thermal hydraulics at graduate level. To me writing an equation to see what the numbers are was easy and looking at the data which came out of the test results was easy. There is not other things to do. Test results show 2 kilograms, design number is 2 kilograms and the theoretical --

THE PRESIDENT: I'm not challenging this.

DR. NIJHAWAN: -- numbers are 2 --

THE PRESIDENT: I’m not challenging this. It's just when you have -- as you know, when you have a science disagreement you normally look for peers to try to arbitrate --

DR. NIJHAWAN: Okay, let me tell you this. I presented a paper on this topic in an ASME conference in 2012. Nobody laughed at me. They asked me questions about why, why is it happening? That was my peers.

When I show them the equations I showed them -- I have actual test results. No test results were done for Bruce, or for CANDU-6 or for Darlington for the same wells. It was only done for Bruce and Bruce test results were carried over at Wyle Labs and I have the test reports. They were carried over to other reactor design. But as far as Bruce is concerned the design number is about 2 kg. The test number is about 2 mg, although there is a large scatter. Unacceptable to me, but it was fine,

process that we're going through right now is affected one way or another.

THE PRESIDENT: No, no.

MR. HAWTHORNE: My argument is not about let's go -- because everybody's busy on the regulator side. Let's not go and form a working group. Because you could have done the same on fish and you didn't. You resisted that temptation. So I would ask you to resist again and I will give you an assurance that we will form a relationship and give time and energy to see if there is some merit.

I also think, just listening to this, that because of the relationship that's gone on for a decade or so, it may well be the case that the doctor has not been made aware of improvements and upgrades that have been physically carried out to the site, and were he made aware of that, some of these concerns may be reduced.

And so, an open dialogue between Bruce Power, the operator, and an expert with some, you know, valid concerns makes a lot of sense to me. I don't know, frankly, at this point that necessarily involves the CNSC.

THE PRESIDENT: We always like to hear a solution coming in front of us. We're not looking for additional kind of regulatory work. However, now the three parties being involved here in putting a position together -- in fact, staff has just said that they agree that if you change the valve, you're going in the wrong direction.

So by all means develop an approach, agree where you agree. Where you disagree, let us know then what the situation is so we can all agree as to what is the final solution here.

MR. JAMMAL: It's Ramzi Jammal for the record. Thank you, Mr. President.

A couple of things I would like to reiterate on the record.

Our recommendation to you with respect to this relicensing recommendation has not changed. So the information we've got, the process we approved for Bruce Power to conduct with respect to post-Fukushima is acceptable to us.

Now, Bruce Power as a licensee is offering to work with the intervenor with respect to review of the assessment, how it's done, but it has to be bounded with respect to establish the elements of the engagement so we're not going to end up spinning the wheels, is it ASME Code process and so on and so forth, because at the end we base our regulatory decision based on fact and science, not research projects.

So the engagement: the licensee has responsibility for safety and Bruce Power and the intervenor can engage. We would like to make sure that the process that's going to be applied is acceptable to us by both parties.

This is not just freelancing on a licensee or an intervenor and coming up with results because we want to be engaged to ensure that what's being done meets our regulatory requirement and we can render a regulatory decision based on what's been done. Because to date the regulatory decision has been based on an ASME requirement, ASME process, and CNSC has reviewed and accepted these processes.

So I want to leave the Commission with: My conclusion is, as we stand today the recommendation to the Commission will not change. The engagement between the licensee and the intervenor is welcome and the CNSC will make sure that this engagement is made in a way that the result can be used for a regulatory decision.

THE PRESIDENT: Okay. There are a couple of other issues that have been raised by the intervenor. So unless somebody wants one more -- by all means, Dr. McDill.

MEMBER McDILL: No. I have another issue but maybe other people --

THE PRESIDENT: Anybody has another issue? Dr. McDill, you're still on.

MEMBER McDILL: Thank you.

My second question is PARs with hydrogen versus PARs with deuterium. I think I was on that one last time too. So please talk to me about it, all three of you in turn.

MR. FRAPPIER: Gerry Frappier for the record. Maybe I'll take a first stab at it.

So, as you know, we have PARs that have been deployed at the stations along with the ignition systems that have been there traditionally to manage the hydrogen issue should hydrogen be generated out of an accident scenario.

There was a point made that because we have heavy water a lot of the hydrogen, certainly the initial hydrogen might have a lot of deuterium in it, which is a different isotope of hydrogen, and whether the PARs would function using that.

We had done some calculations indicating that the PARs would perform as well with the deuterium as it would with hydrogen.

However, we are also doing experiments. We started an experimental program with Chalk River to actually test those hypotheses and that is going on as we speak and we'll see when the results come back from that with some experimental evidence regarding deuterium and PARs.

At this point in time we are satisfied that the PARs that are in place are sufficient to meet the requirements as laid out by the CNSC, and if research shows something different, then we will adjust our thinking at that time.

MEMBER McDILL: When are these results liable to be on the scene?

MR. FRAPPIER: I would say within the next few months, but to tell you the truth, I haven't got the actual schedule in front of me, unless there's somebody in Ottawa perhaps -- I don't know, Sam or Chris, if you have a better sense of the research project with Chalk River, when it's going to come to fruition.

MR. HARWOOD: This is Chris Harwood from Ottawa.

We believe that we should be able to get some results in the next fiscal year.

Can you hear that?

MEMBER McDILL: Thank you. Yes.

DR. NIJHAWAN: Sunil Nijhawan.

There are three issues in PARs.

First of all, let's talk about which gas is produced. Mr. Frappier just said: Well, maybe part of it will be deuterium.

Where is deuterium produced from? It is

produced by the interaction of heavy water -- and let's talk about one scenario, the scenario of station blackout.

In that scenario, it's produced by the interaction of remaining heavy water in the heat transport system with the overheating fuel. It is also generated by the interaction of boiling moderator heavy water with fuel and debris. It is also generated by the interaction of heavy water in the heat transport system and from the moderator with the feeders.

There is no light hydrogen in the accident, none. If there was light water, we don't have an accident. There is no -- so the PARs have to be done for deuterium. Let's forget talking about hydrogen in CANDU industry, let's talk about deuterium.

A very simple equation will tell you that the recombination rate, and I found 100 papers on the different hydrogen deuterium from 1950s when they began making bombs.

And there is work showing that the recombination rate would be at least $1/\sqrt{2}$ times smaller. Which is confirmed to me by Grant Carol, one of the original people who worked on it at AECL. It is confirmed by a whole number of people.

So, A, we should have PARs which are designed for deuterium. Secondly, we should have PARs which are designed for enough amount of hydrogen -- well deuterium, hydrogen.

Look at this. I would like to point to this graph of reactivity of carbon steel and zircaloy and stainless steel with light water. Because we don't have data for heavy water. Reactivity is only different by 5 per cent, because the dissociation required before you create an oxidation is about 5 per cent different. Reactivity of carbon steel, which is in our feeders, is more than for zircaloy at any temperature that the steel exists.

So we have forgotten in the last 30 years that we have been licensing reactors. And every time we have been looking at the temperature of the fuel in 1500°C range, 1000-1200°C range. We have forgotten what happens downstream of that, there is an end fitting, and downstream of that at the feeders. And I didn't forget that in my calculations.

And I spent about four months doing research on oxidation of steel and setting up models whereby channels heat up, transfer some of this energy and steam to the feeders.

And look at the oxidation of feeders. Oxidation of feeders, in my opinion, in a bounding analysis will produce, if steam was available, up to 2,000 kg of deuterium, which is a very large amount of deuterium, which is more than what is produced from intact fuel. So that is something we could remember.

So second thing about PARs selection, which Mr. Frappier claims is sufficient for our reactors, is that these PARs should remove the hydrogen such that the concentration remains below 4 per cent.

The reason it should remain below 4 per cent is that at 4 per cent they start to burn. And at 6 per cent AECL PARs initiate or have initiated in their experiments, as I predicted 10 years ago, experiments done a few years ago show that the PARs will produce explosive interactions with the gas at the exit.

Because the temperature at the exit of the PARs is so high when the concentration is more than 6 per cent.

The feeders which produces hydrogen by the way are corroded even on the outside. They are turning about .9 mm per year, it depends -- is the data which has come from Bruce Power, that they will trim. So they are susceptible to oxidation.

Here is what happens in the PARS. The red line, where I say "AECL Type", is the increase in its hydrogen conversion with concentration. So if I am more than 10 per cent, my concentration is about -- my removal capacity is about double of what it is at 5 per cent.

I shouldn't let it go to 10 per cent or more than 5 per cent because the temperature at the exit at high concentration is more than the autoignition temperature. That is why AECL experiments, short explosion.

So the PARs, as designed today, based on the AECL substrate, will produce explosion because they produce -- they just do the job too well. There are other substrates available like which is better, which limit their oxidation rate at anything after about 6 per cent, 7 per cent, and maintain the temperature below the temperature of the auto ignition.

So maybe we can design PARs which look like this.

Secondly, the 19 PARs put at Point Lepreau will be grossly dangerous, let alone inadequate, because the concentration of hydrogen only from -- deuterium only from zircaloy reaction could be as high as 15 per cent, maybe 30 per cent if 100 per cent oxidation of zircaloy takes...

So oxidation of zircaloy -- of par number is wrong, our PAR types is wrong. And then what about the placement? We have to look at things like that as well.

MEMBER McDILL: I am going to move over to Bruce. Thank you. They are huddling.

THE PRESIDENT: Before, just try to explain to me. So AECL was supposedly building these boxes for Canadian -- for the CANDU. How did they not design it for deuterium?

DR. NIJHAWAN: Very good question, sir. Very good question.

And there is history there. They had a requirement, and the requirement -- and I continue saying our reactors were not designed for severe accidents. All the things we put into it weren't for design basis accidents.

The design basis accident source term for hydrogen is from the worst case of LOCA plus loss of ECC accident.

For the CANDU 65 Reactor the number is 65 kg of total hydrogen. The 65 kg of total hydrogen produces and average of total 3 per cent of hydrogen concentration in the containment and never reaches 6 per cent, maybe 6 per cent locally, but globally it does not. So those were just fine for design basis accidents.

The moment I put three PARs or 20 PARs or 50 PARs in a CANDU 6 building and I have not done the numbers required for Bruce, which are significantly more, I am playing with fire. Because the amount of hydrogen which can be produced by a severe accident is so high concentrations will go more than 6 per cent very easily.

And especially very interesting part, that our Bruce reactors, which have a containment looking like this, if you can pay attention the bottom part is my fuelling machine duct. So I got 5 inverted volumes, 4 -- 4 inverted volumes for reactors and maybe 2 for fuelling machines which can't contain this hydrogen if there is an accident in all four units.

Or even a single unit, there is no reason for hydrogen, which is exited, which is taken out at this location inside this inverted volume to go out. Because the vacuum building has already acted to remove the hydrogen, to remove the steam produced much earlier.

First thing which happens is that the steam from heat transport system comes out without any hydrogen. That is what goes into the vacuum building.

So this is a trap. I have to have very special systems for hydrogen removal, more than some PARs at sporadic places. This is a -- problem is these are just problems, they can be fixed. It is not that this is -- we can come up with a system here where hydrogen can be removed, but not in the present geometry.

This is the only reactor in the whole world where the reactor is sitting at the pressure mark.

THE PRESIDENT: Okay, Bruce, now your turn.

MR. HAWTHORNE: Well, I am just going to say again what I said before, there is a lot of material here, there is a lot of compelling stuff. Got a knowledgeable presenter. But we are not going to deal with 34 points here, we are not, we are just not going to do that.

