada, all the parties after the incident of the hydrazine leak, got together and now everybody knows how you manage this wonderful chemical miracle to reduce oxygen, kind of corrosion, and everybody knows now how to do it and how fast you can dilute it and all that stuff. Is that correct?

**MR. SAUNDERS:** Yes. I think there are two things.

I mean we did have the small incident which was truly a small incident. It was on our ECI system and in fact wouldn't have exceeded the limit that's on our CCW system, just that it was a pathway we didn't have approved.

But when you look at the limits that Environment Canada and the MOE were considering where we discharged from the boiler, we put it into the CCW flow, which is a huge flow, so those limits are designed to make

sure that in reality when we discharge into that flow that it doesn't impact the lake, so that's how those limits came about. It took a -- and in their review for some of these changes for planning of the *Act*, Environment Canada spent a considerable amount of time not only with us, but with industry in general looking at hydrazine because it's far from only the nuclear industry that uses this chemical. And they were very satisfied with the programs we had in place and in fact, you know, I think their view was that we weren't really the target. They were looking for people who weren't controlling it.

We control it very carefully. We measure it every time and we know exactly what we are putting in. If we are at all over the limit we report it.

**THE PRESIDENT:** Okay. I think we need to move on. Thank you. Any final words?

**MR. ROBERTS:** Thank you for the opportunity and just keep using hydrazine. It's good stuff.

--- Laughter / Rires

**THE PRESIDENT:** Thank you.

--- Pause

**MR. LEBLANC:** So just to give you a sense of where we are, we have one more oral presentation. It's from the Asthma Society. They had been scheduled to

present this evening after dinner and so we will hear them after dinner.

Meanwhile, we plan to do some written submissions, at least until six o'clock today and then resume at seven with the presentation by the Asthma Society and then we will do written submissions into the evening, certainly at least until 9:30 and then we will determine at that point whether we are continuing or not.

So I'm saying this so you can plan accordingly. So what we are going to do in terms of -- we are going to continue where we left off yesterday. So we were at -- let me find it.

--- Pause

**MR. LEBLANC:** So I think we were at CMD 15-H2.32 so I will let the Members get their written material, and staff, and Ruth. So it's 15-H2.32 -- 37? You are right, we did a little bit. Thank you.

So we are at 38 in fact. Thank you very much. So 15-H2.38.

**THE PRESIDENT:** Community Living Kincardine.

**MR. LEBLANC:** Yes, that's what we are going to do. Yes.

**CMD 15-H2.38**

**Written submission from**

**Community Living Kincardine and District**

**MR. LEBLANC:** So the next submission is the submission from -- a written submission from the Community Living Kincardine and District. It is CMD 15-H2.38.

**THE PRESIDENT:** Any comments? Has everybody found the spot?

**MEMBER MCEWAN:** Yes.

**THE PRESIDENT:** Dr. McEwan...?

**DR. MCEWAN:** So again, I think this will be discussed a couple of other times, but we saw -- we have seen a number of interveners who have discussed in an emergency how the system would deal with people with disabilities. How would an organization like this work with you to ensure that that was part of your plan, specifically looking at that population?

**MR. SAUNDERS:** Frank Saunders, for the record.

Probably a question that is more properly answered by the province and the municipality, but I can tell you that these things are in the plan. I do recognize that there is a part of the population that is not mobile

for a variety of reasons, right, and so things like volunteer fire departments and buses and other things are scheduled to be able to deal with that population. But I don't like to speak too far for the other agencies.

**THE PRESIDENT:** No. This is -- the Office of the Fire Marshall will give us chapter and verse on this on Thursday.

**MR. SAUNDERS:** Yes. Thank you.

**CMD 15-H2.39**

**Written submission from Philippe Gagnon**

**MR. LEBLANC:** The next submission is from Philippe Gagnon and CMD 15-H2.39.

**CMD 15-H2.40**

**Written submission from Alberici Constructors**

**THE PRESIDENT:** I think we have some questions on this one.

--- Pause

**MR. LEBLANC:** Okay.

Dr. Barriault...?

**MEMBER BARRIAULT:** Thank you, Marc.

The fire training facility, is it shared

with other facilities or is it just used by Bruce?

**MR. SAUNDERS:** Yeah. No, we will share with others. That has been our practice in the past. We haven't obviously been doing it for a couple of years while we are building here, but it will be shared with municipal fire departments.

**MEMBER BARRIAULT:** Thank you.

**CMD 15-H2.51**

**Written submission from Stefan Wesche**

**MR. LEBLANC:** The next submission which is in the same line as many that we dealt with yesterday is from Stefan Wesche. It CMD H2.51.

**CMD 15-H2.52**

**Written submission from  
University Network for Excellence  
in Nuclear Engineering (UNENE)**

**MR. LEBLANC:** The next submission is from the University Network for Excellence in Nuclear Engineering, also known as UNENE, at CMD 15-H2.52.

**THE PRESIDENT:** Questions anybody?

Well, I have one. So there is a long list

of interesting research that I want to know from staff and from Bruce. Is any of this research being used, provide interesting stuff, et cetera?

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

Yes, and I will ask Gerry Frappier to comment.

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

So yes, we are aware of all these projects and the results of the projects. For the most part they are very applicable today. They fit into a part of industry's research on aging. So there is -- Fuel Channel Life Management has some of these projects they are feeding into, some of the different analytical approaches that are being used to look at aging. The Commission will remember the famous NOP and how we go about doing that.

So again, this is -- part of the universities are developing the projects and sometimes some of the projects being referred to here, we were using them as independent reviewers of work that was done by industry. So some of this was being done for the regulator. Some was being done directly for industry. Some of it was being done just out of academic curiosity.

**THE PRESIDENT:** Are they doing -- is this

group, are they doing any fish studies?

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

Not as far as I know.

**MR. FRAPPIER:** I think they emphasize the nuclear engineering part of UNENE here, not as much in the environmental side of things.

**THE PRESIDENT:** Thank you.

Anybody else?

**MEMBER VELSHI:** Mine is more a comment than a question.

Again, on page 3 where they talk about hiring of their highly qualified personnel, I thought a 60 percent employment rate was not stellar given what we thought would be the demographics and needs in the industry. But it's just an observation.

**THE PRESIDENT:** I'm sorry. I'm not sure I understand. What is the 60 percent? This is --

**MEMBER VELSHI:** Sixty percent have been successfully employed by industry.

**THE PRESIDENT:** By industry, government and other scientific organizations within Canada. So what happened to the other 40?

**MEMBER VELSHI:** Right.

**MR. SAUNDERS:** I don't think we know the

answer. We would need to get that statistic sorted a little bit. Like I say, a lot of them probably went on to other work and so forth, so stayed in the research field, et cetera.

**THE PRESIDENT:** Okay.

**MEMBER TOLGYESI:** Does it mean that graduate studies are part of this 40 percent, you know, Masters and PhD's probably?

**MR. SAUNDERS:** I'm afraid we just don't know the source of the stat. So we can't answer it, but we can certainly find out if you are curious as to exactly what they included and they didn't include in that.

**THE PRESIDENT:** Well, I think the universities should be interested in this. Anyway, I'm sure there is a logical explanation to this. It would be interesting to find out.

Okay.

**CMD 15-H2.53**

**Written submission from Gail Reynolds**

**MR. LEBLANC:** The next two submissions are to the same effect. The first one is from Gail Reynolds in CMD 15-H2.53.

**CMD 15-H2.54**

**Written submission from Susan Wellisch**

**MR. LEBLANC:** The other one is from Susan Wellisch at CMD 15-H2.54.

**CMD 15-H2.55**

**Written submission from Anna Mattiuzzo**

**MR. LEBLANC:** The next submission is from Anna Mattiuzzo and CMD 15-H2.55.

Dr. Barriault...?

**MEMBRE BARRIAULT :** Merci.

This CMD really brings in tidal power as a source of electricity. Do we have any information from CNSC on tidal power and its use in the production of electricity?

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

**MEMBER BARRIAULT:** Or do you want to pass it on to Bruce?

**MR. JAMMAL:** Well, Bruce can answer it. I will give you a simple answer, Dr. Barriault.

Unfortunately the only information we have is probably personal information, what is in the media

itself. So we don't have any facts other than what is being presented. Potentially, tidal power can be a generating capability.

There is some research taking place and some minor capabilities that have been proven to date. Other than that, we don't have any other information.

I will ask my colleagues.

**THE PRESIDENT:** I thought, Dr. Barriault, coming from New Brunswick you would tell us.

**MEMBER BARRIAULT:** I wish I would.

--- Laughter / Rires

**MEMBER BARRIAULT:** I know that there are some turbines in Nova Scotia and the Bay of Fundy.

**THE PRESIDENT:** Talking about the Bay of Fundy.

**MEMBER BARRIAULT:** Yes, exactly. That's what I'm saying. But I don't know of any really in New Brunswick.

The only reason I'm asking that is because solar power obviously is an unpredictable source of power; wind unpredictable, but tidal is predictable. You can see when you will have your tides, high or low, depending. So that's the only reason why I thought it was interesting. Thank you.

**MR. SAUNDERS:** Unfortunately, it's really

predictable in Ontario.

--- Laughter / Rires

**CMD 15-H2.56**

**Written submission from Justine Dainard**

**CMD 15-H2.57**

**Written submission from Marie-Josée Yelle**

**CMD 15-H2.58**

**Written submission from Anthony Wilson**

**CMD 15-H2.59**

**Written submission from Liz Duchene**

**CMD 15-H2.60**

**Written submission from Ernst Braendli**

**MR. LEBLANC:** The next five submissions are to the same effect. They are respectively from Justine Dainard, Marie-Josée Yelle, Anthony Wilson, Liz Duchene and Ernst Braendli and they are respectively at CMDs 15-H2.56, .57, .58, .59 and .60. We have already seen similar letters.

**CMD 15-H2.67**

**Written submission from**

**International Union of Operating Engineers Local 793**

**MR. LEBLANC:** The next submission is a written submission from the International Union of Operating Engineers Local 793 in CMD 15-H2.67.

--- Pause

**CMD 15-H2.70**

**Written submission from Rhys Naylor**

**CMD 15-H2.71**

**Written submission from Nancy Arcarnd**

**CMD 15-H2.72**

**Written submission from Rick Zytaruk**

**CMD 15-H2.73**

**Written submission from Christine Penner Polle**

**MR. LEBLANC:** The next four submissions are again items we have addressed before. They are written submissions from Rhys Naylor, Nancy Arcand, Rick Zytaruk, Christine Penner Polle. They are respectfully at CMD

15-H2.70, .71, .72 and .73.

--- Pause

**CMD 15-H2.74**

**Written submission from United Way of Bruce and Grey**

**MR. LEBLANC:** The next submission is from the United Way of Bruce and Grey, CMD 15-H2.74.

--- Pause

**THE PRESIDENT:** I see Bruce Power has a campaign about United Way that's part of the community?

**MR. SCONGACK:** Yes. James Scongack, for the record.

We have approximately 1,000 employees a year participate in our United Way campaign and also contribute on a monthly basis to the charity. We also have an annual event with our various suppliers and part of the proceeds go to the United Way campaign. Obviously the United Way has a very broad reach in the area. It covers a wide range of various groups and, in particular, their Utility Assistance Program has been a major need in recent years.

So yes, it is a very active campaign and in total it is about \$2 million since 2001 raised.

**THE PRESIDENT:** Thank you.

**CMD 15-H2.75**

**Written submission from Tim Seitz**

**MR. LEBLANC:** The next submission is from Mr. Tim Seitz. It is CMD 15-H2.75.

--- Pause

**MEMBER TOLGYESI:** I'm sorry. This intervener in the before last line he's saying -- talking about nuclear warheads are fashioned from the nuclear waste produced in nuclear reactors.

**MR. HOWDEN:** That may be the case in other countries, but that is not occurring in Canada.

**CMD 15-H2.76**

**Written submission from Joan Fahey**

**CMD 15-H2.77**

**Written submission from David Lewis**

**CMD 15-H2.78**

**Written submission from Kristine Hammel**

**CMD 15-H2.79**

**Written submission from Gregory Whalen**

**CMD 15-H2.80**

**Written submission from Carrie Watson**

**CMD 15-H2.81**

**Written submission from Eric Snider**

**MR. LEBLANC:** The next six submissions are similar to those we have referred to earlier, they are submissions from Joan Fahey, David Lewis, Kristine Hammel, Gregory Whalen, Carrie Watson and Eric Snider, respectively, in CMD H2.76, .77, .78, .79, .80 and .81.

**CMD 15-H2.82**

**Written submission from Brenda Preston**

**MR. LEBLANC:** The next submission is from Ms Brenda Preston, CMD 15-H2.82.

**MEMBER VELSHI:** Marc, perhaps this should get saved for when we talk about emergency management later on.

**MR. LEBLANC:** You are saying those issues would be addressed in the context of the discussions on Thursday?

**THE PRESIDENT:** Yes, it deals with

evacuation, KI pill distribution --

**MEMBER VELSHI:** Communication.

**THE PRESIDENT:** -- communication. So we will deal with this really in the next two days really.

**CMD 15-H2.83**

**Written submission from Temara Brown**

**MR. LEBLANC:** So the next submission is submission 15-H2.83 from Temara Brown, which is similar to what we have already dealt with.

**CMD 15-H2.84**

**Written submission from Steve Cornwell**

**MR. LEBLANC:** The next submission is from Steve Cornwell, CMD 15-H2.84. Questions?

**THE PRESIDENT:** Well, let me.

In Item 2 here, and I think we have touched on it and maybe it's now a good time to be a little bit more precise -- the interveners say it is unclear to me how lumping Bruce A and B together into one license contributes to announcing the safety and quality of regulation of the station. So maybe you can start and CNSC staff can react.

**MR. SAUNDERS:** Yes. Frank Saunders, for the record.

I think the important thing that people perhaps miss here is the operating limits to the plant will not be combined, right? The plants themselves, the operating specs and the operating limits and the operating policies and principles all remain specific to the licensed facility. All CNSC is really proposing is combining the overhead that goes on to manage the license.

So the fact that it's in one document instead of two is irrelevant to safety, quite frankly, and it is irrelevant to the operation of the plant. It saves a little bit of overhead because instead of, you know, two multipage documents that virtually say the same thing for the first part and then get into the details of the plant, you combine the common stuff and then you keep the separate stuff separate. It is just in one document versus two.

It has no impact whatsoever on safety as far as I'm concerned. It saves some work and effort on the overhead and that would be about it. And people have kind of pointed at us for this, but this was not actually our idea. I will pass that idea over to CNSC staff. It was really just simply an effort to issue.

**THE PRESIDENT:** But somewhere I thought you actually did some organizational efficiency gain by

combining, I don't know, supply, procurement, common equipment.

**MR. SAUNDERS:** Yes, our management system was set up on a single management system for both plants, however, the operating procedures and the operating direction are separate for each plant.

So yeah, all the common systems and all the common approaches or programs are common. So we don't have a radiation safety program for Bruce A that's different from the one for Bruce B, we have one radiation safety program for Bruce Power.

And we've been set up like that for 10 or 12 years. It just made sense right from the go actually to do that.

So this fits in very nicely with that. It's not a problem for us to deal with a single licence, it's easy to do. Truthful is, the stuff that we deal with, it really isn't going to change very much, so it doesn't solve a lot of the -- it doesn't change a lot of the administration on our part. I think it does -- it helps, though, from a CNSC perspective for dealing with how you send the letters and how you draft the letters and all that, it just makes life simpler.

**THE PRESIDENT:** Staff...?

**MR. HOWDEN:** Barclay Howden, for initial

comments and I'll ask Mr. Jammal to finish off.

But you know, there's a single set of regulatory requirements. Bruce Power has a single management system which is good, you want that corporately across any of their facilities as we promote for all our licensees and they have their common programs.

For us, combining things into a single licence, as you know, we have standard licence conditions now, so those are standard, and there is a licence conditions handbook, the compliance verification criteria combines everything together and it does get a lot of efficiencies for us. But as stated, there will be separate reporting on performance. So there are benefits to us for sure.

I'll ask Mr. Jammal to provide from a senior management perspective his view of this combination.

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

I have next to me Mr. Jeff Stevenson from the site office. From the CNSC regulatory oversight, who have already combined the two site offices into one, it's been a few years now. I can ask to refresh my memory if my old age -- I can't remember things as accurately as before.

However, from the regulatory effectiveness, there will be no change in regulatory

oversight of that facility. There are definitely advantages and effectiveness of the managing of the single licence.

But this is not new to the Bruce Power. We've combined Pickering A and B before as one licenced entity and for annual report we'll be addressing the operational performance of the stations and the stations as Bruce A and B has been presented.

So as we always continue enhancement of regulatory effectiveness and administratively, there is huge benefit.

In addition to the restructuring that has taken place a few years back at Bruce Power, has demonstrated that putting the administratively one licence, again, will make much more effective administrative oversight, but from regulatory compliance, regulatory oversight, nothing has changed.

Over to you, Jeff.

**MR. STEVENSON:** Jeff Stevenson, for the record.

So I don't have much to add beyond what Mr. Jammal has said. The only thing I guess to add is that when we do our compliance inspections, especially looking at the program levels as opposed to the specific operations of the stations, the programmatic inspections that we do

cover both stations equally already anyways, so this really does reflect the way our oversight is already built.

So when we do look at common programs such as things like supply chain, the root cause investigation processes, conventional safety processes and other management system type activities, those are common to both stations and apply equally.

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

**MEMBER VELSHI:** And I guess from the public's perspective it really should make no difference to them as far as the level of public engagement, review and involvement, it would still remain the same whether you have one licence or two?

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

That is correct. And when we do report on performance, they will see both stations separately.

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

Marc...?

**MR. LEBLANC:** The next submission is a written submission from the SauGreen for the Environment Inc., CMD 15-H2.85.

**CMD 15-H2.85**

**Written submission from SauGreen for the Environment Inc.**

**THE PRESIDENT:** I was just interested in this urban tree planting program. How widely is this -- is there a program across the whole country, anybody knows a little bit about this?

**MR. SCONGACK:** Yes. James Scongack, for the record.

So obviously this is a -- SauGreen is a local group to Saugeen Shores, but if you look at some of their references, you know, they reference various programs and reports.

One report I believe in there is a TD Bank report where these kind of, you know, urban planning type grassroots activities have taken place in communities all across the country and I really think that a lot of the initiatives from this local group have come out of successful initiatives in cities like Toronto and Ottawa and Vancouver and they're really applying them now to a smaller municipal landscape.

And I must say, this is a very impressive community group. We are pleased to offer some support. As you can see, they've not only received some funding from Bruce Power, but engaged quite broadly to leverage that

funding and secure funding through a range of programs.

**THE PRESIDENT:** Thank you.

**MR. LEBLANC:** The next submission is a written submission from Cameco Corporation, CMD 15-H2.86.

**CMD 15-H2.86**

**Written submission from Cameco Corporation**

**MR. LEBLANC:** The next submission is from Right to Play, CMD 15-H2.87.

**CMD 15-H2.87**

**Written submission from Right to Play**

**THE PRESIDENT:** So this is a program we discussed before where you're trying to get more skills for the Aboriginal community.

So how successful has it been?

Go ahead.

**MR. SCONGACK:** James Scongack, for the record.

So that's an excellent question. You're correct, this is one component of the work we do with the SON as part of our youth outreach. And just to give you a sense on how it fits in before I can explain kind of the

level of success with it.

One of the things when we're looking at youth development, obviously we're doing a lot of work in the schools and a range of things in the communities, but one of the things that -- and this is a program that's been primarily rolled out across Northern Ontario. These two First Nations communities are the only two communities I believe initially that were rolled out in Southern Ontario.

And really what this is designed to is to engage youth outside of school hours, to encourage them to participate in organized sports and the feeling is, is that we'll have an overall positive impact on youth and contribute to their academic success.

I was just out at the Saugeen First Nation actually three weeks ago and had a round table with a number of youth and actually asked them about what they thought of this program and had the opportunity to meet the coordinator at Saugeen, and universally this is a program that I think is very well received in the community.

You know, the challenge with a program like this is sometimes the government funding -- and the provincial government does fund a portion of this -- tends to only be for a short period of time. Now that it starts to get traction in the community, there's a need to sustain that. So you know, Bruce Power has indicated that as long

as the community is willing to also contribute to it, this is a long-term success we're interested in.

But certainly talking to the youth, they see this as an invaluable contribution to their community and talking to the mentors, they see the impact it has on youth.

So you know, it's part of that long-term investment that I think Duncan talked about last night.

**THE PRESIDENT:** Thank you.

Marc...?

**MR. LEBLANC:** The next submission is from the MPP Peter Tabuns for Toronto-Danforth, CMD 15-H2.88.

**CMD 15-H2.88**

**Written submission from**

**Peter Tabuns, MPP for Toronto-Danforth**

**THE PRESIDENT:** Go ahead.

**MEMBER MCEWAN:** So I know that we've addressed this a couple of times this morning and last night, but maybe we should just -- as this is from an MPP, he states unequivocally that Bruce will begin rebuilding one of the reactors next year. So implicit in that is that the licence isn't a five-year licence.

So maybe you could just address that

finally and put a nail in that coffin.

**MR. SAUNDERS:** Frank Saunders, for the record.

I think the confusion arises in people's minds that, you know, the energy plan has suggested a schedule that they would like, at the same time we're in negotiations with the province about how that might be achieved.

I think most people looking at 2016 would say that probably that's not likely going to happen at this stage of the game.

What we have committed to absolutely is that we will do the PSR work and we'll bring that work back first to the staff and then to the Commission to propose it and until that's done we won't be doing any refurbishment or major component replacement on the reactor system.

So I don't know how to say it much more clearly than that. I know people are reading the schedule and they're reading into it, but the reality is, you know, the work takes a little time to get through sometimes and the CNSC has processes we need to follow and we're aware of that and we're preparing to be able to follow those processes.

**MEMBER MCEWAN:** So maybe you could just explain what a PSR is?

**MR. SAUNDERS:** Yes, sorry. A PSR is a probabilistic safety review, sometimes we call it an integrated safety review.

Basically it's a wholesome review of the plant against modern codes and standards to look at whether there -- aside from just, it was just simply maintaining the plant, obviously you know, if you're just going to do like for like you don't need that much permission for that, but one of the thing, the requirement in the new PSR document that the Commission reviewed I guess was a month ago roughly now, will actually require in Canada that we do that review on a 10-year basis; whereas now it's a little less fixed than that.

You review against modern codes and standards, you're really looking at the plant design to see whether there are things in the plant design that you should upgrade or change to bring the plant as close to modern standards as is possible, or to detect whether there are unacceptable risks in the design that definitely need to be corrected.

So the periodic safety review does a wholesome review of all aspects of the plant, ties it all up and creates a global assessment report and from that an integrated improvement plan which is really what the Commission ultimately approves is the improvement plan that

would go with the refurbishment.

**THE PRESIDENT:** Again, in this instance the MPP was commenting, on the second page he's talking about -- and I know we're going to discuss this I think tomorrow -- no, Thursday -- about INES Level 7 accident. And he keeps saying that Bruce Power and CNSC assess the consequences of a Level 7.

So comments from you and from CNSC about that.

**MR. SAUNDERS:** Frank Saunders, for the record.

I think CNSC has already assessed the consequences of a large event. It is really kind of inappropriate to try and assign, you know, an international event scale level before an event, because it doesn't just depend on the source of radio activity, it depends on the impact and various other things.

What he is really saying I think is a large release. And certainly we have assessed it, we know what it looks like, CNSC has assessed it. And I don't think you have quite issued your report yet, but the report is quite detailed in terms of the impact.

And the province is aware as well of these things. They weren't ignored in the past. It is just as knowledge expands and techniques improve, then you go back

and review what you have done in your emergency planning in regards to those things.

I don't believe that any of that review will substantially change the emergency planning we have. I think it is quite robust now actually.

**THE PRESIDENT:** Staff?

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

Just to be clear, what Mr. Saunders was talking about was -- we presented last month to the Commission consequences of a hypothetical severe accident, which looked at -- came out with estimated doses equivalent to actual doses at Fukushima, and we went through the whole consequence analysis and the impacts on emergency planning. So that was what was discussed last month at public proceedings of the Commission.

In terms of the INES 7, I am going to ask Mr. Jammal to comment on that.

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

The INES scale is a communication tool that has been established by the IAEA. However, regardless of the level on the INES scale, the hypothetical study and the study that was conducted by the CNSC itself is equivalent to, at minimum, INES scale Level 7, because the equivalency is identical to and similar to the doses that the Fukushima event has caused with respect to the measured

doses to the public and to the environment.

So from the CNSC perspective, there has been assumptions made by the interveners globally. The key point here to say that the CNSC, its study, has demonstrated the equivalency of the dose to the public and the environment to the same scale as Fukushima. And if you are going to go back and correlate to INES levels, that is the INES Level 7 as declared by the IAEA or the Japanese themselves.

I will ask Dr. Patsy Thompson if she would like to add anything else.

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

I just wanted to add that when we did that work we actually looked at the doses to members of the public as a result of the accident, the hypothetical accident. And that showed us essentially that the emergency response plans and the planning zones were adequate to deal with that type of emergency.

And so I don't believe the findings would be any different around the Bruce site. And, if anything, the fact that the site is very much larger and the population more distant from the source of the release, the consequences would likely be less and the planning zones would be probably more than adequate.

**MR. JAMMAL:** Mr. President, if you will allow me to add one thing?

I am going to read to you -- I was going to wait until tomorrow, but I might as well say it. Under Section 1.5 of the INES scale itself it is unequivocally, and I am going to read, if you allow me just three seconds:

"It is not the purpose of INES or the international communication system associated with it to define the practices or installations that have to be included within the scope of the regulatory control system, nor to establish requirements for events to be reported by the users to the regulatory authority or to the public. The communication of events and their INES ratings is not a formal reporting system. Equally, the criteria of the scale are not intended to replace existing well-established criteria used for formal emergency arrangements in any country." (As Read)

And it goes on.

So the key point here is the study of the

CNSC is equivalent to the actual Fukushima exposure and the INES scale values are being manipulated here for whatever reason.

**MEMBER VELSHI:** Is the INES scale equivalent to how hurricanes and earthquakes and tornadoes get classified or is it just, like you said, a communication tool?

**MR. JAMMAL:** Ramzi Jammal, for the record. It is mainly for communication tool, literally at the international level. As a matter of fact, the INES scale is undergoing a review. One of our staff members, Mr. Martin Larabie, actually he trains the trainers nationally, internationally on INES scale. And the key message to everybody, this is not to be used as a regulatory decision, nor to establish any requirements based on the INES scale.

So it is a communication tool. And as a matter of fact, right now they are trying to put into the INES scale to unify some kind of messaging to the public to include medical exposures, incidents from radiotherapy practices and so on and so forth.

So the key point here is, I expanded a little bit my answer, but it is a communication tool, no more, no less than that.

Is it like a hurricane level? The

hurricane is measurements. They did take measurements. But again, the INES scale is a tool for communication with respect to what it means on the international level.

**MEMBER VELSHI:** But is it something -- you know, when someone says it is an earthquake, you know, Richter 7, then people know the severity of that. Is there something equivalent for nuclear incidents?

**MR. JAMMAL:** Sorry, I misunderstood your question. The answer is yes. Yes, it is a communication tool to say this is a significant event. And to answer you, above certain levels it doesn't matter what the number is. You take the appropriate action, that is what is the case.

**THE PRESIDENT:** I am sure we will revisit it because it is being used now, not so much as a scale, but since Fukushima was deemed to be by the IAEA INES 7, everybody -- you could have used instead of INES 7, you could have used Fukushima-like or Chernobyl-like, something like that.

We will revisit it tomorrow? I can't remember anymore, tomorrow or Thursday.

Right now, I think it is a good time for us to break and to reconvene at 7:05.

Thank you.

--- Upon recessing at 6:08 p.m. /

Suspension à 18 h 08

--- Upon resuming at 7:08 p.m. /

Reprise à 19 h 08

**THE PRESIDENT:** Okay, we are back and ready to continue.

The next submission is an oral presentation by the Asthma Society of Canada, as outlined in CMD 15-H2.140.

I understand that Mr. Oliphant will make the presentation. Over to you, sir.

**CMD 15-H2.140**

**Oral presentation by Asthma Society of Canada**

**MR. OLIPHANT:** Thank you very much and thank you for your public service in working for Canadians in this regard.

Thanks for the opportunity for us as the Asthma Society of Canada to offer some comments as you consider the application for the renewal at Bruce Power.