You know, it is the first time I have seen this information. I am actually very interested in exploring it more, but we are not going to do it here. What do you want me to say? I think he is right? Let's throw out all the PARs, we will go out and get some new ones?

You know, there is merit in exploring this. Yes, I want to hear that, I want to be involved in it. But these are -- this is not a Bruce Power issue. This is a CANDU industry issue. This is about have we thought about the design of the CANDU reactors and severe accidents scenarios in the right way? And some of the submissions is perhaps not.

You know, I don't think it is reasonable for me or anyone on my team to say, yeah, we agree with that or we don't.

We work within a regulatory framework. We are asked to provide support to that. We have guidance and we have CNSC Staff interaction which goes on, and we do what we think is appropriate to meet the requirements.

Notwithstanding that, if someone with clear expertise comes along and says, maybe there is another way to look at that, then we are going to look at it, I have already told you that.

But, you know, to give you incremental answers here to 34 points, it isn't going to work.

THE PRESIDENT: But when somebody tells us right here there is new information, that Point Lepreau is now -- the PARs are dangerous, well, we take no risks. And the question is --

MR. HAWTHORNE: Sure. But that is a CANDU owner group issue. With all due respect --

THE PRESIDENT: -- the question is what are we going to do about it?

MR. HAWTHORNE: -- with all due respect, I think that that's what I was asking, that's what the huddle was by the way, just so you know, because I said, is this gentleman ever had the chance to present to CANDU ownership?

Because this is broader, it is -- I think it is broader. From what you say it involves, you know, a discussion about the CANDU fleet. And it seems to me that that is exactly why the CANDU Owners Group was created, to actually look at R&D and consider various other things.

And, you know, Gary serves on that. So the reason I was huddling with him was why don't we invite this gentleman to come and present to the CANDU Owners Group and have an informed discussion amongst all CANDU operators, not just the ones in Canada. And give him a fair hearing and come to some conclusions on behalf of the industry at large.

THE PRESIDENT: Staff?

MR. JAMMAL: Ramzi Jammal, for the record.

I will pass it on to Mr. Frappier. There are a couple things I would like to say here.

This is not new information that is being introduced here. The calculation with respect to the design with respect to the post-Fukushima, everything has been taken into consideration. So the mention of the PARs, CANDU Inc. is not here to defend the design of the PARs.

But they have sold thousands around the world, so now we are declaring that the PARs are inadequate right around the world? That is a success story, it is a Canadian success story with respect to the design.

So I am not going to go into the debate, but there is one thing I want to go back and reiterate. The information we have that the staff presented to you as a recommendation is based on facts and science.

In addition, even though Dr. McDill spoke about the thermal siphoning and the water makeup. It was no longer a fact. In 1998 we learned from the events in India where they were able to -- they had a full complete fire and loss of instrumentation control and they were able to maintain the cooling.

So what we implemented post-Fukushima is based on factual elements, that they were done elsewhere from the COG and OPEX.

But I would like to pass it on to Mr. Frappier, because this is nothing new that is being introduced here. There is one key element with respect to the effectiveness of one, one, probably, beyond-design-basis element, but we're forgetting the whole systematic improvement that did take place in the containment from the cooling, from the other elments, that will take -- should take credit with respect to the safety systems and enhancement that has taken place.

I'll pass it on to Mr. Frappier.

MR. FRAPPIER: Gerry Frappier, for the record.

Thank you.

So there's a lot of complicated things that have been put in front of the Commission with this intervention. I think that when it comes to severe accidents, in doing detailed severe accident analysis, the beyond- design-basis accidents, I'm sure there's lots we can still learn, but we have looked at many things.

The carbon steel question, for instance, is one that has been looked at before. It's not new. We don't believe the carbon steel will get warm enough to be able to start producing massive amounts of hydrogen.

With respect to the PARs, as Mr. Jammal said, we don't AECL here to defend themselves, however, we do have our hydrogen expert back in Ottawa. If you don't mind, I'd like to give him perhaps a second or two to explain a few things or comment on a few things to the Commission.

So, Sam, if you can hear me, could you take the ball here?

MR. GYEPI-GARBRAH: Sam Gyepi-Garbrah, for the record.

First of all, I'd like to address the 6 per cent hydrogen that Dr. Nijhawan mentioned.

Hydrogen at 6 per cent bends rather slowly and there isn't any significant kind of explosion experiences there as far as we are concerned and to our knowledge. AECL has done a few -- a lot of experiments in near-flammability-limit mixtures done in enclosures with PARs in containment and between 4 to 9 per cent these mixtures are not very reactive and they bend rather slowly. They are not explosive hydrogen mixtures.

Second, Dr. Nijhawan mentions that there is 65 kilograms used in the analysis. It is actually 65 kilomoles of hydrogen, and that is 130 kilograms of hydrogen that AECL used in the analysis for hydrogen distribution and containment.

If there's any other he wants to me clarify on.

MR. FRAPPIER: Thank you.

So certainly we can look at -- and I think no matter what happens, both in Canada and internationally the more investigations into severe accidents is something that is ongoing. But from the perspective of what's before the Commission right now, we believe that we have the information we need to make the recommendation that we have made.

THE PRESIDENT: Go ahead, Ms McDill.

MEMBER McDILL: I'll forbore on the other 32.

--- Off microphone / Sans microphone

DR. NIJHAWAN: Just one final thing.

I'm not casting dispersions on AECL PARs. If I put 75 of these PARs in Point Lepreau they'll be just fine. It's just having the lesser number which will permit a higher concentration, and hence an explosive interaction by be exceeding the autoignition temperature that's all. I put 75 on before. At the right places, that's all.

And make sure no local location exceeds 6 per cent. That's all. AECL PARs are fine, there are just not enough of them. I would rather not put any PARs at Point Lepreau than put 19. That's a personal recommendation.

And about 65 kilomoles/65 kilograms; my bad. It is 65 kilomoles. But the actual hydrogen produced in a local LOECCwill not be limited to 65 kilomoles because they neglected to calculate the oxidation of feeders.

As Mr. Frappier was saying, We don't believe the feeders will get warm, warm for an hour, even in the analysis presented by a CANDU 6 reactor, you've got 20 grams per second of steam going out at 1500°C into an --and feeding into a feeder, it won't get warm, it'll get hot! And I calculate that transient with a very sophisticated model which takes days to run. It takes me four days to run a transient to find out hydrogen generated from a severe accident.

By the way, just by the way, for your interest, the worst amount of hydrogen -- if I may please have this picture here -- the worst amount of hydrogen is not produced by high-power channels, which -- which you would think, High-powered channels, a lot of heat, they produce a lot of high power. They don't. It's the low-power channels which don't fail and sit there and cook, and they produce hydrogen both from the fuel and from there, and from the feeders.

So it is only by analysis. All I'm selling you is analysis saying, Please, go and do analyses based on the 34 different questions that I asked over here, whatever method you use to do the analysis. Without an analysis anything you do to do

EFADs, and if you do PARs, water by the water hook-up -- may I have one more minute -- we're so happy you're going to add water to the boilers, but should you add water at three hours instead of at two hours, you will cook the reactor.

How? Even -- the way it is, the boilers are empty. When the boilers are empty, the heat transport system, water, will now stop the thermal siphoning and relieve through the relief value whether they're adequate or not, go into the heat, go into containment and get depleted.

When they get depleted -- and let's say we are removing half the water, unless we are down too close to the headers, at that time, which is at three hours, at that time I go and put in water into the boilers. Bad move. If you had not done the analyses, you'd never know.

The bad move is because at that time, even if you put water into the boilers, the heat transport system will not cool. Not only it will not cool, because their thermal siphoning it's in their steam, but water will come from the channels and sit inside your boilers. That's called reflux condensation.

That's an experiment we did. I worked

with a professor -- I was blessed. I was blessed. I had three of four people who worked in my life who beat things into me which makes sense.

We did an experiment which said: what if we put water in the boilers late? We put the water in the boilers, all the water from the channels will come and sit inside the steam generators. The channel would be empty. Wrong move.

So that why I say do better analyses rather than handwaving. Do better analyses and all these 34 questions I've raised can be solved. Not one is beyond us. We went out and made these reactors. It was my generation who designed and built these reactors. We can fix them too. But to go out and as a religious statement say they are safe, they're designed by gods, they have very low chances of giving out fission products is wrong. Whatever we got, we can fix them. They all can be fixed.

MR. FRAPPIER: Gerry Frappier again.

Just for the record, I was flippant in my language in using the word "warm." I certainly didn't mean that they were just going to be warm. They were going to get hot, very, very hot, just not hot enough is my point.

DR. NIJHAWAN: The temperature at --

I'm sorry, I don't want to hold -- I will finish this talk.

The temperature at which the oxidation starts for steel is 400°C. Steel melts at about 1500. So the temperature at which my fuel is still sitting and available -- here we go. Look at the -- look at this blue curve on the left. Look at the bottom. It is 900°C. At about 600°C I'm already oxidizing: 2000 square metres of surface area and a surface layer which peels off after some time, although I didn't model peel off to limit the amount of hydrogen, you have a lot of hydrogen potential. This is undeniable. If we had stainless steel feeders, they should not exist.

I thought, Will there be would be an issue, but my analysis shows hydrogen does not do nothing. Twenty-two kilograms of hydrogen over two days, who care? Feeders do 2,200 or 2,000, some number like that.

THE PRESIDENT: Okay.

You obviously gave us a lot of things here. Some of them -- I can tell you, for me, personally, deuterium gas is new. Whenever I have new information, I always like to have a little bit more information. I think that we had a pretty good suggestion to get some sort of industry committee to invite the intervenor and go through those 34 and see if we can agree, where we agree to disagree or agree to agree, and what needs to be done, and we'd like to have some kind of updates as to how this thing kind of progressed.

So unless somebody has further concerns or questions, I will give you -- you have the final word, any final word you want to say.

DR. NIJHAWAN: Dr. Binder, I'm very thankful. I'm very thankful to you, sir.

I would like to tell you I've spent 25 years working on this, and this is the best day of my life as far as this issue is concerned, that you are at least willing to talk to me. I will do my best and I will get back to you, but I'm very grateful for the opportunity to work further on this to give -- and we didn't even get into 32 other ideas there --

--- Laughter / Rires

DR. NIJHAWAN: -- but that's something I would ask the Commission to look at as part of the licensing process that you're going through, that those issues will also have a bearing on the safety story of Bruce.

THE PRESIDENT: Okay, thank you.

Thank you very much.

--- Pause

THE PRESIDENT: The next submission is an oral presentation by the Bruce Power Pensioner Association as outlined in CMD 15-H2.135 and 2.135A.

I understand that Mr. Mullaly will make the presentation.

Over to you.

CMD 15-H2.135/ CMD 15-H2.135A

Oral presentation by

Bruce Power Pensioner Association

MR. MULLALY: I want to thank the Commission for allowing me to do this presentation today.

Let me introduce myself. I'm Doug Mullaly, and I'm President of the Bruce Power Pensioners' Association.

And I guess I could say after sitting here for the last three or four hours, I reaffirm that I made the right decision to retire.

--- Laughter / Rires

MR. MULLALY: I want the Commission to know that the Bruce Power Pensioners' Association strongly supports Bruce Power in its five-year licence renewal.

Allow me to tell you a bit about the Bruce Power Pensioners' Association. The Bruce Power Pensioners' Association has been in existence since 2007. The Association has over 1,300 members, representing approximately 40,000 years of nuclear experience.

Now, the role of the Association is to maintain a communication channel between Bruce Power and the pensioners. And certainly one thing that we have found with any new pensioner that -- it seems somewhat like a divorce. Everything just stops after they retire from Bruce Power, so we had a lot of people saying, "We really want to still have that communication", so we established the organization and then Bruce Power's been a strong, strong supporter of us since day one.

So we have opened up those channels of communication. That's been great.

Another role of the Association is to keep pensioners updated on the pension plan and any other issues affecting pensioners.

We support pensioner and spouse wellness program activities, and we do a lot of work in that area. We want to maintain healthy pensioners as long as we can, and we work with the community, Grey-Bruce Health Association, various other groups to do that.

We're proud to say that we support Bruce Power in ongoing activities. We are an advocate of Bruce Power in the community, and we support pensioners' social activities, obviously.

We, as pensioners, considerable ourselves as ambassadors of the company.

Now, I'm not here to discuss the technical aspects of Bruce Power's application. Their strong safety culture and operational excellence speaks for itself.

What I do want to talk about is the commitment of Bruce Power to its pensioners and to the community.

Since day one, Bruce Power has demonstrated its support and commitment to the Bruce Power Pensioners' Association through its participation on the Bruce Power Pensioners' Executive Team. We actually have a senior manager that sits on the executive with us to keep that dialogue going between Bruce Power and the pensioners.

Bruce Power collaborates with us on

employee wellness. They take their wellness programs and where it will fit in with pensioners, will marry those programs together, so we'll adopt the Bruce Power wellness programs if applicable to pensioners.

We have an annual general meeting, and every year we have a senior executive from Bruce Power come to that meeting and give us, as pensioners, an update on what is happening at Bruce Power and what, exactly, is going on on the site. So that's a very important thing for our members.

Bruce Power provides funding to support our active membership.

Bruce Power involves our membership in key stakeholder events and announcements. And Bruce Power has invited the Pension Association to be an active member on the tripartheid committee on pensions, along with the PW and the Society, and that's very important to pensioners.

Now, the Bruce Power Pensioners' Association partners with Bruce Power on a number of community initiatives. We heard a bit earlier today about the snowstorms and the Highway 21 closings, and this is certainly the land of the horizontal snow.

We've worked with Bruce Power for a number of years in planning the living snow fence, and for those of you that aren't familiar with that term, it's just a string of trees along Highway 21, predominantly Highway 21, that act as windbreaks to cut down on the horizontal snow that we get. And that's been an ongoing activity for probably seven or eight years we've been planting trees along with Bruce Power people.

Not just only does it help Bruce Power and our pensions, but everybody in the community.

We help out with community e-ways collections with Bruce Power. We've helped out with Habitat for Humanity builds with Bruce Power. We've helped out with the Saugeen Valley Children's Safety Village with Bruce Power.

We supported community television programming. We have supported breakfast programs for local schools with Bruce Power.

We help Bruce Power out in their annual community beach party. We support and assist local food banks, and we support and assist many community charitable organizations.

Bruce Power is an integral part of this community. Prior to Bruce Power taking over the site from OPG, the local towns were in dire straits.

OPG had closed down generating units,

and the impact of lost jobs as a result had a terrible effect on the local communities. Population was decreasing, businesses were closing, house values were dropping rapidly and there was no hope that our children could remain in this community due to lack of employment. Communities were in rapid decline.

When Bruce Power took over the site, it breathed life into the local communities once again. Their capital investments with the local economic spin-offs -- spin-off effects brought the communities back to life.

They offered many job opportunities, not only during their expansion phase, but also in the operation of the site. They have employed many young people, which has caused housing to grow, schools to expand and local businesses to flourish.

So what are the community benefits of having Bruce Power here?

Bruce Power certainly demonstrates safety first. It's one of their core values. And that's not something that's just practised on the site. That spills off over into the communities.

When people come home, they carry those values and they share those with the rest of the communities. It's a very important value that they follow.

It's certainly improved the local economy. No question about that. Capital investments not only on the site, but in local towns.

It's provided employment for young people, financial support for local charities and organizations, and it is a leader in the industry and the community.

There's overwhelming support from the local communities for Bruce Power, as evidenced by the many surveys conducted locally. Eighty-nine (89) percent agree that Bruce Power operates safely and is a good community citizen. Amazing number, 89 percent.

Bruce Power, with its low-cost strong operational performance, excellent safety record and strong community support definitely deserves to continue supplying Ontario 6,300 megawatts into the future.

Bruce Power has earned the renewal of their operating licence. I thank you.

THE PRESIDENT: Thank you.

Questions?

Mr. Tolgyesi.

MEMBER TOLGYESI: Where are your members generally living now, being retired, in the area, in a large area, or some of them are --

MR. MULLALY: The vast majority are in this area. Certainly we have members across Canada and outside of Canada, but the vast majority tend to stay here after they retire.

MEMBER TOLGYESI: How many members you have?

MR. MULLALY: We have over 1,300 members.

MEMBER TOLGYESI: That's quite a bit.

MR. MULLALY: Yeah, it's -- we're quite happy with the membership. It's a voluntary thing. You don't automatically become one. Someone has to apply to join.

But I think the total retirement population is roughly around 16, 17 hundred, so we have 1,300 of those as members in our Association.

THE PRESIDENT: Anybody else?

Dr. Barriault.

MEMBER BARRIAULT: Thank you, Mr. Chairman.

Perhaps this has been explained already. What is the Saugeen Valley Children's Safety Village?

MR. MULLALY: Saugeen Valley

Children's Safety Village is something that the community has come up with, and it actually is a miniature village, a town, and it's to teach children safety in their environment, in a town.

So it actually has little cars and streets, and it just operates like a little town.

MEMBER BARRIAULT: And to what age group does this cater to?

MR. MULLALY: It would be kids just entering school, like Grade -- probably Grade 1 to 3, that range.

MEMBER BARRIAULT: Five or six.

MR. MULLALY: Yeah.

THE PRESIDENT: Does it have a nuclear power plant in it?

MR. MULLALY: Just down the road.

MEMBER BARRIAULT: Thanks.

THE PRESIDENT: Anybody else?

Okay. Thank you very much.

The next submission is an oral presentation by Babcock & Wilcox Canada Ltd. as outlined in CMD 15-H2.112.

I understand that Mr. MacQuarrie will make the presentation.

CMD 15-H2.112

Oral presentation by Babcock & Wilcox Canada Ltd.

MR. MacQUARRIE: Good afternoon, Dr. Binder and Members of the Commission, and ladies and gentlemen. Thank you very much for the opportunity to present to you.

My name is John MacQuarrie and I am president of Babcock & Wilcox Canada. I understand that you have had a chance to review my presentation so I will just hit the highlights of some of the key points that I would like to present to you today. Essentially I will cover who we are and what we do and why we support the renewal of the license application for renewal of the license for Bruce A and B.

So a little bit about Babcock & Wilcox Canada. We are headquartered in Cambridge, Ontario and we are a global supplier of nuclear components and services. We have a large facility in Cambridge. In fact, we are the only North American-based supplier of large nuclear components such as steam generators. We also have a significant training facility there that supports our service business that we use to provide services to customers in Canada and around the world.

A little bit more about our products and services so you can understand a little bit about the role that we play in the industry. Our products are listed there on the slide. Some of the key ones are steam generators. We are at up to 305 steam generators supplied, which we understand to be the most ever supplied by any company in the world, not just of the CANDU type, but of every type of reactor that has been operated in North America.

We also make critical heat exchangers and near the bottom of the list you can see reactor feeders there. So essentially we are making what you might call critical pressure retaining components for a variety of nuclear plants, including pressurized water reactors and CANDU plants.

And services, essentially we service what we sell and so you can see the list of components that we work on is very similar to the products that we make. Essentially, what we do in our service business is assess the condition of these components and so look at the need for repair of degradation or perhaps replacement.

One thing I would comment on about our service business is it gives us a unique opportunity to work very closely with our customers because we work in their facilities and therefore they get to know us very well and we get to know them very well, and so my comments this afternoon are related to that perspective that we gain by working so closely with our customers.

So with that background on B&W I would like to explain a little bit about or talk a little bit about our relationship with Bruce Power. It is a long-standing relationship.

We supplied all of the steam generators and some other critical components for the Bruce reactors starting in the several and we have been providing services since that time.

What I would like to say to summarize some of the points that are on this slide is that we have found that whether Bruce Power is procuring components from us or working with us where we are providing services in their facilities, that in everything that they do, that safety is always paramount in their approach to executing their work and so therefore we have high confidence in their ability to continue to operate their reactor safely and provide clean and economical power to Ontario.

A couple of the attributes that I would like to highlight that we observe about Bruce Power is, first, their commitment to nuclear safety culture and, second, their collaboration with industry partners to ensure that they are always utilizing the best technology to understand the condition of their components.

Bruce Power exhibits a continuous improvement attitude, particularly in the areas of human performance in an effort to reduce errors, to improve performance overall and to achieve event free operations.

Some of the best evidence perhaps I can offer for this is what's noted there at the bottom of this slide, is that in our service business we have been fortunate to work over 9 million hours, which for us is 18 years, without a lost time accident. And while we would like to take credit for that entirely at B&W that would not be correct to take all that credit because we work most of those hours in Canadian nuclear plants and a lot of them in Bruce's plants. I think a lot of credit goes to the fact that they operate in a very safe way and they have challenged us to be safer over the years and because of that we have been able to achieve that record.

Bruce Power makes tremendous investments in monitoring the condition of their safety related components. They invest millions in every outage to have inspections occur, to have analyses done and to ensure they understand the condition of critical components. In our case, we are quite involved in steam generator inspections and feeder inspections and some other components, but I know that they work similarly with many other suppliers to ensure that they understand the condition well.

They also make tremendous investments on an ongoing basis in leading-edge inspection and repair technology. There are some examples on the slide here of what they have invested with us, but they are ensuring, from our perspective, that they remain at the leading edge of inspection technology so that they can detect any degradation issues in their components.

So today I would say that from my perspective Bruce Power knows more about their components than ever before because of the techniques that they are using and the investments that they are making and that gives us confidence that they know about the integrity of their components, they understand degradation mechanisms and that they know that they are fit for service.

One of the things we wanted to highlight a little bit was a case study in a series of projects that we worked on with Bruce Power a few years ago known as the West Shift. Perhaps you may be familiar with these projects. They were on Bruce A, Unit 3, and the essential purpose was to shift the fuel channels in order to extend the life of these reactors. B&W Canada was fortunate to work with Bruce Power on this project, along with many other industry partners.

You know, what I would like to highlight to you is not the fact that I understand they were executed on time and on budget, but I would like to highlight to you the approach that Bruce Power took to those projects, which was investing in a considerable amount of training to prepare the crews to do that work. We were heavily involved in that at B&W. Our facility that I mentioned earlier where there were more than 100 boiler makers, millwrights, other skilled tradespeople, technicians and engineers trained on a full scale or a partial scale mock-up, but fully simulating the tools and the procedures that we were going to use, often done in full dress rehearsal so that the individuals could experience what the environment would be like, all of this done to ensure that the work would be done correctly with minimal radiation exposure.

I would say that there are very few industries, in my experience, that would go to that extent or invest that kind of -- make that kind of investment in training. So I think it is remarkable. You know, it ensured that the work could be done safely. It could be done first at the right time and that there would be no challenge to reactor safety. I think this demonstrates Bruce Power's conservative approach to doing work like this and their strong commitment to a nuclear safety culture.