You may be surprised to have had this submission that I suspect were not one of the usual suspects that you have intervening at your hearings, but we

are definitely here for a reason.

Over the past few years the Asthma Society of Canada has been repositioning itself to help us better fulfill our vision of every Canadian child and adult with Asthma and respiratory allergies living active and symptom-free lives. And we are doing that by taking on the issue of air quality and the environment head on.

We are attempting to become leaders in health and environment, specifically linking respiratory health with outdoor and indoor air quality in a meaningful and scientifically defensible way.

First, I need to start with a little bit about asthma, because most people don't know much about it. It is the core of what we do.

Asthma remains a significant individual health and population health problem in Canada. Approximately 3 million Canadians or about 9 per cent of Canadians have asthma. As many as 250,000 Canadians face severe limitations in their daily lives because they have a severe form of asthma. And between 250 and 300 Canadians will die this year as a result of asthma.

Canada has the fifth highest rate of asthma in the world, and 18 per cent of people with asthma visited an emergency room in the past year.

Right now about 1 in 5 or about 19 per

cent of boys and almost 15 per cent of girls between the ages of 5 and 12 have asthma, it is on the increase. And it is the leading cause for them to visit emergency departments in this country. Almost 32,000 children visited an ER in Ontario alone last year as a result of asthma.

Chronic lung diseases, including asthma, cost \$12 billion a year, including \$3.4 billion direct costs in healthcare and \$8.6 billion in indirect costs.

No one knows what causes asthma, but we know it is a combination of both genetic and environmental factors. And at this stage in human history, we can't alter our genes, but we can have an impact on our environment.

Very personally, I am one of those 3 million Canadians who suffer from asthma and also allergic rhinitis. Like most Canadians, I am dependant on medications for that, reliever and controller medications. And the focus of our organization for the last 40 years was heavily on helping people manage their symptoms through appropriate medications.

That, however, is a downstream solution. What we have wanted to do is move upstream to some of the factors that make our lives more difficult and even lead to deaths of Canadians with asthma.

Environmental allergies trigger attacks in about 80 per cent of people with asthma. In addition to those 3 million with asthma, another 3 million have significant respiratory allergies, including allergic rhinitis, which you know as hay fever. It's not a trifling problem for people. It means sleepless nights, lost workdays and lower productivity generally.

The prevalence of both respiratory allergies and asthma has risen steadily over the last 20 years, and is predicted to increase steadily due to climate change and declining air quality, particularly, but not exclusively, in urban areas.

People with allergies and asthma are widely susceptible to environmental factors, including both natural environmental factors, like pollen, dust, mould and other airborne allergens, as well as human-made factors, industrial and vehicle emissions -- NO<sub>x</sub>, SO<sub>x</sub> and VO<sub>x</sub>, as they say -- particulate matter, and other forms of air pollution.

There is evidence that shows that air pollution most likely is a cause of asthma in very young children, and it dogs us as we get older, hitting in two ways. First, air pollution stimulates the production of pollen, putting more allergens into the air, and irritates our mucous membranes, which intensify allergic symptoms.

But it's not only our current rates of pollution that are a problem, climate change, which is at least in part due to pollution, will increase allergens in the air and related allergic disease as warmer weather and milder winters can result in increased pollen production in plants and longer allergy seasons.

It's also proving to heighten the allergenicity of airborne allergens. In other words, the allergy season is longer than it used to be and the allergens that are in the air are stronger than they used to be.

It's not only pollen that's the culprit. More precipitation leads to more mould, drier conditions lead to more dust and dust mites, and particulate matter from forest fires are as a result of the dryer conditions due to climate change.

Energy production is a big part of both the problem of climate change, and, frankly, we believe it's part of the solution when it comes to air quality. Recently, with the closing of the last coal-generating power stations, the Ontario government undertook a review of its long-term energy supply and sources. The Asthma Society of Canada engaged in this review attempting to remind the government that energy choices have health impacts and that air quality should be of prime concern in

any good mix of energy sources.

We have been advocating that, when looking at the cost of energy, it is critical to include the health costs of dirty energy. The human medical cost of burning fossil fuels is staggering. As I've been repeating over this past year, you can choose the food you eat, you can choose the water you drink, you can't choose the air you breathe.

The Asthma Society has long recognized the contribution made by nuclear power to clean air. But our work in Ontario's phasing out of coal has pointed out that, while conservation is critical and renewables such as solar and wind are extremely beneficial, we could not have phased out coal generation without nuclear power, particularly that provided by Bruce Power. We will not be able to maintain the amount of energy we need to keep Ontario working, living, moving and developing without a significant contribution from the nuclear industry.

Ontario is close to being on target to meet the 2014 levels of greenhouse gas emissions, and a major contributing factor to this achievement is the progress made in the electricity sector. Through the closure of coal plants, the refurbishment of Bruce Power's nuclear reactors, conservation efforts and the addition of renewables to the supply mix, we are starting to be on

target.

Outlined in the Climate Change Plan, the electricity sector is again the major area where megaton reductions will be a contributing factor to ensuring long-term goals are met. In the short term, the electricity sector may see a slight increase in emissions while the upcoming refurbishment of nuclear reactors occurs throughout the province because natural gas generation will be relied upon to make up demand when necessary.

Without the security of Bruce Power's nuclear output over the next three decades, achieving the ambitious 2050 goal set by the Ontario government may not be possible. Without the Bruce Power site, the province would need to replace 6,300 megawatts of clean, reliable and flexible baseload supply that could only be done by reintroducing coal or expanding the use of natural gas, which may be natural but is not clean. Both would result in a sharp increases in greenhouse gas emissions.

With the phase out of Ontario's polluting coal plants now complete, it's imperative the province stays off coal and not rely further on other fossil fuels such as natural gas. Building a low-emissions energy system that grows the economy while protecting the air we breathe will ensure the effort of the coal phase out is not wasted.

In December 2013, the Ministry of Energy released its Long-Term Energy Plan, which indicated refurbished nuclear is the most cost-effective option available to meet Ontario's baseload requirements, while producing no greenhouse gas emissions. The refurbishments at Bruce and Darlington need to be coordinated to ensure continued system reliability during the refurbishment period and stability of price given the high volume of low-cost nuclear output. For the refurbishments of Bruce and Darlington to have the highest chance of success, the full capacity of the nuclear industry will be required.

In short, we are a health charity advocating for and speaking with people who have asthma and respiratory allergies. We are advocating for clean energy as an important part of the energy mix that will keep Ontario going. We believe that the nuclear industry is critical to ensuring that people with the health concerns that we advocate for are satisfied that Ontario will be a safe and healthy place to live and to grow.

Thank you.

**THE PRESIDENT:** Thank you.

Questions? Dr. Barriault.

**MEMBER BARRIAULT:** Thank you for your presentation.

I guess the question I'm asking really,

are you doing studies, epidemiological studies really, onto what's happening with asthmatic patients, both short term and long term? Do you have any statistics on it?

**MR. OLIPHANT:** We do. Frankly, most of our information is coming from south of the border, from the Americans, simply because they are ahead of us in their concern about respiratory illness. It is the poor cousin in the health world in Canada. I always say that people who have a heart attack give to Heart and Stroke, people who have cancer give to the Cancer Society, people who have asthma give to Heart and Stroke and Cancer.

--- Laughter / Rires

**MR. OLIPHANT:** That is one of our realities that we face every day. It not considered serious.

What we do know is that, while hospitalization rates and mortality rates have decreased over the last 10 years, the morbidity rate, or the actual sickness rates, has increased, particularly among children. Whereas eight years ago we used to be around 14 to 15 per cent of boys between the ages of five and 12 had asthma, we're now at 19 per cent. Most of that, they think, is related to air quality changes. There may be some better diagnosis, but that is an issue.

The other issue of concern for us is

Canada's first nation, Inuit and Métis populations, which has a 40 per cent higher rate of asthma than non-first nation, Inuit and Métis Canadians.

The other issue are, frankly, new Canadian communities, particularly Asian and South Asian communities, which are at a higher rate as well over European Canadians.

We're not quite sure why that is, but all of the rates are going up. And the costs are going up. Last year over \$500 million was spent on asthma medications. That's half-a-billion dollars just on asthma medications and lost workdays and hospital admissions. So we are concerned.

The other issue is that we're recognizing that allergies are on the increase as well. Eighty per cent of people who have asthma have allergic asthma. The others are exercise or pregnancy-induced or stress-induced or hormonally induced asthma. It's about 20 per cent. Eighty per cent have actual allergic asthma.

But another 3 million Canadians are now faced with non-asthmatic allergies. We tend to call them the "sneezers and the weazers." The sneezers are people with allergies, the weazers have asthma.

But recent studies that have been done, actually, at McMaster are showing that those allergic

reactions are increasingly difficult and a greater burden on the workplace in terms of productivity. We have lost sleep at night, and that becomes a workplace productivity problem.

So that work is being done.

**MEMBER BARRIAULT:** Thank you.

Thank you, Mr. Chairman.

**THE PRESIDENT:** Dr. McEwan.

**MEMBER MCEWAN:** For the new Canadian populations, how does their incidence rate in Canada compare with the incidence rate of the populations back home?

**MR. OLIPHANT:** They are higher in Canada than -- and we're looking particularly at India and China. They appear to be slightly higher here. We can't discern, though, whether or not that is simply better diagnosis here or whether there is some kind of adaptation that is going on. We just don't know what that is, but we do know that the incidence is higher.

We do think it is related, though, to air quality in larger centres in those two particular countries. There is quite a bit of research being done right now on that, so looking at air quality in Chinese cities and in Indian cities, and we're recognizing that those children that are being born there probably will have

later-life asthma problems.

**MEMBER MCEWAN:** I think you gave the data that the incidence over the last 10 years is increasing?

**MR. OLIPHANT:** It is increasing --

**MEMBER MCEWAN:** Okay.

**MR. OLIPHANT:** -- from about 8 per cent to about 9.3 per cent of the population.

**MEMBER MCEWAN:** But the mortality from it is going down?

**MR. OLIPHANT:** Eight years ago we had about 500 people die a year, we're down to about 300.

**MEMBER MCEWAN:** Is that related to better treatments or is it related to a changing pattern of disease?

**MR. OLIPHANT:** We think it is all related to better diagnosis and more compliance with medications.

The shift is happening, too, in that the people who are most prone to dying of asthma are still young children, but the second group are people in their twenties and thirties, who might have had asthma when they were young, it sort of disappeared or really went into remission in their teenage years, now, when they're 28, 30, 35, they're not taking controller medications, they go out for a run and they have an asthma attack and they can die. And it catches them by surprise.

There's work being done, actually, at UBC on that, and they think it's related to what they call traffic-related air pollution, TRAP, which is related to emissions that are probably affecting lungs, so that this is going on. That's a concern we have.

I don't get to talk about asthma very often to people like you. This is very good.

--- Laughter / Rire

**THE PRESIDENT:** Oh, but we're here to talk about nuclear.

--- Laughter/Rires

**MR. OLIPHANT:** I can do that, too.

**THE PRESIDENT:** We'll get to this.

Dr. McDill?

**MEMBER MCDILL:** Just a quick point of clarification. On page 5, you say that with longer dry periods and droughts, you have more dust mites.

I thought dust mites loved warm, wet and reproduced like crazy. They also reproduce like crazy in hot, dry?

**MR. OLIPHANT:** The dust is the part that comes from the dry. The dust mites get harboured in usually our pillows, our mattresses, that kind of stuff, so they like the humidity, but the dust itself that houses them is coming in through dry weather.

We also have forest fires, which is strange. Dust mites are a big issue.

Your pillow needs changing.

**MEMBER MCDILL:** Thank you. Right on that.

--- Laughter/Rires

**THE PRESIDENT:** Ms. Velshi.

**MEMBER VELSHI:** In your page 1, paragraph 2, you talk about other agencies that you work in collaboration with, environmental, non-governmental organizations, and you list a bunch of them, Pembina Institute, and so on.

Do they share your position on nuclear power?

**MR. OLIPHANT:** Generally, no.

We are often an outlier in that world, but I think we're having some influence in them.

So what we have attempted to do, and it's -- and those are partners, and they're not all the same. Say CAPE, the Canadian Association of Physicians for the Environment, have a strong stand against nuclear energy, yet they tolerate us in doing our work together. So we work together on coal in Ontario, and they kind of say, "You do the nuclear stuff. We get it". They have other health concerns that they have. They're not our concerns.

We're working with them on Alberta right now on coal as well.

We have an issue that is a little different with them on pipelines as well that we actually -- and it's not the same as nuclear, but we think that if you're going to have transportation of oil across the country, or bitumen, that trucks, trains and tankers are not healthy ways to transport. And so we are having at least a little bit more ambivalence about pipelines than those partners do.

So we don't agree with them on everything, and -- but we manage to find congruence on enough issues that we work together.

**THE PRESIDENT:** That was my question also. You mentioned CAPE, but David Suzuki Foundation, Environmental Defence, there really are more than just -- they're really anti-nuke, if you like.

My question is, not only you're partnering with them, you also have done some studies about cost effectiveness and cost and emissions. You know, like on -- you mentioned the one, the -- the one that you actually -- I'm trying to find where it is.

**MR. OLIPHANT:** The Alberta study we did with Pembina?

**THE PRESIDENT:** Yeah. There's one

collaborative study published in 2004 on Clean Air Ontario, and ---

**MR. OLIPHANT:** Two thousand and fourteen (2014), yeah.

**THE PRESIDENT:** And Wisconsin. They're all -- actually, and here you are supporting the refurbishment, so you'll be viewed as pro nuclear here.

**MR. OLIPHANT:** We are -- we are viewed as pro nuclear, and they're often somewhat displeased with us, and it does not hinder us from doing our work.

So we have found a way to cooperate with them. We build strategic partnerships, so an example of that was when we were looking at coal in Alberta. Sixty (60) -- over 60 percent of electricity is generated by coal in Alberta. And we did a study using CMA, Canadian Medical Association, modelling with CAPE and with Pembina, and determined that 100 people will die in Alberta -- 100 Albertans will die because of coal this year.

Now, our answer is different in Ontario, that the energy mix in Ontario led itself very easily towards expanding nuclear because you can bring back reactors that had been dormant. I don't know the right word for it, but you brought back four at Bruce.

In Alberta, we have a different set of problems to find new sources of energy, and it's probably

we're advocating more wind and solar in Alberta than we are in nuclear. So it's very strategic about what we do in a different place.