We have been providing engineering support to Bruce Power for many years, as I mentioned, primarily around component lifecycle management for those are the components that we are the original equipment manufacturer of. We have seen them invest a great deal in the development of new engineering and analysis tools so that they continue to understand new degradation mechanisms as they arise or make sure that they are at the leading edge of their capability to engineer and analyse components.

You know, from this we find that they are very ready to rely on expertise that exists out there, to utilize global operating experience whenever they can to ensure that their assets are appropriately managed and that they are meeting all of the code and licence requirements that they need to in order to operate their facility.

So with that experience, Babcock & Wilcox Canada requests that the Commission extend or renew the operating license for Bruce A and B because we are confident that Bruce Power can continue to operate these reactors safely and that they will continue their commitment to nuclear safety culture and to the strong focus on asset management that they have and that they will continue to provide a very safe working environment for their staff and for everybody that works in the reactor, as well as the many other positive things that we have heard about today.

Thank you very much.

THE PRESIDENT: Thank you.

Questions? Mr. Tolgyesi...?

MEMBER TOLGYESI: You said you are the sole producer of steam generators.

MR. MacQUARRIE: In North America.

MEMBER TOLGYESI: In North America. So what is the second-hand market for those steam generators?

MR. MacQUARRIE: Second-hand market as in for used steam generators?

MEMBER TOLGYESI: What do you do with them?

MR. MacQUARRIE: I'm sorry. I'm not sure I understand the question.

MEMBER TOLGYESI: What do you do with the steam generators when they are built or do you change them? Do you recover them or you --

MR. MacQUARRIE: So you are referring to when a steam generator has reached its end of life and what do you do with the generator. So typical practice in the industry is that when a generator reaches its end of life it is replaced and replacement is quite common. Bruce Power has done that.

he reactors that are -- or, sorry, the steam generators that are no longer needed, the original steam generators, are typically either stored at the site or they are sent somewhere else for reprocessing and for recycling, if that is possible.

THE PRESIDENT: So I think there is a little hidden meaning to this question.

--- Laughter / Rires

THE PRESIDENT: We have a long history with steam generators' end of life. So you said you service what we sell. Have you ever thought about vendor take back?

--- Laughter / Rires

MR. MacQUARRIE: Yes, we have. We have been asked that before and at this point in time we don't offer it.

THE PRESIDENT: So since steam generators is on the table I cannot resist. What is the plan? What is the long plan if it changed for the steam generators?

MR. HAWTHORNE: I knew you wouldn't resist that opportunity. For the record, Duncan Hawthorne.

As we all know and are painfully aware, we did have a strategy here that involved waste reduction, really which we have advocated is the environmentally appropriate thing to do, to reduce, reuse, recycle, which are the tenets of environmental stewardship. For us that involves shipping to Sweden and have Studsvik do it, who do it for many countries throughout the world. CNSC had a hearing and, you know, as far as we were concerned we met all the regulatory requirements to do that but, as you well know, there was a lot of heat in that debate. We took the decision to store for a while where we tried to engage communities along with a potential route.

Frankly, as I said at the time, it wasn't a commercial case for us. We weren't going to save money by doing that versus storing. I just think it was important that we took the right environmental choice. And what we are looking at is the possibility of doing, what we would have done in Sweden here, do it locally and avoid the whole transit issue. So we are actively pursuing that now.

For the moment they continue to be stored on-site, but I think it would be a great disappointment to all of us if all we ever do with these is stack them up on the site. It's a mistake. It's a bad environmental solution and so I am still committed to the tenets of reduce, recycle, reuse. I just don't think I am going to Sweden with them in order to achieve that goal.

THE PRESIDENT: Thank you.

Questions? Question? Okay. Thank you. Thank you very much for this presentation.

MR. MacQUARRIE: Thank you.

CMD 15-H2.113

Oral presentation by

The Society of Energy Professionals

THE PRESIDENT: The next submission is an oral presentation by the The Society of Energy Professionals, as outlined in CMD 15-H2.113.

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

MR. TRAVERS: Thank you, and I would like to thank the Commission for being here and allowing us the opportunity to speak in support of the Bruce licence renewal application. My name is Scott Travers. I am the President of the Society of Energy Professionals, IFPTE Local 160.

With me here today is Mr. Mike Gade. Mr. Gade is currently an operations specialist at Bruce Power. He has previously been a licensed authorized nuclear operator at Bruce to be. He is here today in his capacity as one of our local vice presidents. So Mr. Gade is the local Vice President for the Bruce Power Local and he will be speaking a little bit later on in the presentation.

MR. LEBLANC: There is perhaps a little bit of interference. Perhaps you have a blackberry or another electronic device close to the microphone.

MR. TRAVERS: Oh, definitely we can --

MR. LEBLANC: Sometimes it works.

MR. TRAVERS: Okay. I hear it now.

--- Laughter / Rires

MR. TRAVERS: Okay. How many more phones do we have kicking around here? It’s shutting off. Perfect.

The Society is a union that represents almost 8,000 employees in the electricity industry here in Ontario. We represent members at 13 different employers, including Ontario Power Generation, AMEC-Nuclear Safety Solutions and Nuclear Waste Management Organization. In particular we represent approximately 1,100 members here at Bruce Power.

Our members are employed as first-line managers, supervisors, professional engineers, scientists, information system professionals, economists, auditors, accountants, as well as many other professions. Approximately 90 percent of our members hold post-secondary degrees and diplomas, with about 70 percent holding degrees at the Bachelors, Masters or PhD levels.

Our members are knowledge workers, working to the best of their abilities who take great pride in exercising their civic, social and professional responsibilities and as a union we stand behind our members professionalism, their integrity and their commitment to excellence in all areas and, in particular; workplace safety, public health and environmental sustainability. So we come to the Commission uniquely represented to be able to speak to the safety culture and the practices at Bruce Power.

So I would like to turn over the presentation to Mr. Gade at this point.

MR. GADE: Thanks, Scott.

Mike Gade, for the record.

Yes, as Scott said, the Society members support the Bruce Power licence renewal application. Our members and our union are uniquely motivated and uniquely situated to act as an additional safeguard of the public trust in the Bruce nuclear generating stations and indeed to all of Ontario's nuclear operations.

Our members work inside of and in close proximity to these facilities. They are amongst the first in harms way if the highest standards of safe operation and occupational health and safety are not adhered to. They live in the Bruce and surrounding communities and their children drink the same water and breathe the same air as all the local residents.

Because of our occupational positions, training and experience, and thanks to the independent role we play in the internal responsibility systems at Bruce Power, we are in a position to enforce the most stringent of standards. It is a position and responsibility which we take very seriously. Our members have confirmed to us that Bruce Power continues to implement and maintain effective environmental protection programs at Bruce A and Bruce B, in accordance with the CNSC requirements.

We are proud of the health and safety achievements of the Society members that work on the Bruce joint health and safety committees and their efforts to ensure worker safety.

The Society is committed to continuing to work with Bruce Power, the CNSC and all stakeholders to approve not only the operation of the stations, but also the health and safety of the workers in the surrounding community, the reliability of the units and the engagement of the workers at this plant.

The Society would like to thank the CNSC for inviting us to make this submission.

THE PRESIDENT: Thank you.

Questions? Dr. McEwan...?

MEMBER McEWAN: Thank you, Mr. President.

Thank you for the presentation. I am interested in again the safety culture. We have heard a lot about it and Bruce are obviously very proud of what they have achieved.

For your members, if they have a concern in the workplace, do they have the ability to make it either known or acted upon immediately or is there a process or is there a supervisory food chain that they have to go through? If they see an immediate concern, can they do something about it?

MR. GADE: Absolutely. So if our members see an immediate health and safety concern, they can actually take action and if it is an unsafe activity they can have that activity stopped immediately. If it's not an immediate concern, each of our members has a requirement and an obligation to raise that safety concern. That is part of our internal responsibility system and our safety culture.

Every person has a responsibility for safety at this site and a requirement to play their role, so if there is a safety concern the expectation is the members will raise that through their line to their line managers and seek resolution and also one of the safeguards that I spoke of for safety is that the members also know that we have an independent voice as a union, they have representation and they have many avenues, including joint health and safety committees, joint committee on radiation protection in which to have issues raised and dispositioned in a thoughtful manner.

MEMBER McEWAN: So just following on from that, if raising the issue through the line management didn't work to the member’s satisfaction, what would they be able to do?

MR. GADE: So the question is if they are not able to have it resolved through the line manager? The expectation would be through the internal responsibility system if their concern isn't resolved to their satisfaction, to continue elevating that and the union would at that point get involved, likely, to make sure that the issues are resolved in a thoughtful and meaningful way. So it will be resolved and elevated to the highest levels of the company if the issue is still in existence.

MEMBER McEWAN: So I guess my final on this theme would be the joint health and safety committees. How often do they work and, again, how effectively do they work and how much are they concerned with, if you like, policy and how much with operational detail?

MR. GADE: So joint health and safety Committees meet regularly, every three or four weeks as a regular basis. They do -- joint health and safety members have a requirement to do regular workplace inspections so our entire workplace is inspected for hazards and to make sure that the standards are being upheld.

And also the joint health and safety committee members of both unions and the management members also have a requirement if there is an emergent issue to take that on an immediate basis. So they are available 24/7 if there is any emergent issue to deal with it.

THE PRESIDENT: Questions? Ms Velshi...?

MEMBER VELSHI: In your written submission on page 4 under safety culture you talk about a self-assessment that was done and it identified a few areas of improvement and you talk about three specific initiatives that are underway. Can you elaborate on what those initiatives are and what were those areas of improvement identified?

MR. CLEWETT: Scott, would you like me – I can --

MR. GADE: Sorry?

MR. CLEWETT: Do you want me to cover that?

MR. GADE: Sure.

MR. CLEWETT: Len Clewett, for the record.

Yes, that is a formal safety culture assessment we performed in 2013, which we do every few years. We had over 2,500 respondents and we got very solid ratings from those respondents, but we had two areas that we thought would help us improve performance.

One was equipment health that had a lot of comments and we had a site-wide initiative and in fact have seen tremendous improvement in the equipment performance, specifically at Bruce A since that time as a result of that initiative.

The other was really involving communications at the first line managers to their crew. We, I think, have excellent communications throughout the site, but it is an area to help us facilitate giving them communication tools each and every day and that has also been very successful.

So those were the two initiatives really, that first line manager communications and the equipment health are the top two themes that came out of that survey.

MEMBER VELSHI: Thank you.

THE PRESIDENT: On that topic, staff, are you familiar with this INPO 12-012 and the Nuclear Energy Institute 0709?

MR. HOWDEN: Barclay Howden speaking.

I believe we are. I'll ask André Bouchard to reply.

MR. BOUCHARD: André Bouchard, Director of Human and Organizational Performance Division.

Yes, we're very familiar with that INPO document and we were privy through a collaboration with COG to a discussion with INPO members to get a deeper understanding in our way forward with our current effort for producing a REGDOC on safety culture.

THE PRESIDENT: Thank you.

Any other questions?

Thank you. Thank you for your presentation.

CMD 15-H2.143/15-H2.143A

Oral presentation by ATS Automation

THE PRESIDENT: The next submission is an oral presentation by ATS Automation, as outlined in CMDs 15-H2.143 and 15-H2.143A.

I understand that Mr. Bains will make the presentation.

MR. BAINS: Thank you, Mr. President.

I would just like to thank you the Commission for allowing ATS to present at this hearing.

My name is Narinder Bains. I am the General Manager of Nuclear at ATS Automation.

I would like to start off by saying that ATS supports the continued operation for the Bruce Power Nuclear Generating Station and the further five-year licence renewal.

During the presentation, I would like to outline how Bruce Power is leveraging the commercial sector to support the important mandate of running a safe plant. They're doing this by introducing new innovative technologies and by working in lockstep with key suppliers and ensuring that their suppliers match Bruce Power's safety culture and record.

If the Commission could bear with me for the next couple of slides, I'll be giving an overview of ATS because I think it's important to note that Bruce Power is really thinking out of the box, looking beyond traditional nuclear suppliers and have broadened their supply chain to draw in experiences and best practices from other industry sectors.

They have brought in companies like ATS Automation who have the experience in implementing innovative technologies and design processes that are used in other industry sectors such as life sciences, transportation and consumer products. ATS is not a traditional nuclear company.

ATS is one the world's largest systems integrators with revenue run rates of approximately $1 billion. We are a Canadian company and our headquarters are in Cambridge. We focus on industry diversification, which provides business stability as well as cross-industry transfer of technologies, knowledge, methodologies and lessons learned.

Our relationship with Bruce Power mirrors our customer approach in other business segments. This approach is partnership-based, validated by long-term relationships. Our strength is our resource base of over 3,500 people involved in innovative high-technology product development and project implementation throughout the world.

ATS is an example how Bruce Power is continuously searching and qualifying suppliers who can add greater value in the area of innovation which has a direct impact on safety.

This slide illustrates the diverse industry sectors that ATS serves. ATS has engineered and built manufacturing and assembly lines for all these products and industries. ATS has supplied large assembly lines for automotive and solar industries to complex assembly lines for life science products and understands the consequence of failure and safety in every industry.

For example, we supply manufacturing lines for heart pacemakers, drug-coated stents for heart surgery and produce medical imaging machines.

Similar design methodologies and safety practices have been used to design and implement nuclear systems for Bruce Power.

Although ATS is a fairly new company in

nuclear, about 15 years, our impact has been seen across many areas of industry, including refurbishment projects, outage tooling to fuel fabrication, decommissioning and in the radiopharmaceutical field.

There are two specific examples in the following slides where ATS has worked closely with Bruce Power and is continuing to work closely with Bruce Power.

One is the NCR Project, the refurbishment of reactors, and the second is designing and building an innovative fuel channel inspection and maintenance system. This system is called BRIMS, the Bruce Power Inspection and Maintenance System.

BRIMS has been developed in an effort to increase worker safety and productivity. It's a collaborative project with Bruce Power and other suppliers and has resulted in the creation of a specialized tool that will be deployed during outages to inspect and maintain fuel channels in the reactor core.

The design combines operations experience from Bruce Power, an innovative design from suppliers that has resulted in an advanced remotely controlled system. There are unique features that make the system more reliable and faster. One of these is a local tool test and calibration system which is done right in the vault.

The BRIMS System and its approach is to

reduce personnel time in the vault, which reduced radiation dose and provides faster and more predictable inspection data.

Apart from the innovative design of the BRIMS System itself, several other factors within the project increase overall safety.

The BRIMS machine is currently being thoroughly tested offline at ATS on a representative reactor fuel channel mock-up. This ensures that the machine goes through thorough cycle testing for reliability and performance.

Also at ATS, we have a vault replica that has been set up so the workers can rehearse transporting the machine into position and commission on a mock-up using actual personal protection equipment such as protection suits and breathing air lines. This ensures that everyone has in-depth training that increases safety and reduces the time spent in the vault, which in turn reduces the radiation dose.

ATS also supports refurbishment of the Bruce Power Nuclear Generating Station. We have been involved in almost all of the CANDU refurbishment projects, starting with Point Lepreau in New Brunswick. More recently, ATS engineered and supplied the majority of the automated tools for the active component removal for the

Darlington refurbishment projects.

A sample of the automated tools is shown in the slides. They're all designed to reduce setup time and are remotely controlled so the personal radiation dose is minimized.

Operating experience will be used and incorporated from all previous refurbishment projects for future refurbishments of Bruce.

The tool design process for refurbishment projects involves all the stakeholders. As already mentioned, operating experience is carefully collected from previous refurbishment projects and design changes are incorporated. In some cases, changes are subtle, while others more intrusive.

The stakeholders involved in the design process from the station include engineering, operations and, more importantly, safety, radiation protection and the actual staff who will be handling and operating the tools.

Detailed risk registers and risk mitigation planning steps are taken to ensure the risks are eliminated or reduced to an acceptable level.

Other key design features and processes include the use of state-of-the-art safety control systems and the use of computer simulations to optimize the in-vault installation process. Simulations are used to work offline and evaluate different scenarios so the safest possible solutions can be found.

Another important aspect of the project will be the use of high fidelity mock-ups for complete system testing, rehearsals and training.

ATS supports Bruce Power's application for licence renewal. We have worked very closely with Bruce Power in developing tools and systems that are inherently safe and minimize radiation exposure for the workers. There has been a tremendous focus at Bruce Power on safe operation and ensuring that all suppliers put safety as the highest priority.

Bruce Power promotes innovation, commitment and, above all, teamwork with suppliers like ATS to ensure safe operation and safe implementation of key projects during maintenance outages and refurbishment projects.

This concludes the presentation. Thank you.

THE PRESIDENT: Thank you.

Questions?

Dr. Barriault.

MEMBER BARRIAULT: Thank you, Mr. Chairman.

Your BRIMS machine for examining fuel

channels, how many channels can you examine a day? How long does it take to look at all the fuel channels?

MR. BAINS: There are multiple channels that can be done within a day and the design of the BRIMS machine was really to enhance the productivity of inspecting fuel channels.

MEMBER BARRIAULT: Is it a visual inspection or non-invasive?

MR. BAINS: There's a visual inspection but the machine is also used for sampling, taking pressure tube samples. It's also used to locate and relocate the spaces. So there's multiple uses of the machine.

MEMBER BARRIAULT: Okay. Is that in operation now at Bruce?

MR. BAINS: (No audible response).

MEMBER BARRIAULT: No. When do you expect delivery or do you --

MR. BAINS: Yes. The delivery --

MEMBER BARRIAULT: Maybe I'm assuming something --

MR. BAINS: The scheduled delivery is June --

MEMBER BARRIAULT: Okay.

MR. BAINS: -- and it will be used in the August outage.

MEMBER BARRIAULT: Okay. And how much -- what's the efficiency of this machine compared to what you're doing now?

MR. CLEWETT: Yeah, efficiency of the machine -- it will also help for reliability but also allow us to have a lower dose to the workers.

MEMBER BARRIAULT: The workers, yeah. Great.

MR. BAINS: Yeah.

THE PRESIDENT: Can you be really more specific? What is it the machine actually measures?

MR. CLEWETT: Glen Clewett, for the record.

Actually the machine is a tool delivery apparatus, so when we use testing to do the scrape of the channels, this tool delivers the other tool to the reactor face.

Same thing when we do measurements to locate spacers, this tool is used to deliver the tool to the specific pressure tube.

So it's actually a tool that we call the delivery tool.

THE PRESIDENT: So it's like a robotic kind of delivering something.

MR. CLEWETT: That's correct, yeah.

THE PRESIDENT: To save, you know, people from doing this.

MR. CLEWETT: Remotely controlled.

THE PRESIDENT: Yes.

MR. CLEWETT: Correct.

MR. NEWMAN: Gary Newman, for the record.

It's actually taking the place of fuel handling equipment that currently delivers the entire suite of tools. This new tool is actually based upon many elements of our prior tools, like mini-SLAR you may have heard of in the past. It's just taking all these concepts and making now this new tool with some greater efficiencies to deliver the entire suite of tools that we put on the reactor to do full-length volumetric inspections for, you know, indications in the channels, to do scrape, to do maintenance such as SLAR-related activities, that sort of thing.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: These tools, you are manufacturing them. Are you selling them to the customer or you are renting them and, you know and...

MR. BAINS: This is actually almost a first-of-a-kind project in nuclear because this is actually a project managed by Bruce Power. It's a collaborative effort.

So Bruce Power have bought the best and the best from the industry, so other companies like CANDU Energy are supplying inspection heads, MDA, MacDonald, Dettwiler Associates are doing the overall systems engineering, there's Bruce Power involved in the execution.

So Bruce Power have brought really a number of key companies together and worked together in lock-step to deliver this system.

THE PRESIDENT: Is OPG interested in it, or is there a commercial secret here?

MR. HAWTHORNE: Maybe I can add, sir, a bit more and it's really not fair to put a vendor on a spot in that respect, but let me just try and give -- for the record, Duncan Hawthorne.

Our strategy here is that we know that as a consequence of managing the asset life program that we're going to have to do a lot of inspections of fuel channels. It involves repositioning spacers, it involves taking scrapes and samples, et cetera, but in order to do that kind of encased form of activity, we didn't want to continue to use the old tools and techniques. One, because they carry with them a higher employee dose uptake and obviously that's not desirable. Secondly, it ties up the fuelling machine and, again, given that there's a lot of operational units that are in that, it didn't seem to make sense. And, thirdly, we think there's real productivity improvement to be had by having new state-of-the-art, modern, efficient tooling.

And frankly, bringing a supplier like ATS in who are not of the nuclear culture who have a different approach and can bring more innovative techniques, seemed to us the way to create some breakthrough.

BRIMS machines are an example of that. We've got one we're going to deploy it, we're going to test it in places we don't really, you know, it's not on critical path until we prove the concept, we've seen it work in action in the facilities now.

So there's a whole suite of new tools and techniques that we're deploying here, just to do all of the inspection work and are more efficient both in terms of time, cost and dose uptake and it's part of a very comprehensive, you know, tens of millions of dollars, in fact, probably into the hundreds of millions of dollars of capital investment on our part.

THE PRESIDENT: Ms Velshi...?

MEMBER VELSHI: Would there be a

challenge to compare results from BRIMS with your historical way of inspections?

MR. HAWTHORNE: No. The reality is, it's just a more efficient way of obtaining the sample.

And sorry, I didn't answer the question about OPG, but there are signs of interest. You know, we were smart enough to have some role in the intellectual property of that, so there is indeed a commercial element to the rules of entry, if I can say that.

But, you know, obviously all of us as operators are looking to try and share expertise and knowledge. We had a specific initiative and a specific sense of urgency and pace to do some of the stuff, but equally, there's obviously benefit in OPG doing some of the things.

So the most recent position I would tell you, and I'm not speaking for OPG, but they certainly have expressed an interest in having their own BRIMS machine and we won't charge them too much for that opportunity.

--- Laughter / Rires

THE PRESIDENT: Anybody else? Question?

Just a comment. I have rarely seen so much information very efficiently displayed of their slide here, it's a highly dense deck. So thank you for that.

--- Laughter / Rires

THE PRESIDENT: Any final comments?

MR. BAINS: No, sir.

THE PRESIDENT: Thank you.

MR. BAINS: Thank you.

MR. LEBLANC: Just an update on your agenda. We had planned to have dinner at six o'clock. It's not yet six o'clock and we have Nordion that is available who was scheduled to present at seven, so we appreciate their willingness to present now.

And then we're going to take, after Nordion's presentation we're going to take a one-hour dinner break and we're going to resume thereafter.