But we are -- we have no health concerns for people with asthma and respiratory allergies about the nuclear industry --

**THE PRESIDENT:** Thank you.

**MR. OLIPHANT:** -- unabashedly. And they're not happy I'm here, I'm sure.

**THE PRESIDENT:** Dr. Barriault.

**MEMBER BARRIAULT:** Now I'm really going to put your feet to the fire.

As you know, we're looking at legalization of marijuana in Canada, which is a cigarette, which is smoke. You know, I'm not going to debate the effects of marijuana, but what I am debating is the issue of cigarette smoke.

What is your stand in regards to it?

**MR. OLIPHANT:** We are an anti-smoking charity, 100 percent. We believe that firsthand smoke, second-hand smoke and third-hand smoke are all extremely difficult for people with asthma.

There's not a causation factor between asthma and smoking. There is a causation between uncontrolled asthma plus smoking equals high probability of

developing COPD. That is the issue.

So -- and COPD is an extremely difficult disease, especially for older adults.

What we have found that people with asthma will tell us, anecdotally, that smoking relieves their symptoms. And so we've had to spend a lot of time saying it may give you temporary relief -- and we're not sure whether it's the nicotine or the heat. Could be one or the other.

**MEMBER BARRIAULT:** And those bronchial tubes get opened, some people feels it's like expectorate. But having said that, it's because it's irritating the bronchias and alveoli, so you expectorate.

**MR. OLIPHANT:** Yeah. And in fact, we're -- we do not promote marijuana use, we do not promote e-cigarettes, we do not promote tobacco. We are an anti-smoking charity, unlike some of the environmental charities that don't worry about it.

**MEMBER BARRIAULT:** Thank you. Appreciate that.

**THE PRESIDENT:** Anything else?

Last word for you.

**MR. OLIPHANT:** Again, thank you for this work. It's an unlikely partnership that we have developed over these years with both the environmental charities and

with industry. We are attempting to find industries that are innovators and can promote our wellbeing.

So an example of the kind of thing we do, we're working with the cement industry.

Right now, people don't recognize that buildings that are built with concrete block are healthier buildings than wood and plaster or sheet rock. They're healthier. They're less mouldy and they're better buildings. But the footprint of making cement is problematic because they use pet coke and other things for their -- the fuel to get the high enough combustion.

Well, they're now trying to use recyclable -- or not recyclable -- materials which are no longer used like asphalt shingles to use for fuel. And we're saying bravo for an industry that is actually going to lower their greenhouse gas emissions, stop using coal, and we're out there supporting them. And we're also supporting nuclear.

We're looking for real world solutions to problems, and I say to my environmental sisters and brothers, we need energy. We need energy. We live in a world where, of course, we have a hierarchy and we believe conservation is best. We think renewables are second best. Run of river hydro is next. Then we put nuclear. Then we put dammed hydro, and then we put natural gas. Then we put

diesel, and then we put coal.

We have a hierarchy. We start with conservation.

But as long as we need power to fuel our cities and our lives and our homes, we're going to need nuclear, and we're happy to support that industry.

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

**MR. LEBLANC:** So we will -- this ends the oral presentation for today. These will be continued tomorrow morning at 8:30, but we will continue now with the written submissions in the order that are set out in the agenda.

We do have a number of orals that have become written. We'll deal with them at the end. We also did not have the chance yesterday to do Dr. Greening's submission because we were too close to the end of the day, so we will try to also do the -- that particular submission this evening. We'll see how things go.

**CMD 15-H2.89**

**Written submission from Sierra Club Canada Foundation**

**MR. LEBLANC:** So the first -- or the next written submission, I should say, is from the Sierra Club

Canada Foundation. It is CMD 15-H2.89.

**CMD 15-H2.90**

**Written submission from Wounded Warriors Canada**

**MR. LEBLANC:** The next submission is from the Wounded Warriors Canada, CMD 15-H2.90.

**CMD 15-H2.91**

**Written submission from Peter Varty**

**MR. LEBLANC:** The next submission, which is from the letter campaign, so we've seen it before, is from Peter Varty, CMD 15-H2.91.

Dr. McDill?

**MEMBER MCDILL:** There's a bit of a variation on the theme here.

**MR. LEBLANC:** Okay.

**MEMBER MCDILL:** I just wanted to make reference to point 4 already having been discussed this evening with respect to -- this afternoon with respect to decommissioning.

**THE PRESIDENT:** So you want that repeated or you just want --

**MEMBER MCDILL:** No, just that we've

already mentioned the decommissioning, that it was this afternoon, not yesterday.

**THE PRESIDENT:** Right. Okay.

**CMD 15-H2.92**

**Written presentation from Ben Lobb, MP for Heron-Bruce**

**MR. LEBLANC:** The next submission is from Mr. Ben Lobb, the MP for Huron-Bruce, CMD 15-H2.92.

**CMD 15-H2.93**

**Written presentation from Richard Sullivan**

**MR. LEBLANC:** The next submission is from Richard Sullivan, CMD 15-H2.93.

**CMD 15-H2.94**

**Written submission from  
GE Hitachi Nuclear Energy Canada Inc.**

**MR. LEBLANC:** The next submission is from GE Hitachi Nuclear Energy Canada Inc., CMD 15-H2.94.

**CMD 15-H2.95**

**Written submission from Dana Laliberté**

The next submission is CMD 15-H2.95 from Dana Laliberté.

**CMD 15-H2.96**

**Written submission from Ontario Clean Air Alliance**

**MR. LEBLANC:** The next submission is a submission from the Ontario Clean Air Alliance, CMD 15-H2.96.

**CMD 15-H2.97**

**Written submission from Gary Wilson**

**CMD 15-H2.98**

**Written submission from Heather Church**

**MR. LEBLANC:** The next two submissions are to the same effect. The first one is from Gary Wilson and the other one is from Heather Church, respectively CMDs 15-H2.97 and H2.98, which are a repeat of other submissions.

**CMD 15-H2.99**

**Written submission from AREVA NP Canada Ltd.**

**MR. LEBLANC:** The next submission is from AREVA NP Canada Ltd., CMD 15-H2.99.

**CMD 15-H2.100/15-H2.100A**

**Written submission from Bruce Peninsula Environment Group**

**MR. LEBLANC:** The next submission is a written submission from Bruce Peninsula Environment Group, CMDs 15-H2.100 and H2.100A.

**MEMBER TOLGYESI:** On CMD 15-H2.100, which is Bruce Peninsula Environment Group, on page 2, second paragraph:

"The International Committee on Radiation Protection (ICRP) has several years ago admitted that this rate of exposure is not protective of the female gender and had recommended a drastic lowering."

Do you have any comments, staff?

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

So the ICRP has adopted essentially from a

radiological science point of view the information on the relationship between cancer incidence and doses, taking into consideration many epidemiological studies that include adults of both genders and children, and so the information takes into consideration both sexes and is protective of women and young children and sensitive populations.

In some risk assessments, the dose conversion factors have been developed for essentially humans of different age groups, including infants, young children and adults. So the framework is protective of people of all ages.

**MEMBER TOLGYESI:** They are talking about recommending a lowering of rates and they say:

"Many countries have already adopted these much lower..."

Do you have any -- what is the CNSC position and what are these countries where they lowered the limits?

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

The CNSC had adopted the recommended dose limits from the ICRP in our Regulations. We are in the process of -- we have done a review of our Regulations against ICRP recommendations and they have not recommended

changes to those limits.

But I believe Dr. Sandor Demeter, who is sitting behind me, who is a member of one of the ICRP committees, can provide perhaps additional information.

**DR. DEMETER:** Sandor Demeter for the record.

There has been an evolution of dose limits with the ICRP. Canada is at the most recent -- its levels are consistent with the most recent ICRP 103 recommendation. In fact, in the U.S. under the Nuclear Regulatory Commission they're two volumes behind and the Department of Energy in the U.S. is one publication behind. So we are consistent with the most recent international publication with regards to dose limits for occupational settings and the public.

**THE PRESIDENT:** Just so I understand, they claim that 1 mSv -- this is the regulatory limit that we've been using for a long, long time -- is not protective according to ICRP. Are they right or not?

**DR. DEMETER:** Sandor Demeter for the record.

The ICRP 1 mSv limit -- and the ICRP makes it very clear in their documentation -- is set there to promote a regulatory framework, not as a dose limit for health effects.

And one of the comparisons that -- I was trying to think of an example of how to put this in perspective.

As a physician, if you've got someone who has taken in a radioactive substance and you want to treat them to help remove that radioactive substance, the clinical practice guideline for removal of that radioactive substance would suggest that you need a dose of 250 mSv in the U.S. under their NCRP, under their guidelines, before you would consider reducing their dose through giving a medication or having any type of therapy to get rid of the internalized radioisotope.

So the 1 mSv is not a threshold for health effects. It's a threshold for regulatory bodies to try to set regulations for dose limits.

**THE PRESIDENT:** Thank you.

Dr. McDill.

**MEMBER MCDILL:** This is the supplementary to 100, so it's 100A. If Dr. McEwan is on 100, we can stay there.

**MEMBER MCEWAN:** No. I'm (off microphone).

**MEMBER MCDILL:** Okay.

My question is with respect to the intervenor's comment on the vacuum building and aging concrete structures. I thought perhaps it might be good to

ask staff to comment on the five-year safety cycle and also Bruce.

**MR. SAUNDERS:** Yeah. I think the commenting on the age of the containment buildings is fairly straightforward. They're primarily concrete. They age quite well.

And in fact, tomorrow we start the vacuum building outage. So, every 12 years, in Canada, we do a thorough inspection on the inside of these buildings. We monitor the leak rates continuously during operation. We know what condition the buildings are in. The concrete has actually never been an issue.

There are various things inside that building which spray water and other things that condense steam and those are where we spend most of our time doing repairs. The concrete itself, I mean to be honest with you, five years is immaterial as far as concrete is concerned. It's a couple of seconds, right? So no issue in that regard.

I don't know if staff wants to add anything.

**MR. LAFRENIÈRE:** Ken Lafrenière for the record.

Yeah, I would agree that by regulatory requirements we asked Bruce Power to have an aging

management program for their containment structures. That includes the concrete and we don't see any degradation that would be of any concern.

Also, I would like to point out not only do they go into these 12-year cycle vacuum building outages, those buildings are continuously monitored. They do quarterly leak tests of containment. So we have assured fitness on a continuous basis of those structures.

**MEMBER MCDILL:** Thank you.

**THE PRESIDENT:** Dr. McEwan.

**MEMBER MCEWAN:** So I think this is the supplement to the supplement, dated April the 7th. This is an extraordinarily inflammatory supplement. I don't know if either staff or Bruce want to comment on this but I think it needs a comment.

**MR. SAUNDERS:** Yeah, I think we can comment from Bruce Power's perspective at least. Frank Saunders.

Yeah, I mean I think it's been well known we've actually had sustainability programs for many years and that's about the same dollar value. Recently, we decided to kind of pull them all under one umbrella and treat them as kind of a single program and that was more about us being able to allocate the money to the most deserving projects than it was anything else.

So this announcement really was to kind of tell people how we're doing it and how they contact us and where that money will come from. So we set a certain pot of money there to work on sustainability programs.

We've done it since we started as Bruce Power and I expect we'll keep doing it for many years. So I see it as a pretty positive thing to do as a company but perhaps other people see it differently.

**MR. HOWDEN:** I'm just going to make a comment.

So we don't follow these programs here. Our main focus is with the requirements for Bruce Power's interaction with the public through their Public Information Program, which is governed under RD 99.3. And that's our focus and they are in compliance with that RD right now.

**THE PRESIDENT:** Dr. Barriault.

**MEMBER BARRIAULT:** My question is for Bruce.

How do you maintain vacuum in the vacuum building? Is it electric, fans, what? What's the system?

**MR. SAUNDERS:** Yeah, they're fans, sort of filtered exhaust, right, and they're electric fans. That's how it works.

And then for emergencies we have an

emergency filtered air discharge system, which essentially is another set of hands, just with a more robust set of filters that will make sure we exclude most of the radioisotopes that could get out.

So that's how we know whether the building is leaking or not, because all we have to do is measure the exhaust on the fans and we can tell whether that's changing and we know whether the building is leaking. It wouldn't actually be the concrete that would be leaking, it would be the seals likely where you join the various pieces, but we see no deterioration in that. That performance is very strong.

**MEMBER BARRIAULT:** So obviously this would be hooked up to the backup electrical system in the event of a loss of electricity?

**MR. SAUNDERS:** Yeah, that's right. If you remember my diagram from yesterday, there's one red circle there on the vacuum building and that powers the emergency filtered air discharge system and its purpose is to keep the containment negative.

**MEMBER BARRIAULT:** Okay. Thank you.

**THE PRESIDENT:** Anybody else?

Thank you.

**CMD 15-H2.101**

**Written submission from EnergyMobile Studios Inc.**

**MR. LEBLANC:** The next written submission is from EnergyMobile Studios Inc., CMD 15-H2.101.

**CMD 15-H2.102/15-H2.102A**

**Written submission from Dale Dewar**

**MR. LEBLANC:** The next submission is from Dale Dewar, CMDs H2.102 and H2.102A.

**THE PRESIDENT:** Anybody? So on the original one H2.102, again, the last paragraph, paragraph four, maybe Bruce one more time explain how is Lake Huron protected. Has the effect of an accident on the Great Lakes been fully considered?

**MR. SAUNDERS:** Yes. Frank Saunders.

I think the point that we have to look at is what do you do to prevent accidents in the first place and all the work we have done post-Fukushima, and so forth, is to prevent serious accidents from happening, because unless you have a very severe accident, the plants are built and the systems are built to prevent that release of radiation. So you want to prevent the severe accidents, such as happened at Fukushima or even Chernobyl.

I don't put TMI in the same bailiwick because TMI is an example of a system that actually behaved the way it was supposed to, they had a very serious meltdown of the core, did not release material to the environment because the systems worked as they were supposed to. So all our work is really in preventing the accidents from occurring and then providing means of collecting water and that if we should.

So when you look at the kind of accidents people might be thinking of here that would have an impact on the Lake, you are talking accidents that are of a very large release. If you look at our PSA results there, the numbers are in the range of 10 million to 100 million sort of years in terms of frequency, which is truly incredible. If most accidents in the world could be out in that range we would be in pretty good shape.

So can you ever say that there is never, ever any chance? I don't think you can and I don't think -- just like you wouldn't say there is no chance that an airplane can crash or anything else, but you can make it so unlikely as to be manageable and have equipment -- material available should it happen that you can limit the release to the point that it doesn't do the kind of damage they are talking about.