For the occupants in the room, we know that the Ottawa Sens are playing against the Montreal Canadiéns, however, we do have two interveners that had been scheduled for tomorrow that will be presenting this evening, so we're adding two presentations this evening. They will be from the Southwest Economic Alliance, that's CMD 15-H2.137 and Kinetrics, which is CMD 15-H2.119. So Southwest

Economic Alliance, .137 and Kinetrics, .119.

Thank you.

THE PRESIDENT: Okay, thank you.

So the next submission is an oral presentation by Nordion as outlined in CMD 15-H2.41. I understand Mr. McIntosh will make the presentation.

Over to you.

CMD 15-H2.41

Oral Presentation by Nordion

MR. McINTOSH: Thank you very much.

My name is Scott McIntosh and I am the President of the Gamma Technologies Business Unit at Nordion based in Ottawa here in Canada, of course.

I'm here to speak to you about the contribution that Bruce Power and the Bruce Nuclear Generating Station make every day to the health and wellbeing of millions of people in Ontario, in Canada and around the world.

Nordion is a provider of radioisotopes for the prevention, diagnosis and treatment of disease. One of our primary products is Cobalt-60, and that Cobalt-60 is produced in power reactors.

In Ontario, both the Pickering B and

the Bruce B reactors produce Cobalt-60 for Nordion. And today, Bruce Power is the largest producer of Cobalt-60 in the entire world and they currently account for approximately 30 per cent of the global supply of Cobalt-60.

When the Pickering B reactor shut down permanently in the 2020 timeframe, there will be an even greater reliance on Bruce Power.

Now, Cobalt-60 is used primarily for sterilization of single-use medical devices and that's such as drapes, gowns, catheters, sutures, IV equipment, orthopedic implants, endoscopic devices, many more. You name it, it is sterilized with Gamma.

More than 40 per cent of single-use medical devices world-wide currently use Cobalt-60 as a method of sterilization.

Now, if you or someone you know has spent any time in a doctor's office, a dentist's office, any clinic, undergone any kind of diagnostic procedure, any kind of small minor surgical procedure chances are very, very good that you have been touched by products that were sterilized using Cobalt-60. And in fact, some products, many products in fact, can only be sterilized with Cobalt-60 either due to their design or due to the materials that were used in producing them or packaging them.

Sterilization with Cobalt-60 is known as gamma processing or irradiation, it's a simple, safe, reliable and cost-effective method that's been used for over 50 years. The Bruce Nuclear Generating Station, and subsequently Bruce Power, have been a significant contributor to that history since 1983. In fact, Cobalt-60 produced at Bruce Power makes up almost half of the installed base world-wide of Cobalt-60 and that's enough Cobalt to sterilize 175 million cubic feet or 5 million cubic metres of single-use medical devices annually.

And to put that in perspective, that would equate to roughly 100 billion syringes or 10 billion surgical gloves sterilized every year using Cobalt produced at the Bruce Power station.

As you can imagine, this has had and continues to have a profound impact on the lives of many millions of patients around the world.

So with that, I'd like to play you a short video that gives a first-hand perspective on the impact from a front-line healthcare provider. So there's also a cameo in here from somebody you'd recognize.

--- Video presentation / Présentation video

MR. McINTOSH: So although alternative technologies for sterilizing medical devices certainly exist, they each have drawbacks that make them less appealing than gamma.

As an example, ethylene oxide is used for fumigation of sterile medical devices, but it is an explosive carcinogenic gas, difficult to handle and dangerous in many respects.

More importantly, switching between technologies used to sterilize is a burdensome and costly process for the manufacturers, could take years to accomplish due to stringent regulatory requirements.

And, as such, if there was a sudden reduction in the availability of Cobalt-60, much of the healthcare infrastructure that we as North Americans and those in the west have come to rely on, would be put at risk.

Gamma processing is also used to reduce pathogens such as e coli and salmonella in meat, poultry, shellfish, and spices in a growing number of countries.

In fact, food used by NASA for space missions has been treated with gamma to eliminate any chance of food-borne illness. Potatoes, onions, grains can be treated with gamma to inhibit sprouting, eliminate spoilage and extends the shelf life, substantially reducing post-harvest losses and ensuring that food makes its way from field to fork.

Continuing on the subject of food, Cobalt-60 is used to control insect populations and improve crop yields through something called sterile insect technique. It is also used to eliminate pests in fruits and vegetables prior to export, reducing the possibility of infestation in the importing country. And in come cases, such as for Indian mangos being exported to the U.S., irradiation is the only approved treatment.

Gamma also has applications in a broad range of consumer products from cosmetics to pet treats to food packaging materials. And in a bit of a symbiotic way Cobalt-60 actually supports the nuclear reactors from which it is derived by providing a means for tests for reactor component testing for radiation durability.

Now, today, Cobalt-60 from Bruce Power is processed by Nordion into sealed sources at our facility in Ottawa and shipped to more than 120 gamma processing facilities in over 40 countries around the world. Not only does this directly support more than 300 highly skilled jobs, including scientists, engineers, and technicians in Ontario, it drives significant exports.

The unique combination of capabilities and capacity positions Canada as a global leader in the gamma processing industry. Bruce Power and the Bruce Nuclear Generating station have been and continue to be critical to maintaining this leadership.

There are a limited number of reactors in the world that can produce Cobalt-60 and, moreover, development of a new source of Cobalt-60 production takes many years, is capital intensive, and can involve dealing with foreign governments and reactor operators whose commercial and operational philosophies are not as well aligned as those of a Canadian operator.

Furthermore, having a partner like Bruce Power who is geographically close to our production facility and can produce Cobalt-60 in multiple units drives efficiencies that we could find in few other places.

Transportation of radio active material is, as you can imagine, costly and complex.

And having a Canadian reactor operating under the same world class regulator regime as we do, provides confidence in safety, security, as evidenced by an impeccable transportation record.

So in closing, I hope I have impressed upon you the important contribution Bruce Power and the Bruce Nuclear Generating Station have made to the health and well-being of people in the community, in the province, in the country, and around the world everyday through the production of Cobalt-60, and that you give ongoing need for this critical resource consideration in your decisions.

Thank you.

THE PRESIDENT: Thank you.

Questions?

Dr. McEwan?

MEMBER McEWAN: Just out of interest, how much Cobalt-60 still goes to therapy applications?

MR. McINTOSH: Cobalt-60 is not typically used for a great deal of therapy, except in, and very specialized cases, that is used for external beam, and it is a very very small quantity of the total Cobalt made around the world. In fact, none of the Cobalt made at power reactors, such as Bruce right now, is used for that application.

THE PRESIDENT: Questions?

Okay. So let me ask. When are we going to get some of this food irradiated in Canada?

MR. McINTOSH: Mr. Binder, I thought I would have that question from you.

--- LAUGHTER / RIRES

THE PRESIDENT: I thought you would be ready for this.

MR. McINTOSH: Food irradiation has been around a very long time. And we have at Nordion put a great deal of energy really over a 30-year period to have it adopted. It is being adopted very very well in some countries, mostly, truthfully, for export of materials to other -- it is used as a quarantine practice, so for disinfestation of pests.

But it could be used far far more effectively for food safety applications in the U.S., in Canada, and in other places where we have kind of a mass food industry.

And really, it has been held up for two reasons. One is consumer acceptance. I would love to be able to overcome that, but have been unable to. And to some degree from a regulatory regime, certainly other countries have been faster to adopt the technology than Canada has.

So I don't know the answer to your question, when it is going to be adopted. But, boy, that is a day I would celebrate.

THE PRESIDENT: I hear rumours that Health Canada is looking at this again. Anybody can clue us in on that?

MR. JAMMAL: Ramzi Jammal, for the record.

That is correct, the discussion is taking place with Health Canada with potential. Our Staff, Director Kavita Murthy, is providing some input with respect to the Health Canada proposed plan to go for Gazette 1 with potential regulatory requirement for food irradiation.

THE PRESIDENT: I must add, for ground beef, I just cannot understand why we don't -- the U.S. allows it, we don't allow it.

MR. McINTOSH: Yes. I couldn't agree more. I think it is an easy technology to adopt. And the fact that consumers have been slow elsewhere to pick it up, I understand, but it should be their choice, quite frankly, and in Canada it is not. So we operate in the regulatory environment we are given.

THE PRESIDENT: Okay.

Anybody else?

So thank you for your presentation.

So we, I know you have been waiting for this, we are going for dinner. And we shall return at 7:05.

Thank you.

--- Upon recessing at 6:08 p.m. /
Suspension à 18 h 08

--- Upon resuming at 7:06 p.m. /
Reprise à 19 h 06

THE PRESIDENT: Okay. We are ready to proceed.

I understand that CNSC Staff want to update us?

CMD-15.H2.18B
Written submission from Frank Greening
(Update)

DR. THOMPSON: Yes, Mr. Binder.

My name is Patsy Thompson, I am the Director General of the Directorate of Environmental and Radiation Protection and Assessment.

We were asked to come back to deal

with some issues related to CMD-15.H2.18B, and the questions were related to those calculations and values that are on page 14 of that CMD.

And so in reviewing the information provided on page 14, Staff found a number of errors in the approach used to do the calculations on that page.

The first error is that the alpha dose that is used in the calculation is a preliminary dose that was performed very early by Bruce Power in the assessment when they became aware of the event.

This was a simple dose calculation based on ICRP default parameters. And as we explained last night, as we got fecal and urine analysis, we actually got refined and accurate dose information.

And so the actual dose from the event for the highest exposed worker is 6.9 mSv, and not 35 mSv used by Dr. Greening in his calculations.

The approached used, as we mentioned yesterday, was independently verified by the Radiation Safety Institute of Canada. It was also independently verified by CNSC Staff.

CNSC staff also used our own dosimetry software program to verify Bruce Power's calculations.

In addition to transuranic doses, people working at nuclear power plants can be exposed to other sources of radiation, and those include intakes of tritium and external exposure to photon and beta radiation.

The dosimetry used to ascertain doses for tritium are urine bioassay samples, and for the other components they are essentially -- the dosimeter is worn outside of the body. And when we look at the total dose it is essentially the dose from all those components.

And so the second error that is found on Dr. Greening's intervention is that the tritium dose that he provided is based on essentially a very basic calculation using general assumptions from a tritium measurement in air, and that is from a tritium release that occurred in Unit 1.

Bruce Power in their approved dosimetry program essentially used urine bioassay to measure tritium doses. And so using the air concentrations the way Dr. Greening did is not a very accurate way, and it is a very simplistic way of doing those calculations because it is difficult to know and verify the assumptions like time of exposure.

The 7.6 mSv dose that is shown in the calculation can be discounted as the individuals exposed would have their individual tritium urine bioassay measurements done and doses calculated afterwards.

The worker who received the highest alpha dose during the event actually did not receive any tritium dose during that event, nor did he have any tritium doses for the year 2009.

The third problem with the calculations done by Dr. Greening is that the 17.3 mSv dose that he quotes was actually the dose received by a different worker, and not the worker that received the highest alpha dose of 6.9 mSv. And so combining doses from two different workers is not appropriate.

In addition to verifying those calculations, CNSC Staff obtained the name of the individual with the highest alpha dose and we went to Health Canada's National Dose Registry today to obtain the dose history for that individual. And that is the individual who received a 6.9 mSv dose from the transuranic intakes during the event.

For that worker, the dose that is measured with the external dosimeter for the year was 10 mSv. And this is the total for year 2009. The transuranic dose, as we said, is 6.9 mSv. And so the total dose for that individual for the year 2009 was 16.9 mSv.

And so the information we have here is consistent with information from Health Canada, it is consistent with the information that was provided to Bruce Power during the event, and subsequently to close off the alpha event.

THE PRESIDENT: Okay, thank you. Thank you very much.

I would like to move now to the next submission, which is an oral presentation by New Clear Free Solutions, as outlined in CMD-15-H2.126.

I understand that Mr. Rouse is joining us via teleconference. Mr. Rouse, you have 10 minutes, the floor is yours.

CMD 15-H2.126

Oral presentation by New Clear Free Solutions

MR. ROUSE: Good evening, Mr. Chair, and commissioners. Thank you for having me.

I'd also like to thank Dr. Nijhawan for his presentation. It was really, really interesting and I'm really glad he was here.

I have a couple of things about his intervention I just want to mention really quickly.

Again, I'm very interested in the

results on all this stuff, especially when I find out that Le Preau might be more dangerous with PARs than without them. I just want to make sure that any discussions and conclusions that come out of that, that the results be made public, maybe at a public meeting or something like that. That would be great.

Another thing, just watching his intervention, was the safety relieves valves. We seem to have this decision to make between the big valves or the small valves. There's two different competing problems. I'm just curious why we couldn't try and come up with a solution that solves both problems. Maybe have both, with the normally open value on the big ones for the last hour, is something to consider there.

I would also like to mention that earlier in the Greenpeace submission I think there was a couple of things in his intervention that I didn't hear his dispositions and hope that maybe the Commission will revisit some of those things, like the timing of the PSA results, and I think there was a methodology when it was accepted or if it was accepted.

That's it regarding the other presentations that I saw.

Now to mine. The main point, I guess, in my intervention is that Bruce Power didn't do uncertainty analysis for the external events. Uncertainty analysis is a clear requirement of the PSAs. As you well know I was involved in the consultations on the new PSA reg docs and there was no mention from industry or anybody about exemptions to uncertainty analysis. I think if we wanted to have some kind of exemption from doing that requirement it should have been handled then instead now at the licensing hearings.

I think, you know, uncertainty analysis is a real key part of risk, you know. It's used for decision-making, and knowing the uncertainty in the things we're making decisions on is very important.

I just want to read a couple of quick quotes from an IAEA document called "The Safety of Nuclear Power Plants, No. SSR-2/1, Specific Safety Requirements." These are requirements that are in our international obligations to the Convention on Nuclear Safety.

Requirement 42, under "Safety Analysis," section 5.73, says:

"The safety analysis shall provide

> assurance that uncertainties have been given adequate consideration in the design of the plant."

There's also another section in there under the "Probabilistic approach" that says:

> "Establishing a balanced design that has been achieved such that no particular feature or postulated initiating event makes a disproportionately large or significantly uncertain contribution to the overall risks..."

I think these two requirements in the IAEA document especially apply to the EME equipment, and my concerns. I think there's a lot of concerns about, you know: is this really reducing our risk by an order of magnitude?

You know, we heard from Dr. Nijhawan's presentation, that didn't seem to be refuted a whole lot, that we only have two to three hours to get this to work. That doesn't seem like a lot of time from the public's perspective. You know a lot of things can go wrong that can delay something a couple of hours. So I'm quite concerned about the uncertainty.

There was something else I heard

today, a discussion -- I've heard this at several Commission meetings -- is, you know, the worldwide numbers are showing us we're having an accident every 10 years, but the PSA are showing that, you know, it's one in a million or whatnot. The answers given today, I don't think really explain it all that well. I think I have a better explanation for the Commission of why these numbers might be coming out like that.

I think it's our use of the mean data. We use the average. There's a lot of statistical outliers in these studies, a lot of uncertainties in the stuff. So if we look to -- you know most scientific bodies and stuff use the 95th percentile to determine, you know, if something is scientifically factual or not. Like kind of the benchmark is the 95th percentile.

When we do look at some of the uncertainty analysis that come from PSAs, when you look to those values, they're a lot more in line with what's happening in the real world. I think that may be a better explanation of why those numbers are they way we are and maybe we should be setting our bar a little bit higher than the average.

In conclusion --I'll wrap up here, I think, sooner than I'm supposed to -- in conclusion, uncertainty analysis is a requirement and Bruce Power is not filling that requirement. I really hope that the Commission will remedy that.

Thank you very much.

THE PRESIDENT: Thank you.

Questions?

Ms Velshi.

MEMBER VELSHI: I'll ask staff of this.

What's the difference between uncertainty analysis and sensitivity analysis?

MR. FRAPPIER: We thought that question might come up, so we have tried to make sure that we got the definition exactly right for you.

I'm going to ask Usha Menon, our specialist in PSA, to respond to that.

MS MENON: The uncertainty analysis is where we take a parameter in the basic event data and then we run through a Monte Carlo simulation with various samples to derive a particular value. So there is a certain -- for example, if a basic parameter, like a failure rate in the data, has an error factor and has a normal distribution -- a distribution given, then we run that model to calculate the mean or the point estimate value.

So the uncertainty basically gives the 5^{th} percentile, the 50^{th} percentile and the 95^{th} percentile.

Sensitivity is basically done within the PSA model by, you know, taking credit for a certain component. Like if you say that EME is there, with the EME or without the EME what would be the difference in the core damage frequency value?

So that's what sensitivity is. So there is a difference between the two.

MEMBER VELSHI: Thank you.

The intervenor says that uncertainty analysis has not been done by Bruce Power, so maybe I'll ask staff: is this a requirement? And then -- maybe you can answer, and then we can come to Bruce. Has this been done?

MS AKL: Yolande Akl, Director of Probabilistic Safety Assessment and Reliability Division.

Yes, uncertainty and sensitivity analysis is part of a S-294 requirement. Bruce Power did uncertainty analysis for internal events level 1 and level 2 and also level 1 outage. However, some of the external events -- one of the requirements in S-294 allows for alternative methods, so they don't need to do a PSA for some external events.

In this case there is no possibility of doing uncertainty analysis, so they can use an alternative method with justification.

MEMBER VELSHI: Bruce Power, do you have anything to add?

MR. SAUNDERS: Sorry, yeah. Bruce Power, for the record.

Yeah, I mean the requirement is that we will understand the uncertainty, right, and in some cases uncertainty is fairly easy to calculate when you're doing mechanical systems and the like, and that's what the level 1 PSA does.

All of the external events actually feed through the level 1, right, because they're only an event if they damage something in the plant, quite frankly. Yeah, so the uncertainty is calculated there.

As anybody who knows the weather knows, there's a whole lot of uncertainty around weather events and whether they happen or not, so, generally, you used a combination of uncertainty and sensitivity. What sensitivity really means is: if I say my maximum wind is 227 kilometres per hour, what happens if it's 280, does that dramatically change the outcome? And that's essentially what we did, both there. We also did that for seismic, you know we changed the return period from 10,000 to 30,000 year, seeing if that made a dramatic difference on the output. Then you feed it through your level 1, which is, in fact, where the sort of uncertainty is done in a different way.

And that's a normal way of doing it, so it's not -- it's not unusual. I think people were just getting confused about the terminology.

MEMBER VELSHI: Mr. Rouse, do you have any comments on that?

MR. ROUSE: May I speak?

MEMBER VELSHI: Yes, your turn.

MR. ROUSE: Okay.

A couple of points. The clause in the requirements for the external events, it says that they can do something besides a PSA, that -- like a seismic margin analysis or something.

They did PSAs, and uncertainty analysis is a part of that, and it's a requirement. It's not that they didn't do a PSA.

Another thing, I kind of get the conclusions there that they can't do it. OPG's uncertainty analysis, I believe it's the minimum for their seismic, and you may want to ask if other people are doing uncertainty analysis.

So that's kind of -- yeah, my two points, it's pretty clear that we need it and we don't have it, and we would like to see it.

Thank you.

MEMBER VELSHI: Staff?

MS AKL: Yolande Akl, for the record.

I just want to correct the -- what the intervenor is saying because Bruce Power actually performed uncertainty analysis and sensitivity analysis and, for example, seismic events, PSA and internal fires PSA. So this is like a requirement for -- in S294, but it allows for alternative methods. But they are compliant with what S294 is requiring.

MR. ROUSE: So -- oh, sorry, Chris Rouse, for the record.

So they didn't do uncertainty analysis? That's correct? Because the response I get from Bruce Power is that they didn't do it. And if there's an analysis on uncertainty, I would like to see the results, please.

MS AKL: They actually did uncertainty analysis for seismic PSA.

MR. ROUSE: So why can't I have the

results, then?

MR. SAUNDERS: So the conversation -- the letter that we had and the conversation, this was around EME and how it was employed and where the uncertainty analysis fit into that. And that was the case.

The submission had all the rest of it in there, so I'm a little puzzled what you don't have because we sent you what we have. But we can try --

MR. ROUSE: I guess I don't have uncertainty analysis for the external event.

MR. SAUNDERS: Well, you have the uncertainty analysis for the Level 1 events, which include the external events when they're factored through. But let us go look at what we sent you, and if we didn't send you --

MR. ROUSE: I mean, it kind of seems like we're saying that we're not going to do an uncertainty analysis because it's too uncertain, which is a little concerning from the public's point of view.

MR. SAUNDERS: Well, I think the weather is uncertain. If that concerns you, then I think you're on the wrong planet, quite frankly.

MR. ROUSE: I take climate change very seriously.

THE PRESIDENT: Okay. I think I hear that Bruce will undertake to send you the material -- try to verify what they sent you and supplement it if you're missing something with what you're asking for.

Dr. McDill?

MEMBER McDILL: Two questions.

Just to address Mr. Rouse's first comment with respect to the two hours and -- I wonder if just so that that is clear, perhaps, again, state the case of the Indian reactor that thermo-siphoned without power of any kind externally, if I understand correctly, for quite a large number of hours.

If you could clarify what I'm trying to say.

MR. LAFRENIÈRE: Ken Lafrenière, for the record.

I think Gerry Frappier will augment my response, but coming from an operating background in nuclear reactors, thermos-siphoning is what we call an accredited heat sink. It occurs all the time. It's not unusual. And it's been proven very effective, and we've analyzed the effectiveness and we've accepted it as an accredited heat sink.

Virtually all Canadian reactors have

thermos-siphoning at one point in time, and it's nothing really unusual.

Thermo-siphoning accidents or, for instance, in the 2004 blackout, the Pickering reactor's thermo-siphoned during that period of time.

I also know there is some OPEX on the Indian event which, I think, Gerry Frappier will fill you in on.

MR. JAMMAL: It's Ramzi Jammal, for the record. Gerry told me to speak to that one.

The event that occurred in India was an internal fire that actually rendered the whole station to full blackout, and there was a loss of instrumentation. And I mean, anything that could happen, did happen, from loss of control room and so on and so forth.

And the OPEX with respect to the event, was the capability to go into the steam generator or the boilers, a non-technical term, and they were able to hook it up with one pumper -- one literally pumper, of the fire pumper and they were able to maintain cooling of the reactor for a long period of time.

They were able to do the hook-up in a matter of approximately six and a half hours exactly, so it was way behind two to three hours. And at no time there was any risk for the loss of heat sink in the reactor itself.

MEMBER McDILL: Thank you.

In fairness, does Bruce want to add anything to that?

MR. SAUNDERS: Yeah. Actually, it's a proven -- it's a proven methodology. It works. As long as you keep cooling water in the SGs, it will siphon until it's cold and there's no more heat to drive the siphon.