**THE PRESIDENT:** Staff?

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

Mr. Jammal may want to add something to my answer. Again, it comes down to the prevention of the accident and Mr. Jammal spoke earlier about the defence in depth, with the five layers of defence in depth that are in place in Canada, so prevention of abnormal operations, control of abnormal operations, control of accidents within the design basis, control of severe accident conditions, including prevention of accident progression and then, finally, mitigation of radiological consequences.

So these are the five layers that we have spoken about earlier and that is done through the deterministic valuation, which is then supported by the probabilistic safety assessment that gives you more risk estimations.

I will pass it to Mr. Jammal for some final comments.

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

Again, it is the defence in depth element with respect to the multiple levels and in Canada we have implemented actions -- not just implemented, actually with respect to design changes and the implementation of the Level 5 defence in depth.

In addition to what Mr. Howden has said,

it is even -- our regulatory philosophy now has taken into consideration not just prevention. We are taking into consideration prevention and mitigation, so recognizing the fact that potentially events will occur and how we can mitigate it. So they added EMEs to include potential future designs. In other words the impact would be minimal.

**THE PRESIDENT:** But I thought the study that CNSC has just recently done dealt with impact on the lake in terms of the SOP study, whatever you...

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

Sir, our study did not look at a direct discharge to Lake Ontario or it wouldn't be to the lake. So the parallel that the intervener is making is that during the Fukushima accident you had discharges to the atmosphere and people were evacuated on that basis and then when water needed to be added to the reactors to keep them cool, water accumulated in groundwater and started essentially flowing to the ocean. That is the type of accident people are talking about.

My understanding from the design of the CANDUs is that there is enough water within the system that would continue to circulate to keep the reactor cool and there would not be a need to add as much water to the

reactors and have essentially contamination of the groundwater around the stations.

But if there were, you know, large amounts of water going into groundwater, we have seen contamination in groundwater sumps around the station, so it is possible to get groundwater contamination, but it is not the type of event that we have modelled and it is certainly not one that we thought would be credible and needed to be assessed during this SARP.

**THE PRESIDENT:** But again, correct me if I'm wrong, that the intervener is talking about the effect of an accident on the Great Lakes. If memory serves right, you assumed a large release in your SARP and then you actually investigated the impact of a large release on the water, not leaking into the water.

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

So just to clarify, the SARP looked at a large release to the atmosphere.

**THE PRESIDENT:** Right.

**DR. THOMPSON:** We did not look at a release directly to Lake Ontario.

**THE PRESIDENT:** No, they are not asking about that. They are just talking about a large accident.

**DR. THOMPSON:** Essentially they are

linking the accident at Fukushima, and we saw that some time after the accident where you had groundwater contaminated because of large amounts of water that were being added and the groundwater flowed and was flowing into the ocean and so we did not look at that type of event because it seems to be an even lower probability than the type of accident that we model for SARP.

**MR. SAUNDERS:** I think a differentiation you might want to make on the location and comparing it to Fukushima, the Fukushima had a very active groundwater flow coming down from the mountains out to the ocean and this is not really the case on a place like Bruce where the water collects in a basin around the plant, so even if you had some small releases they wouldn't immediately go in the lake.

You know so it's a much different situation and a much lower probability than release to air. Release to air is really where most of the risk would occur.

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

**DR. THOMPSON:** Mr. Binder, if we could, I would ask Andrew McAllister to provide additional information that is related to your earlier question.

**MR. A. McALLISTER:** Andrew McAllister, Acting Director for the Environmental Risk Assessment

Division.

As part of previous environmental assessments under the *Canadian Environmental Assessment Act* where we do look at accidents and their subsequent consequences, we have looked at aquatic-based releases in two of those environmental assessments. One of them was at the Pickering B refurbishment environmental assessment and the second, and perhaps more relevant one was in the Bruce refurbishment environmental assessment. Both of those assessments looked at impact to aquatic biota and were found to be below accepted international guidelines.

A bit of additional information with respect to the Fukushima accident that Dr. Thompson was mentioning, CNSC staff continue to monitor the information that comes out of that study, the research that is going on, and some of the analyses conducted by UNSCEAR, that's the United Nations Scientific Committee on the Effects of Atomic Radiation, have noted that with the Fukushima event the impact on this sort of large ecosystem, aquatic ecosystem, really the impacts they noted were local and only of a limited duration, meaning of a few months.

So that is sort of the snapshot of Fukushima to date and we stay on top of that as that science emerges.

**THE PRESIDENT:** Thank you.

Marc...?

**CMD 15-H2.103**

**Written submission from**

**Coalition for a Nuclear Free Great Lakes**

**MR. LEBLANC:** The next submission is from  
Coalition for a Nuclear Free Great Lakes, CMD 15-H2.103.

**CMD 15-H2.104**

**Written submission from Carrie Lester**

**MR. LEBLANC:** The next submission is from  
Ms Carrie Lester, CMD 15-H2.104.

--- Pause

**CMD 15-H2.105**

**Written submission from Jo Hayward-Haines**

**MR. LEBLANC:** The next submission is from  
Ms Jo Hayward-Haines, CMD 15-H2.105.

--- Pause

**CMD 15-H2.106**

**Written submission from Michel Duguay**

**MR. LEBLANC:** The next submission is from Mr. Michel Duguay, CMD 15-H2.106.

--- Pause

**THE PRESIDENT:** Dr. Barriault...?

**MEMBER BARRIAULT:** We have covered this before at the past meetings, but he states that the thickness of the wall thickness of the feeder tubes are only 4 mm compared to most places with 200 mm steel. Is this correct?

I guess CNSC could answer this. It's on page 2, the top paragraph.

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

John Jin, who is the Director of the Operational Engineering Assessment Division will respond.

**MR. JIN:** For the record, my name is John Jin. I am the Director of the Operational Engineering Assessment Division of the CNSC.

My division is taking care of the structural integrity of the principal component, including the pressure tube feeder components. It is correct that the interveners mentioned in the document about the

thickness of feeder as compared with the thickness of the pressure vessel in the PWR. But the intervener mentioned about the pressure and thickness, but when it designed the pressure boundary component the controlling parameter is the stress limit, stress level in the component and the stress has the function of the diameter and thickness, so the larger the pressure vessel we need the thicker material.

So the feeder it is ranging from 2.5 inches to 3.5 inches, with a thickness of 4 mm, as mentioned by the intervener, and we have 12 megapascals in the PWR or in the CANDU.

I checked the data of the PWR. We have a PWR pressure vessel with a diameter of 5 metre diameter and with a thickness of 200 -- actually the pressure vessel with the 13 megawatt electric pressure vessel has the 250 millimetre thickness, but when we calculate the stress we have a stress level of 115 megapascals in the CANDU feeder piping.

And it is too much technical but the (indiscernible) strength of the (indiscernible) is 240 and ultimately the strength is 400 megapascals. So it is far below the (indiscernible) strength of the (indiscernible). For the PWR, it is really the same range. We have 175 megapascals stress. So it is fair to compare the stress

between the CANDU feeder pipe to PWR vessel.

**MR. LAFRENIÈRE:** Thank you. Ken Lafrenière, for the record.

I would just like to add that not only the theory that Dr. Jin just had, we actually took feeders out of the Point Lepreau reactor as part of the refurbishment used in service feeders and we tried to burst test them and they were bursting at pressures around 60-70 megapascals, which is a factor of 6 to 7 from the operating conditions.

**MR. SAUNDERS:** Yes. I think I will point out here that these are pressure vessel components. They have to meet a very rigorous code and thickness, minimal thickness and all that is specified in the code, so these meet all those requirements.

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

**MEMBER VELSHI:** Of the two Bruce A units that you brought back to service, was any work done on the feeders on those and any additional inspections?

**MR. SAUNDERS:** I assume you are asking about the three and four here? Yes.

In fact, we inspect the feeders on all the reactors every time we have an outage and we have a whole map that because they wear at slightly different rates in different places in the pipe, so what you do, as you do with all pressure boundary components, is you are looking

for minimum wall thickness and so we have an inspection program that actually does that and when they reach the minimum wall thickness we replace them.

Yes, the four is --

**MEMBER VELSHI:** His concern is that there is just not enough inspections done and you will never get around to inspecting all the feeder tubes. But I just wondered for Unit 3 and 4 whether you had increased how many you inspected and --

**MR. SAUNDERS:** The amount is depended on the age and their results. There is a periodic inspection program which defines it which CNSC watches very carefully on. If we don't to the inspection program there they are telling us pretty quickly.

So that program really tells you how many you need to inspect and when you need to do it. So when we do an outage and we do their results and we look to the period before we do the next inspection, all those feeders have to be sufficient to pass that period of time. And that is very normal with the pressure boundary component, so it wouldn't really matter whether you are nuclear or nonnuclear, that is a standard practice for pressure components.

**THE PRESIDENT:** Anybody else?

Dr. McEwan...?

**MEMBER MCEWAN:** Just on the last page, the third last paragraph, the statistics of risk, the intervener is saying that a frequent flyer living near a CANDU reactor is 100 times more likely to be involved in a nuclear accident than in a flying accident. That seems to me to be, given the frequency each year that we see of aircraft crashes, an unusual statistic. Can somebody help me on that?

**MR. SAUNDERS:** Yes. Frank Saunders, for the record.

I don't actually know how he did his calculation, but I suspect if you wanted to do the calculation based on the number of people that fly you would probably suggest that that is a very low risk. Otherwise most of us wouldn't be flying all over the place.

And I don't know how we would figure out what the risk is around a reactor other than to take sort of the once in the million chance, but I'm guessing that that is simply how you do it, and enough people flying all the time, you would divide it out and say how many airplane crashes are and what is your risk of dying. I don't think it is a very meaningful comparison, to be honest with you.

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

**CMD 15-H2.114**

**Written submission from Chris Robinson**

**MR. LEBLANC:** The next submission is from Chris Robinson, CMD 15-H2.114, which is part of the letter campaign.

**CMD 15-H2.134**

**Written presentation by Northwatch**

**MR. LEBLANC:** The next written submission is from Northwatch. Northwatch had been scheduled to present verbally, but asked that their submission be considered as a written submission, CMD 15-H2.134.

**THE PRESIDENT:** Dr. McDill...?

**MEMBER MCDILL:** Thank you. On page 4 at the bottom there is a recommendation with respect to fuel defects, end-plate cracking, and so on. Maybe both staff and Bruce could talk about where those sit as items of interest.

**MR. SAUNDERS:** Yeah. Frank Saunders, for the record.

Yes, both of these are active programs in our case and both of them, you know, for the fuel defects in Unit 2 -- Unit 2 -- fuel effects Unit 1, yes, we

understand the cause. Part of the refurbishment activity that didn't clean the system quite as well as it should and that event is slowly improving and we take the fuel out of course whenever we discover a defect.

On the end-plate cracking on Bruce B there is an active investigation there to determine the best way to approach it. This has been a problem which occurred in the past, solved itself and went away and then started coming back again a few years ago. We think it may have to do with vibration. We are still investigating. We have tried a couple of different solutions. Ultimately we would be looking at changing a pump and pillar to change the vibration frequency.

Very active programs, both monitored very closely by CNSC staff. Well aware of their results and at this point don't pose any immediate risk.

**MR. LAFRENIÈRE:** Ken Lafrenière, for the record.

Yes, we are aware of these issues. Again I will remind the Commission that the heat transport system has very strict limits on failed fuel, but the design of the reactor is to be able to detect failed fuel, locate it and remove it so it does not pose a health and safety risk whatsoever.

The Fuel Monitoring Program is quite an

extensive program. They look at several hundreds of bundles a year on a continuous basis and there was no concern in this area. The solution for the end- plate cracking will eventually be proposed by Bruce Power, but in the meantime there is no safety concern.

**MEMBER MCDILL:** And the storage for defective fuel?

**MR. LAFRENIÈRE:** Ken Lafrenière, for the record.

So the primary fuel bay has several areas, compartments. If there is an issue typically when that that fuel is removed, back in the heat transport system, it goes from one monitoring system to another monitoring system. So things that exhibit failed fuel characteristics in the heat transport system, typically when you remove them from the reactor, the high pressure, high temperature water goes up and really the fuel doesn't exhibit any of that failed fuel. If there is an issue, as I said, it goes through another monitoring system in the primary bay.

There is a location in the primary bay specifically designed to deal with failed fuel and those are areas where there is higher purification flow, more sampling, better cooling, and so on. Again, not a significant issue.

**THE PRESIDENT:** I don't like when you know

there is something going on and we don't understand it, so it's not a question of whether there would be significant impact here. The question is what is the root cause for those defects?

And you mentioned that you are still investigating it. When and how are you going to undertake to find out what is the root cause for that?

**MR. SAUNDERS:** Yes. So the Unit 1 fuel damage, we know what caused that and, like I say, that problem is cleaning itself up and we are fixing that one. So that is not an issue that is in and we take those lessons learned and looking at it for the next refurbishment to make sure we avoid that problem.

The issue on the Bruce B reactors where we are seeing some end-plate cracking on two of their reactors. There is actually an inspection program and a fact-finding program already well laid out which CNSC staff have examined. We have gone through a number of the steps of it already and eliminated some of the causes and we continue to work forward. I don't have all the dates with me, but the dates are there and they are committed for us to follow up on them. So it's not sort of -- we are not treating it lightly. We are following through with them carefully.

**THE PRESIDENT:** So will we be updated on

an annual basis as to how it's going here?

**MR. SAUNDERS:** I'm sure it will be part of the annual report. It was the last one so I expect it will be the next one.

**THE PRESIDENT:** Okay.

**MR. SAUNDERS:** The other thing I should point out is end-plate cracking is not the same thing as failed fuel, all right, so the end plate, it just simply holds the fuel bundle intact. And if the plate cracks what we don't want is for the pencil to become separate, so we worry about end-plate cracking so that we don't get to a point where the bundle could separate. But at this point we haven't had actually any separation.

But of course we want to solve that problem so that we don't have any cracking at all. And it is a very active program and we are well engaged in it.

**THE PRESIDENT:** Thank you.

Ms Velshi...?

**MEMBER VELSHI:** I think this issue has come up when we have done the annual report before and it's the classification, the three, the below expectations, the satisfactory and the fully satisfactory and this intervener says, well, the two areas that were fully satisfactory and the other 12 were satisfactory, so the fact that the other 12 were not fully satisfactory means it's just mediocre

performance.

And I know initially I, too, struggled with the categorization of satisfactory and fully satisfactory because really satisfactory is a very good performance. Is the term fully satisfactory really appropriate because to me, like the intervener, it sort of implies if you are not fully satisfactory you have some deficiencies and that is not quite what we mean and is there a better term? I'm sure you folks have agonized over this, but is it distinction or is it a best in class or something like that? So I just wanted to leave it out there because I suspect there are others who struggle with that satisfactory and fully satisfactory and that just having satisfactory is just mediocre performance when in reality it isn't, it's excellent performance.

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

Yes, we've been agonizing over the years over this one and the clarity is of the essence.

I would just like to confirm one thing; satisfactory, that means the licensee met all of the CNSC requirements. So, in other words, their performance is based on the CNSC requirements.

Without going again into much details, where the facility inspection finds the licensee goes beyond the CNSC requirement or the corrective -- if they

take actions based on best practices meeting and exceeding CNSC requirement, then it renders into the fully satisfactory.

**MEMBER VELSHI:** Oh, I know exactly what the distinction is. I'm just saying when you say, and not fully satisfactory, implies that there's some deficiencies and that's not what is intended.

**MR. JAMMAL:** Point well taken.

**THE PRESIDENT:** I recall the agony and going from A, B, C. You can talk to a university prof trying struggling with the same thing, but what B and B+ means.

Maybe we should go to real simple, you know, green, yellow, red --

**MEMBER VELSHI:** No, no.

--- Laughter / Rires

**MEMBER VELSHI:** Because yellow implies it's not safe. But I really do like best in class and distinction, so I'll put my pitch there.

**THE PRESIDENT:** Oh, best in class will get you in the same problem. So I don't know if there's an answer to that, but I can see how the intervener reached the conclusion.

**MEMBER VELSHI:** And then the second point the intervener raises is the licence extension that Bruce

Power got, the six months or seven months and what the objective of that was.

And as she implies in here, it was to allow greater public engagement and was that really achieved.

And I know, even as Commission Members, we were getting submissions to the 11th hour because there were new documents coming in.

So I'd like to hear from staff on why the extension and were those objectives well met.

**MR. JAMMAL:** Ramzi Jammal, for the record. I've been assigned to provide you with the answer, so...

As we went through the application and the submission of Bruce Power there were two key elements. Number one is transparency for the public and, second, is the completion of the application submitted by Bruce Power.

So we were not going to come before the Commission on elements that were outstanding of significance for the Commission itself, and for us to have proper information for the recommendations.

So we evaluate the risk associated with the extension and the performance of Bruce Power which was indicating that their performance is acceptable to have an extension of that period of the licence.

The key point was to allow more public

transparency and we did, we published Part 1, we beat as a matter of fact the timeline associated with the Secretary as such and, unfortunately, I cannot speak on the acceptance of the submission to the last minute. I will have to defer that one to the Secretary, but supplemental CMDs are allowed for staff, or for the interveners to take place and the cut-off time is the Secretary who will determine when to accept or not to accept from the time effective.

But the key point here was definitely licence extension was to allow a fulsome submission without any elements that are outstanding and, in specific, was the PSA values so that the public will be transparent with respect to what is it we are doing from the application itself.

And I'll ask my colleague -- okay. And the extensive oversight was never let go, even for the six months' period.

But that's what we've done, that's only to allow the public much more time to review the documentation and for us to have a full complete application.

We would not want to come before you and say, between, Part 1 and now we're going to complete things in Part 2.

So we wanted to complete everything from

Part 1 and then allow the fulsome intervention, allow the public a fulsome intervention based on the complete information supplied.

**MEMBER VELSHI:** And I suspect we'll hear more about this when we do the review on the PRA. And was there -- you know, because you submitted one and then you did a bit more fine tuning on the EME effectiveness and refinement and was there sufficient time for public review of that.

But I just wanted to make sure that you folks were satisfied that you accomplished what you had set out to with the extension.

**MR. JAMMAL:** From staff's perspective, I'm going to repeat again, just to conclude, that we wanted to have a complete Part 1 CMD in the public domain and not to have major elements that were missing between Part 1 and Part 2.

**MR. SAUNDERS:** Yeah, I should point out from Bruce Power's perspective that all the PSA work, including all those final numbers, were published on our website five months ago. So if people didn't read them in the five months, I don't think they made much of an effort to read it and we did answer the questions as soon as we received them. So we didn't get any questions, quite frankly, until actually after the Part 1 hearing was the

first time we received any requests for information on that data.

So we publicized it, we certainly talked about it, we had videos on it. We've done everything we could to make this a public issue so people could see it. I think we did our job in putting it out there and it was there certainly in plenty of time for people to look at, actually including those very final numbers.

It was clear in all our final submissions that we would continue to work on this and we continue to work on it today. If I gave you a set of numbers today, they'd be slightly different. But I think that's what you expect of us, quite frankly, you don't expect us to stand still.

**THE PRESIDENT:** Mr. Tolgyesi...?

**MEMBER TOLGYESI:** I just have a kind of comment to satisfactory and non-satisfactory -- fully satisfactory, is that the fact that you are moving from satisfactory to fully satisfactory, or from fully to satisfactory doesn't change anything in the risk because the operations are responding to requirements?

**MR. LAFRENIERE:** Ken Lafreniere. Yes, that is correct, the risk changes from ratings is negligible. We're just trying to portray licensees that fully meet requirements and licensees that go above and

beyond our requirements that are in place.

While I'm on, I'll take the opportunity to respond to the previous question. A lot of the additional information that staff submitted after the licence extension was due to the ongoing compliance activities which we try and update the Commission right to the last minute so that they're aware of the compliance history for the second part of the hearing.

**MEMBER TOLGYESI:** And my last is, on page 3 there is a question of: Bruce should provide a full inventory of the waste generated. Is the facts or figures on the generation of waste volumes publicly available, or it's something that you don't publish?

**MR. SAUNDERS:** No, I don't think there's any secret behind the waste numbers. We publish the waste in their environmental kind of reports. We do that -- those numbers are there, we know what they are.

If you're talking about the waste that we provide to OPG for storage and the like, that's very transparent, it's available.

I don't control, of course, the numbers from OPG's waste management facility, but I'm quite sure that they publish those numbers too, I just can't put my hand on heart and say that for sure, but I suspect they do.

**THE PRESIDENT:** That's not the first time

I heard that this is kind of data that's missing. So I don't know if it's missing in its complexity or how to find it.

Staff, if I want to know right now what's the total inventory of Bruce and OPG and their sites, is it readily available? Who has it? Is it on a web somewhere, is it in the decommissioning files; where is all this stuff?

**MR. HOWDEN:** Barclay Howden speaking. I'm going to ask Karine Glenn in Ottawa to respond to that.

You know that for the joint convention on nuclear waste and spent fuel all the information is compiled on a three-year basis and made public. I'll ask Ms Glenn to respond to that.

**MR. FORTIER:** Éric Fortier here for Karine Glenn.

We receive a quarterly report from the licensees with all the numbers needed, all the amounts of waste are provided to us.

**THE PRESIDENT:** Is it publicly available anywhere?

**MR. FORTIER:** Éric Fortier, for the record.

I'd have to check that. I would assume that yes, but I'm not a hundred per cent sure. I'll come

back to you on this tomorrow.

**MR. SAUNDERS:** Yes, actually I mean I just -- we just confirmed just to make sure, but the quarterly operations report that we provide to CNSC actually has the waste numbers in that report. So the levels of high, medium and low waste generated and shipped is in there.

We do keep an inventory. Mr. Scongack here can explain a little more about how we do it.

**MR. SCONGACK:** Sure. James Scongack, for the record.

So obviously I'll focus my comments on the outputs from the Bruce Power site because one of the things we heard earlier in the day today from the gentleman who designed the sustainability toolkit is, part of our enhancements to our ISO-14001 standard looking at continuous improvement is obviously moving to sustainability and, of course, one of the outputs from our facility that we're very mindful of is reducing the volumes of not only radiological waste but conventional waste and various other hazardous substances.

So actually over the last 18 months we've been tracking very carefully the volumes from our site on the basis of communicating that with employees, identifying opportunities for further segregation and reduction.

Actually this year, year to date, we're on track for a 10 per cent reduction in waste volumes over 2014. And in fact, this is going to be a new element that we're going to report on annually in our sustainability report so ideally members of the public get a sense of an ongoing improvement in waste reductions on an annual basis.

Of course, to your previous question on, you know, if you asked the question of all the nuclear waste ever produced in Ontario, how would that look, that would be a question you would have to direct to OPG's western waste management facility.

But this is certainly an area we are putting a lot of focus on. It is something we are going to be very transparent on because, frankly, it requires a lot of employee awareness to drive/improve performance, and we think this is an area as part of our commitment to sustainability that is very important.

**THE PRESIDENT:** But where is this data posted or is it posted?

**MR. SCONGACK:** Yes. So you will see it now posted annually in our corporate sustainability report. The volumes of waste produced against plan per cubic metre basis.

**THE PRESIDENT:** Which is on your web or is it --

**MR. SCONGACK:** Correct. That is right.

**THE PRESIDENT:** Okay.

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

With respect to the waste management, I got it before me, as a matter of fact it is the report from radiological waste. That is the Environmental Monitoring Program report from Bruce Power itself, so we do know the volume that is being produced at the three levels; the low-level waste, intermediate-level, and the high-level waste.

So the key point here is the waste management is of importance here. So in other words, how it is being packaged, how it is being reduced, how it is being recycled, it is being done safely. So looking from the low-level waste that has been produced, Table 59(sic), for 2013 at 1288 (m<sup>3</sup>) from Bruce A being generated, intermediate-level is 19.3 (m<sup>3</sup>).

So we do know the waste associated with restart or Bruce B itself.

So the key point here is, is the waste is being managed, so that is how you package it, how you transport it and the element that is being used. So --

**THE PRESIDENT:** That is not the question. The question is where the intervener can find the data?

**MR. JAMMAL:** Okay. On the website of

Bruce Power they can have it and download it.

**THE PRESIDENT:** Okay, thank you. That is all we really wanted to hear.

Mr. Tolgyesi? Est tu fini?

Anybody else? Okay, thank you.

**CMD 15-H2.144**

**Written submission from South Bruce Grey Health Centre**

**MR. LEBLANC:** The next submission is from the South Bruce Grey Health Centre, CMD 15-H2.144.

--- Pause

The next submission is one we didn't have a chance to do yesterday.

**MR. SAUNDERS:** I just want to make a comment on the previous one, and simply because it is a good example of some of the impact of exercises and drills.

So when we performed the Huron Challenge drill one of the things we exercised considerably was the hospital in South Hampton which traditionally hadn't had a very large radioactive area. And out of that came a need to help them change that and to look at the instruments, and Kincardine as well, upgrade the instruments.

So some of the money that is attributed in here has actually been attributed directly to those

hospitals to upgrade and purchase new instruments to make their lives easier and to expand the area in South Hampton so they can also take contaminated casualties, so basically doubling the capability.

So this is just a good example of how sometimes a drill will point out things to you that need some work. And you go away and do them over the next few years.

**CMD 15-H2.18/15-H2.18A/15-H2.18B**

**Written submission from Frank Greening**

**MR. LEBLANC:** So the next submission is one we didn't have a chance to do yesterday because of timing constraints.

This is submission from Dr. Frank Greening, it is CMD-15-H2.18, H2.18A and H2.18B.

**THE PRESIDENT:** Ms Velshi?

**MEMBER VELSHI:** I will start off with a couple of things the intervener has said and get input from Bruce Power and staff on it. And I know one was around statements made very recently by Mr. Hawthorne and by Dr. Thompson that the alpha incident was not foreseeable, and he is giving a whole bunch of arguments on how that absolutely was not the case.

So this is 2.18A on page 4, maybe I will start off with that and get your thoughts on his submission around that. So I will start with you, Bruce Power.

**MR. SAUNDERS:** Frank Saunders, for the record.

I am actually happy to have a chance to comment on this because this because this is about the fourth time I have seen it now and we continue to comment on it. But in truth, I mean obviously we didn't foresee it, otherwise we wouldn't have set it up that way. I mean, we are not in business to shut the work down and then go away.

So we didn't foresee it. Whether you believe we should have or not, I guess is an argument that could be up for debate. We certainly looked about it, we didn't know there was an event back in the I guess late 1970s. We also knew that system had been drained and that the layup had occurred.

So we expected that there would be some for sure alpha emitting material, mostly uranium and the like on the inside of the pressure tubes. We did think though that it would be rather firmly attached and not likely to be super loose contamination.

We did not estimate that the change in ratio from beta to alpha would be as drastic as it turned

out to be. We did expect that it would change, we didn't expect it would change so much that we wouldn't be able to use beta-type instruments to measure.

We did back that up by taking samples and sending them off to people that could do that analysis. Unfortunately, there is a time delay in that process of about a week, and that time delay allowed that contamination to spread, and we didn't see it because there was just no significant beta component.

You can certainly debate that a long time. I don't really understand the benefit of the debate. We certainly took the lessons learned from this process.

We now have, by most everybody who looks at it, one of the best alpha programs in North America. We have equipment of every sort that we use and, indeed, we do find alpha from time to time now, and sometimes in those same units where there is still some contamination in the corner somewhere that we didn't see and our alpha instrumentation picks it up very well. So we know it all works.

So while it is interesting to debate what we might have seen or so forth, I don't actually see the benefit of carrying on the conversation beyond the point of making sure we learned the lesson, which I assure you we did.

**MEMBER VELSHI:** I have sympathy with his point on this, because we had a similar issue in the 1980s when we found Carbon-14 as a particulate and something we hadn't anticipated and, you know, in hindsight should have anticipated.

And so I think his question here is, yes, it wasn't foreseen, but was it foreseeable? And like I said, you can argue until you are blue in the face, but I think the point here is have we learned and are we looking at it widely?

So I would like to hear Dr. Thompson's perspective on this as well.

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

Before Dr. Thompson speaks, I would like to just give you a little bit of a framing. Just to remind everyone this was an important event and there was lots of learnings, and it was discussed in public proceedings many times, with the last time we felt it was closed, on March 28<sup>th</sup>, 2012. So I just want to give you that.

Dr. Thompson is going to speak about what we should have expected or didn't expect, but we did have learnings for it, and she will speak to it. We can certainly say it has lead to enhanced oversight of our licensee's radiation protection program, so we have learned from this.

And I will ask Dr. Thompson to speak to what we learned.

**MEMBER VELSHI:** And, Dr. Thompson, before you speak, I just want to clarify that it was just a statement that supposedly was said in 2014 that I want you to clarify please.

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

So the statement that Dr. Greening is using is a statement I made during the DGR hearings last September when Dr. Greening brought some of the alpha issues to that hearing.

Essentially, at the time of the event the radiation protection program, the CNSC Staff had reviewed and accepted, used the ratios that Mr. Saunders explained in terms of control of workers.

When the event happened we also did a lessons learned from the CNSC Staff's point of view. Had we essentially taken the information we acquired through our international activities to the radiation protection programs before the event happened, we could have anticipated it and brought changes.

The CNSC has a representative on the ISOE, the international -- it is a group reviewing exposure of workers, occupational exposures essentially, and it is a

group representing regulators and we look at best practices. It also includes some operators.

And so through our activities we had been familiar with alpha programs that were being implemented by other regulators for refurbishment, decommissioning, and other activities.

When the event at Bruce Power happened, we went back to our staff who was active on those groups and we got essentially the 17 components that we then required essentially our licensees to put in place. We issued a 12(2) request, requesting that essentially licensees look at the 17 components of the alpha programs that were considered best practices internationally.

And so we did learn lessons from that event. Through that 12(2) request all licensees have upgraded their programs, they are now acceptable.

We also went further and are doing research to look at the solubility of the particulates that were involved to make sure that we have essentially looked at the changes in the ratio to better characterize the risk. But we want to make sure that we actually have the right numbers.

So there is research going on right now that are co-funded by CNSC to actually get real solubility information to be able to make sure that the ratios are

appropriate.

**MEMBER VELSHI:** Okay. So, again, the issue isn't do we have a good program now? It is, looking back, is there something that could have been anticipated?

**DR. THOMPSON:** The response is, would the programs we had in place -- we didn't anticipate this. Had we been better at bringing forward what we were hearing internationally, probably.

**MEMBER VELSHI:** My second question is on H2.18, page 1, and, again, I'm new to this file.

But in that last paragraph, where he talks about a Root Cause Report that was not shared with CNSC staff by Bruce Power, maybe there's a lot of history behind this, but I was just so take aback in CNSC not having access to something.

Bruce Power, can you comment on that? Is that true?

**MR. SAUNDERS:** No, CNSC has access to our Root Cause. This one was legally privileged, but it has been reviewed by CNSC.

We did provide the summary of all the lessons that we learnt, but we didn't put it on the public record because there was still a legal privilege and some lawsuits and other things that were going on there. However, I think CNSC will verify that they have read the

report and did verify that our summary of the corrective actions were in fact correct and accurate.

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

I'd like to add multiple things, though, associated with this event.

Number one is: Bruce Power had to report it under S-99, and they reported the requirements under S-99.

In addition, the executive summary was submitted the CNSC. Our site inspectors, onsite staff, did review the Root Cause Analysis Report and confirmed that the executive summary did contain all of the elements.

In addition to it, there was an independent third party, the RSI, that conducted the... well, I'm not going to call it the investigation, but the review of the actions taken. Again, the recommendation confirmed the fact that the recommendation resulting from the event itself and the Root Cause Report have been put in place. Actually, our staff did do the correlation.

I'll pass it on to Dr. Thompson and our colleagues. In addition, our site inspectors did confirm that the implementation has been put in place through inspections, and our staff were actually -- attended discussions and a meeting with respect to the root cause.

Before I let go of the root cause, we

approve the process for the root cause according to the management system as approved by the Commission as a program. So we inspected the process that was followed for the root cause by our staff to ensure that Bruce Power has followed what we imposed on them as a requirement for the Root Cause Analysis.

But I will pass it on to Dr. Thompson.

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

If I could, following the report submitted by Bruce Power, with the finding from the Root Cause Analysis and the recommendations and the Radiation Safety Institute Report, our staff from the Radiation Protection Division did a number of activities related to that program. I will ask Melissa Fabian, who's sitting behind me, who is the Radiation Protection staff who was active on those, to talk about some of the inspections and reviews that she did.

**MS FABIAN:** Melissa Fabian, Radiation Protection Officer, for the record.

That's correct, when we did receive the summary of the Root Cause Analysis Report, we did review the root causes, the contributing causes, and the corrective actions identified by Bruce Power, to ensure that they are reasonable.

Following that, we also did a reactive inspection, just a couple of months after the event took place, to oversee the implementation of the Corrective Action Plan and we did not identify any concerns at that point.

Following the issuing of the 12(2) requests, where our expectations on the 17 enhancement areas were clarified, we also did a detailed inspection on the alpha monitoring and control program in 2011 at Bruce Power.

In addition to that, following the event we did establish monthly alpha update meetings with Bruce Power, where information was shared openly about the progress with the corrective actions and with the doses being assessed for workers involved in this event.

**MEMBER VELSHI:** Thank you.

Has there ever been an issue of Root Cause Reports not being shared with the regulator because there are concerns and, you know, your lawyer has said, No, this could be damning towards us, so don't share it with the regulator?

**MR. LAFRENIÈRE:** Ken Lafrenière, for the record.

It's a regulatory requirement, both in S-99 and 3.1.1 that they have to share a summary of the

Root Cause.

**MEMBER VELSHI:** I meant the entire Root Cause Report.

**MR. LAFRENIÈRE:** The entire Root Cause Report and any -- so as Mr. Jammal says, we audit the root cause process, and we're fine with the process. Any Root Cause Report, we have access to, and we routinely go and access and read them to confirm for such things as the summary matches the original, and so on.

Also, on top of that, we also have an internal investigation team at CNSC. So if we feel from a regulatory program that the investigation's incomplete or we want to do an independent look at it, we have the capability in-house to go and do a root cause analysis ourselves.

**THE PRESIDENT:** Dr. McDill.

**MEMBER McDILL:** I think most of my questions have been answered, but I would like it on the record you have read the entire Root Cause Report?

**MR. LAFRENIÈRE:** I'll let my site inspector answer that question. He is the one who actually went and looked at it.

**MR. STEVENSON:** Jeff Stevenson, for the record.

Yes, that is correct. I have seen the

Root Cause Analysis Report for the alpha event, and it matches what was given to us in S-99. End of story.

**MEMBER MCDILL:** This is going to sound like terrible nitpicking, seen and read.

--- Laughter / Rires

**MR. STEVENSON:** Seen and read, yes.

**MEMBER MCDILL:** Thank you.

Have you done your homework? Well, yeah, I saw it.

--- Laughter / Rires

**MEMBER MCDILL:** Sorry. Too close to home maybe.

--- Laughter / Rires

**MR. SAUNDERS:** I think this is the final comment from us in terms of this event, right? I mean Bruce Power took this event very seriously because, obviously, we took great offence to getting caught kind of flatfooted on this. It's obviously not something you want to do, either from a personal risk point of view or from a business point of view: to get surprised in the middle of a major operation about something that didn't go the way you expected. So we took the Root Cause very seriously indeed.

And, you know, as has already been alluded to, we did actually bring in the Radiation Safety Institute

of Canada to do an independent report to both back up our own report to make sure that we didn't miss anything and to make sure that all the parties, union members and others -- because a number of the people exposed here were in the Building Trades Union versus in our normal power workers kind of area and we wanted to give them confidence as well that we had found all the problems, and that we were dealing with it, and, indeed, that we were examining the doses properly and that their members would get proper assignment.

So we really did make a significant effort to make sure all this information was in the public domain and that people, you know, were confident that we had done the job properly.

**MEMBER MCDILL:** Thank you.

One more big question, which might have some subquestions.

This individual has gone to quite an effort to write quite a bit of material. There is a recommendation for lung solubility studies using --  
 --- Off microphone / Sans microphone

**MEMBER MCDILL:** Oh, sorry. Yes, it's in 18, page 3. It's kind of a little suggested lab, "The Need for a Lung Solubility Study of Bruce Unit 1 Alpha-Contaminated Feeder Dust."

Dr. Greening suggests that such a study is an ICRP recommendation in the middle of that page. If that is the case -- well, is that the case? Let's start --

**MS THOMPSON:** Patsy Thompson, for the record.

I'll provide information on what was done at the time of the event and the solubility study that is going on now.

At the time of the event, for each individual that was potentially exposed fecal samples and urine samples were obtained from the individuals. It is with individual monitoring measurements of those two samples that we actually got individual solubility measurements so that we could assign doses to those individuals.

The method that has been used in that case is a method that is scientifically valid. It's been published in the peer review literature and gives the best value, essentially, because it's specific to each individual that was monitored. So we're very comfortable that all the doses that were assigned to the workers are based on their individual metabolism and the actual solubility of, you know, the particles that were in their lungs.

We're going further with some of the

additional work that is being done, essentially because at the time of the event to get fecal samples and urine samples from each individual and getting the measurements done takes a long time. It took a long time for individual dose assignments, and so to do something that would be quicker, in the case of if there is ever another event, we're doing research on a solubility study for, essentially, the material.

The study is being done through two components, an in vitro solubility, so essentially in the lab, and we're also looking at in vivo solubility. That work is being done right now. It's also being done through the CNSC funding, as well as COG funding and Laval University.

So the work is going on. That work would essentially be useful for future monitoring and dose assignment. But to be clear, the assignment of doses to individuals at Bruce Power at the time were done with the best solubility information we could have because it was actually individual-specific.

**MEMBER MCDILL:** And those would have picked up all of the possible contaminants in the actinide series, for example?

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

That's correct. The methodology that was used by Bruce Power at the time isn't a method that is approved under the dissymmetry program, so Bruce Power came forward after doing some research and proposed a dissymmetry approach. We reviewed independently, we consulted with some of our colleagues internationally, and we actually validated the approach using our own dissymmetry calculations and dose models.

So, yes, the method has been approved and it essentially takes into consideration the appropriate radionuclides and alpha emitters.

**MEMBER McDILL:** Bruce, anything to add?

**MR. SAUNDERS:** Yeah. No, I think that pretty much covers it.

The dosimetry was unusual, so we consulted fairly extensively with external experts and put together the recommendations that we ultimately provided to CNSC. Our lab was very capable, and we're confident that it was a very solid and very good program, and staff's review, I can assure you, was very thorough.

We dealt with many questions on that before we finalized it, so we think we did the right to make sure people knew what their doses were and that they were fully protected in the process. And we did our very best to make sure that we assigned was as accurate as is

possible to be.

**MEMBER MCDILL:** Thank you.

**THE PRESIDENT:** So just to bring this to a conclusion, nowadays, all those people that's actually -- all the workers is actually received dosage. What is now your assessment of the long-term impact, health-wise?

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

So a number of intervenors who have talked about or written about the Alpha event give the impression that there's a large number of workers who got severely contaminated and are at the high risk of developing cancer. And so the -- through the process of fecal measurement, urine measurements and assigning doses, the highest dose that an individual got -- so it's one individual -- is seven millisievert. And the rest of the workers have doses below two millisievert.

And so the process is the normal process where the dose information is being sent to the National Dose Registry, so it will be captured and monitored, but that dose -- dose levels, essentially, we don't expect any health effects. So it hasn't increased the cancer risk significantly for any of those individuals.

**THE PRESIDENT:** Dr. McEwan?

**MEMBER MCEWAN:** So on page 14 of 18B, he

gives a series of doses that are considerably higher than seven millisieverts.

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

And so I'll ask Melissa Fabian to respond to the question.

So my understanding is what has been done is taking information from various reports and combining as if it was a total dose. And so Melissa Fabian will attempt to explain what has actually been done by the intervenor that isn't quite right.

**MS FABIAN:** So Melissa Fabian, Radiation Protection Officer, for the record.

So just to give a bit more clarity on the maximum total dose that was calculated by the intervenor, there are some incorrect assumptions that were made in this dose calculation.

For one, you'll note that he is assuming that the gamma contribution to the total dose was 17.3 millisieverts, and that was taken as a maximum value from the annual fallout monitoring report. In fact, that value of 17.3 millisieverts is the maximum whole body effective dose to an individual in 2009 who worked at the restart project.

So it's not appropriate to say that that

is just from gamma. That's, in fact, the maximum dose assuming all internal and external contributions to the individual.

So just to add clarity, the maximum total annual dose for a worker who was involved in the Alpha event was 18.6 millisieverts, so that includes the dose from the event as well as any other work that was done during that year, the year of 2009.

So this includes any dose from inhaled beta emitters based on whole body counts and external gamma doses as well. And the contribution to the total dose from sources other than transuranics has been ascertained using a CNSC licensed dosimetry service, so there is confidence in this value.

**MEMBER MCEWAN:** So he quotes 500 individuals exposed repeatedly through the three submissions. Of those 500 -- well, was it 500 people and, of those 500, how many had a measurable burden?

**MS FABIAN:** So Melissa Fabian, Radiation Protection Officer, for the record.

There were doses ascertained for 557 workers who were involved in the event. This was all workers who entered the vault during the event time frame. And as per a commitment made by Bruce Power, which they could speak more to, all workers who were involved did have

some dose assigned that related to the minimum detectable amount based on the dosimetry analysis.

So that's why you see that all workers who were involved did have some amount of dose assigned to their dosimetry records.

**MR. SAUNDERS:** Yeah, just speaking to that again, it was a confidence thing with the workers. I mean, typically, in dosimetry, you only do the analysis for those people who have an indication that they had the exposure. Because there was a confidence issue here, our CEO said to all the workers that if you have any doubts or you don't believe, we will dose the dose anyway, irregardless.

So the 557 were the number of people who came forward and said, "Yes, we would". There was more like a couple thousand people working on the project, so this is a subset that was working in the vault. And I think that was a reasonable thing to do.

When you do any kind of detection, there is a minimal detective activity. Generally speaking, when we look at MDA or MDL, depending what you want to call it, in the nuclear business we treat everything conservatively, so if we can't detect it, we assume it's a minimum detectable level, even if we think the answer is zero.

So all those people who didn't get any actual reading got assigned an MDA reading, which provides

some dose.

So in reality, that population didn't receive the dose, and certainly those that got it at the MDA, you know, got a very trivial dose assignment on their -- on their record. But we felt, as Bruce Power, that that was the right thing to do so people didn't leave with a doubt about whether they were exposed or they weren't. They knew what it was.

**MEMBER MCEWAN:** So of the 500 and odd, how many actually had a measurable burden, that would be considered real or not assigned?

**MR. SAUNDERS:** Yeah, I didn't bring the dose sheets with me, but we can bring it for you tomorrow, if you'd like.

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

So the number is 410 workers were assigned a dose of one millisievert or less, 104 workers were assigned a dose of between one and two millisievert, 40 workers were assigned a dose of between two and five millisievert, three workers were assigned a dose of between five and 10 millisievert, and no workers were assigned a dose greater than 10 millisievert.

**THE PRESIDENT:** Now I'm totally confused. And again, we are trying to reopen the old file because in

his intervention of -- on page 14, he quotes Bruce Power announcement of March 17 maximum dose of 44.6, June 28 two workers exceeded 25 millisievert.

Where are those numbers come from?

**MR. SAUNDERS:** We were certainly, in the early stages, being conservative with what some of those dose assignments were. The particular quotes he's bringing here, we don't quite know where they came from, so I can't verify them one way or the other.

Early on, we were doing some estimating of what the worst case could be, as you would expect we wanted to make sure that people weren't afraid of it, but as time progressed and we actually got the dosimetry and the results, then the doses became, you know, more and more accurate.

So I don't -- I'm not sure what he's trying to imply here, whether he's trying to imply a conspiracy or what, but it was all a very carefully monitored program to figure out what the actual doses were, and doing it with great care given that the individuals involved would take some time before they knew what the final results were, so we were being cautious about making sure that they understood what the limits were and where they were in the process.

The other thing I should note is this was

all very open. There was nothing hidden here. We had meetings virtually every month with all the workers and told them where we were, what the progress was and what the results were, and how we would do the monitoring and so forth.

So this was a very -- a very open process. Lots of people were involved in it so that we made sure -- again, just making sure people were comfortable that we were doing the right thing and that we were following the protocol so that they would get the appropriate dose.

**MEMBER MCEWAN:** Well, as you're doing the calculations and the dose assignments, how do you build in the RBE to the alpha and betas and the gammas for the dose?

**DR. THOMPSON:** Dr. McEwan, if you'd allow us, we could come back tomorrow with that response. Our dosimetry specialist is not in the office, so we don't have the information on hand.

But essentially, Bertrand Theriault, the assessment and approval of the methodology use, and we'll be able to have that information.

**THE PRESIDENT:** Can you then also try to dig up where -- I recall at the time there were all kind of press releases coming out from Bruce as a discussion of staff whether those were issued or announced somewhere historically about some of those dosages, trying to figure

out what's your final dosage and these dosages.

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

So the final doses are the ones I read a few minutes ago --

**THE PRESIDENT:** Right.

**DR. THOMPSON:** -- with going from less than 1 milliSievert for 110 workers to 5 to 10 milliSieverts for three workers.

**THE PRESIDENT:** I know, but it's so off what is being quoted here.

**DR. THOMPSON:** I know. So we can try to find the source of Dr. Greening's information. I don't know whether we will be successful or not, but we will do our best.

**THE PRESIDENT:** No, but what I suggest you do is go back and you see if you can dig up some of the old press releases or announcements that I think came as a result of -- or maybe Bruce can dig it up.

**MR. SAUNDERS:** Yes. I mean certainly we can go and have another look for it. We were updating regularly CNSC and others by emails on our progress. So it could be that he has some of these old emails.

But if you look at the timelines it's fairly self-explanatory, right, so January 5th was about

two days after we reported the incident so of course it was zero. We wouldn't have known what it was at that point in time and then your May -- March, June, October, all in the same year and you see that those numbers come down and that really just shows you that we are being conservative. We are getting more information and as we get more information we are telling people what the dose limits are.

I mean it's as simple as that. It is basically saying the maximum dose and that's true. It certainly wasn't higher than that and it worked down, right. So I think it is much ado about nothing.

I think the intervener is trying to imply that we were trying to mislead people, which wouldn't be true. What we are trying to do is give people a sense of comfort and level on what the size of this was, because some people might think they got a massive dose than others.

So this was really just an effort to communicate the best information we had at the time to make sure that people knew where they stood and we kept updating it regularly. I don't quite know where he got this source. We can certainly spend a lot of time going back to 2010 and searching through the emails.

**THE PRESIDENT:** But if my memory serves right, you may check to see if it was -- because I remember

we had at least three or four hearings or meetings in which you brought an update about this particular case.

**MR. SAUNDERS:** Yes. Yes, and perhaps we can talk about that.

**THE PRESIDENT:** And maybe some of those things were discussed at the time.

**MR. SAUNDERS:** But as the information progresses, as you start to get results back from your sampling, then your data becomes more and more accurate. This would pretty typically be what we would do. We would overestimate in the initial piece to make sure we were not underestimating and then we would refine it as we went forward.

**DR. THOMPSON:** Mr. Binder, if I could, people aren't in the office, but they are obviously watching the web, and so I do have an answer for Dr. McEwan's question and as well -- I'm sorry. It's late.

So I will answer Dr. McEwan's question and then I will go to the other thing that I have a blank on, a blank on the English, not a blank on the facts, I'm sorry.

So in terms of the RBE factor, it is essentially included in those conversion factors that were used to do the calculations, so it is not separate. It is included in those conversion factors, so I think that addresses your question.

In terms of the issue in terms of the doses reported by Dr. Greening, the information I have is that the doses he has calculated are wrong because he uses incorrect weighting of the dose conversion factors.

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

Sorry to interrupt you, Dr. McDill, but I just want to close one thing, though that CMD represented to the Commission back on March 28, 2012, and starting with the public information from 2009 on, our conclusion at that CMD is the values.

And I fully understand your questions, but I want to close for the record that that CMD, the discussions we had in the public where we had allowed public proceedings to take place, staff's position has not changed from that CMD. So we can look at the values, what the intervener is determining, as Dr. Thompson just got the message from our dosimetrist that the weighing factors were incorrect. But I want to go back to the fact on the record to say that the position of staff as it was closed in the Public proceedings by the Commission and accepted the recommendations from staff still stands.

**THE PRESIDENT:** Okay.

**MEMBER McDILL:** If you are bringing back a dose tomorrow, and I'm not sure you are any more but for

someone, for example who -- one of the three who was between five and 10, a breakdown in a similar manner here, I think these documents are part of the public record and they are going to keep coming back again and again perhaps, depending on the intervener's choice.

Maybe you can continue to submit, and I think it would be good to have on the record another line that says this is what we did so there is a maximum total dose there and there is alpha, beta, gamma, tritium, et cetera. Maybe it's too much. I don't know. Is there a way of doing something very similar to this line here where the number comes out to 5.6, 4.2?

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

So from Bruce Power or other licensees' programs we do have a breakdown of doses from various contributing radionuclides. So we would have you know, the contribution from tritium, for example, alpha and the other exposures types of exposures. So we have that information.

We do have licensed dosimetry services. We make sure that the dosimetry is done appropriately and when it is reported, it is reported as a total effective dose and the dose components we have information on. Because the radiation protection staff use that information in terms of reviewing licensees of our programs for

example, dose control programs and things like that. So that information is available.

Would it be useful to present it in that way? Possibly, but when we were dealing with the alpha event, the questions really were around what doses did people get from the alpha event and we were very focused on making sure that dosimetry that Bruce Power was using was correct.

**MEMBER McDILL:** Thank you. I appreciate your answer.

It was -- my intention was so that other interveners in the weeks and months to come, particularly in the years to come, this document is on the record and it will come back. So my intention was -- the purpose of my suggestion was to reassure the public, not to reassure me or -- definitely not to reassure Bruce, because they -- so, for example, the suggestion here of tritium of 7.6, if that number were correct, and you say it is not correct, there needs to be some way of getting this information out to the public for their reassurance.

**DR. THOMPSON:** Could I suggest, Dr. McDill, that for the time period involved that we go back in the records? And I don't know if it's through a submission to the Commission or some kind of document on our website where we can sort of put that information

forward in terms of the workers on the Bruce site during the year of the event, the dose contributions from the alpha event and the other sources. We do have that information, so I don't know if that would be useful.

**THE PRESIDENT:** Can I suggest -- you see this formula on page 14. It says maximum total dose. Just substitute your correct number into this formula and if you can bring it in by tomorrow or the next day that would be fine.

**DR. THOMPSON:** Perfect, we will do that.

**DR. DEMETER:** It's Dr. Demeter, for the record.

I just wanted to -- based on the discussion, and I obviously wasn't part of this particular incident and didn't review it, but based on ICRP, International Commission on Radiologic Protection methodology and the dose conversion factors which are milliSieverts per Becquerel, and using fecal and urine samples, that is the standard methodology for reconstructing the dose, which is what I have understood has been done here and that milliSieverts per Becquerel, those conversion factors, takes into account the radiation weighting factor for the various isotopes that are found.

So from what I have heard, the standard methodology was followed to reconstruct the dose. But what

I have also heard is that the correct numbers will be presented. But the methodology is in fitting with international standards.

**THE PRESIDENT:** Dr. McEwan...?

**MEMBER MCEWAN:** So just two more comments.

I think it will be very helpful as you do what your calculation of that equation is where you think Dr. Greening has introduced the error, to come up with a figure that is seven or eight times greater than the figure that we ended up assigning as the maximum dose. Does that make sense?

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

So we will be talking to staff back in Ottawa tomorrow morning to see. We will certainly bring back to the Commission, either tomorrow or Thursday, the information on the doses from each contributing exposure to the Commission. If we can find information on where Dr. Greening went wrong we will certainly do that, but we will at least commit to making sure that the correct information is brought forward.

**MEMBER MCEWAN:** Just for the individuals who got the higher end of the range of doses, are there plans in place for long term follow-up? Is that a standard operating process?

**MR. SAUNDERS:** There really isn't for something like this where the dose is committed, and so forth. You know what the dose is, you know the commitment, you can't detected by whole body monitoring. So there is really not much you can do other than we do track it in the dose registry of course and so if there were health issues then the dose -- you know, it's in the dose registry and it would be triggered to look at that, right.

**THE PRESIDENT:** Okay. Anything else? All right. We are going to proceed, continue.

--- Pause

**CMD 15-H2.107**

**Written submission by Mayam Syeda**

**MR. LEBLANC:** So the next submission is a written submission from someone who informed us this morning that she could not make it. It is a submission from Maryam Syeda, CMD 15-H2.107, which really was part of the letter campaign, or very similar to.

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

**MEMBER VELSHI:** It's similar to but there are a couple of differences and, again, just to set the public record straight.

The third paragraph the intervener talks

about the water that is discharged from the station is at a temperature 25 degrees Celsius higher than the norm and causing death to marine life, and I think we should just set that record straight.

**DR. THOMPSON:** Mr. Andrew McAllister will respond to that question.

**MR. A. McALLISTER:** Andrew McAllister, Acting Director for the Environmental Risk Assessment Division.

What we believe they were referring to in that comment about the 25 degree increase relates to a change that Bruce Power sought from the Ontario Ministry of the Environment on their environmental compliance approval. That was a change that they received to deal with operational conditions. It had a finite time period from the 2013 to 2015 between the months of June to September.

To date they provided a brief summary of that in their environmental risk assessment that they had submitted to CNSC staff. They haven't had to use or discharge water to that level or to that allowable temperature. Nonetheless, they do have monitoring -- my understanding is they have monitoring requirements on that to deal with potential fish species that could be impacted, namely smallmouth bass in the discharge channel and, as indicated, they haven't had to discharge at that

temperature.

This is the last year of that part of the approval. Should that discharging of that temperature be needed, CNSC staff would be looking to look at that monitoring information and we always work -- when it comes to issues around temperature, we work collaboratively with Environment Canada on that and we would look at that information should it arise.

**MR. SAUNDERS:** Yes, Bruce Power just for the record on that.

I think there is some confusion in the numbers they put there. Our normal Delta T or difference in temperature is between this 9 to 10 degrees and it has a limit more like 11 or 12 and we have a maximum temperature of -- I think it's 32.2. I'm trying to remember now off the top of my head there.

And so what we saw there was a couple of degrees extra. That is only for emergency situations where the province requires us to maintain power in a really hot circumstance, like hot days in the summer when we are going to breach that limit by a degree or two. I don't quite know where the Delta 25 comes from. Certainly no one is going to give us permission to go 25 degrees above the lake level and I don't think we could get there anyway, quite frankly.

So I don't know. I think there is some misunderstanding on the reading. We got that permission last year. But if you remember last summer they never raised an occasion where temperature was a problem and this would be something that is very short duration.

Typically in the past we have done these with a special permit. There is always the permit associated with them and they last a matter of hours normally and then we go back to normal.

**THE PRESIDENT:** Okay.

**CMD 15-H2.128**

**Written submission from Janet McNeill**

**MR. LEBLANC:** The next submission is a written submission from Ms Janet McNeill, CMD 15-H2.128.

--- Pause

**THE PRESIDENT:** Any comment? Questions?

**MR. LEBLANC:** We know that many of the items that are raised will also be discussed tomorrow.

**CMD 15-H2.129**

**Written presentation by Monica Whalley**

**MR. LEBLANC:** The next submission is from Ms Monica Whalley, CMD 15-H2.129.

--- Pause

**CMD 15-H2.130**

**Written presentation by Chaitanya Kalevar**

**MR. LEBLANC:** The next submission is from Mr. Chaitanya Kalevar and it is CMD 15-H2.130.

**THE PRESIDENT:** Okay, let me. On page 3 the intervener talks about -- it's on Item 4 -- that Bruce Power should do a Level 8 INES accident. Can there be a Level 8 INES accident?

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

Not to my knowledge. The highest is 7. Again, it's just a communication tool. But regardless of the 7 or not, again I'm going to go back to our SARP study and the fact that the radiological consequences far -- it's equivalent to the Fukushima and if the intervener's opinion that 8 was exceeded, that's good for him.

**MR. LEBLANC:** Mr. President, this was the last of the written submissions.

**THE PRESIDENT:** So this concludes today's proceedings, I guess, with 10 minutes to spare. I would like to point -- I was going to say on time. I wasn't going to say on budget, but on time, and we will reconvene

tomorrow at 8:30.

Thank you.

--- Laughter / Rires

--- Whereupon the hearing adjourned at 9:20 p.m., to resume  
on Wednesday, April 15, 2015 at 8:30 a.m. / L'audience  
est ajournée à 21 h 20, pour reprendre le mercredi  
15 avril 2015 à 8 h 30