Mr. Senil was talking about some sort of a severe accident where all this stuff disappeared and there wasn't anything there to cool a reactor, so that's not actually the case. It's actually a pretty straightforward operation, which is why we chose it as one of the additional methods to protect the core.

MEMBER McDILL: Thank you.

My question, Mr. Rouse -- oh, sorry.

MR. ROUSE: I was just wondering, you know, from my perspective, like they keep saying they added cooling water. Like is it two hours? Like if we don't get cooling water for two, three hours, which is my point, you know, that's a lot of point. Stuff can happen and, you know, India got lucky.

But is it two or three hours before we have to put water in the steam generators?

MEMBER McDILL: I'll pass that back to staff again just to --

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

The -- okay. There are a couple things.

The Indian experiment -- not experiment. The Indian accident itself demonstrated that there was ample of time to intervene, so really, in two hours, there will not be a boil-off of heat sink in a reactor designed as the CANDU. That's one thing I would like to put on the record.

So there is ample of time. And as was previously mentioned in the discussion in the blackout, 24 hours of thermo-siphoning was taking place. So the two hours will not -- as far as we know to date, will not cause the heat sink to disappear from the reactor.

MR. ROUSE: Well, (indiscernible) the analysis that they did for the Fukushima plant.

But anyways, if that's your answer, that's your answer, I guess.

MR. TAVASOLI: If I may add something.

This is Vali Tavasoli, Director of Reactor Thermohydraulics.

As I mentioned, it might take two hours to deplete the boilers, but there are other sources of water available which will be fed through gravity if there's no intervention, no opening of other things and so on. It's just that they will be fed through gravity feed from the boiler emergency tank and the aerator tank.

That gives you an extra few hours. So in total, you have about nine hours of water capacity to ensure this natural circulation of the water through thermos-siphoning.

In the meantime, EMEs can be installed within a couple of hours after accident initiation, so there are means in place to ensure consistent availability of the water in the boilers to maintain the natural circulation.

THE PRESIDENT: I don't want to reopen the discussion we had before, but I just really would like clarity because I think even if it's a theoretical scenario with, really, almost zero probability of happening, nevertheless, I think it's important to answer the question.

Blackout with no operators, how long

before serious breach happens, okay? How long before you must add water?

So you came up with nine hours, but I want to make sure that I understand the nine hours is without operator intervention. This is totally without anybody doing anything in the machine.

Is it nine hours?

MR. JAMMAL: Okay. It's Ramzi Jammal --

MEMBER McDILL: I think maybe Bruce can.

MR. SAUNDERS: I'm happy to answer.

If you -- with the inventory that's available in the station, minimum five or six hours. If you don't make any arrangement to use all the inventory you have in the station, which is relatively easy -- you just open a manual valve and drain some down -- it's about four hours.

EME hook-up is 30 minutes to all eight units without any real challenge to do that, so there's ample time to do that successfully.

And this assumes that you have, in fact, all eight units engaged in the problem. Quite frankly, if it's less than that, you're just going to feed from another unit.

So you know, it's really only an issue at all if you've got all eight units there because the advantage of a four-unit station is you can feed from one unit to the other unit and you wouldn't even need the EME, quite frankly.

THE PRESIDENT: I really don't mind the explanation, but it's nice to have you have at least four hours.

MR. SAUNDERS: Yeah. Oh, yeah.

THE PRESIDENT: And then you can bring in all the equipment and all the EME. But we should be able to answer, even if it's a theoretical question, and all the mitigation that you build in to fix, that it's never going to happen. But we should be able to come up with a straight answer on this.

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

MR. ROUSE: But --

MR. JAMMAL: It depends on the design, if you allow, Mr. Rouse, to provide the answers.

For example, CANDU 6 at Point Lepreau with respect to the failsafe mechanism, when we speak of the number of hours, it varies. So you -- in the CANDU for Point Lepreau, we did the Fukushima assessment. With the failsafe design and is nobody intervening, nothing, just the inventory that currently exists in reactor, they have up to eight to 10 hours before they can intervene.

So depending on the design.

So in Bruce's case, you've got up to six hours. In Point Lepreau, eight to 10 hours.

That means no intervention whatsoever. You're just depleting the inventory based on the failsafe mechanism. No opening valves, nothing. Just the way it is.

THE PRESIDENT: Well, that's good. That's a straight answer, I understand that. Okay.

MR. ROUSE: Dr. Rzentkowski said that a valve had to be open to do that, I believe, at one of the other hearings. A valve on a -- in some tank I believe.

THE PRESIDENT: We just heard -- I asked that and I asked without operator intervention and I think I got from Bruce four hours. I think that --

MR. ROUSE: Okay, that’s better than -- well, not better than nine, but it seems like a more realistic number.

THE PRESIDENT: Question?

MEMBER McDILL: Yes, I will change the -- I wanted to talk about your tables, Table 4 and Table 5 on page 5 of H2.126. And you pose a question so I'm just going to pass the question over to Bruce.

The comment basically for both tables, the intervener says these tables came from an access to information of some kind. This is extremely odd that the reactor would be safer during a large earthquake then just from normal internal events, so I am going to ask you to interpret your graph.

MR. SAUNDERS: Yes. It's a common misunderstanding about the way PSA programs work. PSA not only estimates the size of the risk, they also estimate the probability of it happening, although a large seismic event, obviously if it is a very large event will cause more damage and be more risky

The probability in Bruce County of a large seismic event is truly small, so when you multiply consequence times probability together, the risk from a seismic event here is in fact very small.

MR. ROUSE: Do you not consider the normal failure rate in your seismic PSAs? Like, isn't all the stuff in the normal PSAs? You know, you can still have valves that break and whatnot. I just am having a hard time understanding how we could be safer during an earthquake. All the same things could go wrong.

MR. SAUNDERS: The plans are designed with a design basis and the important safety systems are seismically qualified, so normal type of earthquakes that we could expect in this region, actually up to about double what those would be, are already designed in the plant and, yes, they are taken account of in the Level 1 PSA, but we wouldn't expect in a normal earthquake to have any significant failures of those systems.

MR. ROUSE: I guess my thing was all the things that could happen in an internal event can still happen in combination with an earthquake. So I think -- are those things not taken into consideration --

MR. SAUNDERS: They are indeed.

MR. ROUSE: -- in the seismic PSA?

THE PRESIDENT: Okay, Bruce.

MR. SAUNDERS: They are indeed. As I explained earlier, all the data that comes from the external events is actually fed through the Level I PRA and the Level 2 PRA in order to get the results.

So yes, when you look at the spectrum of earthquakes or high winds or anything else you assess the damage they will cause, you feed that damage into the Level 1 PRA and then you produce the risk or the Level 2. So yes, all considered in the process.

MR. ROUSE: It seems odd that you could get a number that's lower.

THE PRESIDENT: Excuse me, can you let us direct the traffic here.

Does somebody else have any other questions? Any other questions?

I just have one. Can somebody explain, the intervener talks about this dry filter vent system. This is on page 8, the evaluation of the dry filter vent, that it is stated to be completed by Q4 2016. Can somebody explain what it means? Bruce?

MR. SAUNDERS: Yes, we can indeed. It is part of the Fukushima action items and there is a committed action on our part. As you know, during this VBO that actually –- today is Wednesday. It started this afternoon. We will be putting connections into the ductwork to the containment system to allow us to hook up additional filtered air discharge system. We are considering two options for that, one is a portable type of system that we can hook up there, the other one is a dry filtered system that is being proposed by AREVA. Both of them are in the sort of, what does the design look like at this stage?

So the commitment in the Fukushima follow-up is to make a decision on what and how we are going to do that by the end of next year and then that is like, say, a committed item in your Fukushima action items.

THE PRESIDENT: And if you do it, will you then try to incorporate that into the PSA for the --

MR. SAUNDERS: Absolutely.

THE PRESIDENT: Okay, thank you. Anybody else? Any other questions?

MR. ROUSE: Can I just have one more?

THE PRESIDENT: You have the final word, so go for it.

MR. ROUSE: So has Bruce Power decided that they are going to put in a filtered vent and just haven't decided which one yet?

THE PRESIDENT: Go ahead.

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

I mean, subject to the outcome of the design review. So it only makes sense to put them in if they will actually work, so we need to finish the design review first, but that will for sure be a decision we will make with CNSC. It won't be our unilateral decision either way.

THE PRESIDENT: Thank you. Final word to you.

MR. ROUSE: I didn't -- my phone cut out, I didn't hear anything. I didn't hear the response. I'm sorry.

MR. SAUNDERS: Sorry, try it again.

So the answer was, if we have a viable

design that will actually work and solve the problem. However, it is not a unilateral decision on Bruce Power's part. When we finish the design review we will make a proposal to CNSC about what our path forward is going to be and that discussion will be held with them and we will make the decision at that time. We expect that one of these two designs will work, but at this stage we don't have a design so we need to finish that piece first.

THE PRESIDENT: Okay, Mr. Rouse, final comment, please.

MR. ROUSE: From me? I'm fine, that's great. Everything is great.

THE PRESIDENT: Okay. So thank you for your presentation.

MR. ROUSE: Thank you. Bye.

CMD 15-H2.115

Oral presentation by EMC Power Canada

THE PRESIDENT: The next submission is an oral presentation by EMC Power Canada as outlined in CMD 15-H2.115. I understand that Mr. Sauter will make the presentation.

MR. SAUTER: Good evening, Mr. Chair and Commissioners.

My name is Charlie Sauter and I am President and COO of EMC Power Canada. With me tonight this evening is Ashling Cassidy, our Manager of contracts.

EMC Power Canada is pleased to be able to provide comment on the renewal of the Reactor Operating Licence for Bruce Nuclear Generating Station. We are proud to count Bruce Power among our valued clients, and have been engaged with Bruce Power in a Construction Projects Agreement since 2011.

As a supplier to Bruce Power for the last four years, EMC Power Canada is aware of the importance Bruce Power puts on providing safe, reliable, clean and affordable energy to the homes and businesses of Ontario. We have worked in partnership with Bruce Power to execute the work safely, to quality standards, on budget, and on schedule and look forward to assisting Bruce Power by providing contracting services in the coming years, enabling Bruce Power employees to focus on the safe operation of the station.

As per EMC's Nuclear Safety policy:

> "Nuclear Safety is EMC's overriding priority in all activities performed by EMC (including EMC sub-contractors) personnel in support of our customers' nuclear facilities.

> Nuclear Safety shall have clear priority over schedule, cost and production. Safety is always first for Bruce Power."

This is an integral part of EMC's Integrated Management System and is stressed from the President and CEO level down. It is present at every level of the organization and always front of mind.

Our work is planned following a comprehensive health and safety environment management system that is seamlessly integrated with our quality program and our management system is OHSAS 18001 certified.

Our safety performance as measured by the Workplace Safety and Insurance Board speaks for itself. EMC’s performance rating is consistently well above the industry average.

Our safety program focuses on three key areas, providing a highly competent workforce, rigorously following a comprehensive management system that is based on industry best practices and continually developing and improving a health nuclear safety culture within our organization and subcontractors that perform work for EMC.

The cultural traits we continually strive for and measure ourselves against: An open and honest respectful environment, taking personal accountability for our actions, cultivating safety communication and continuous learning because we recognize that the nuclear industry and its work processes are unique.

The three C's of reactor safety; control, cool and contain are factored into every task we perform for Bruce Power. The safety culture at Bruce Power is one that promotes openness and the sharing of experience to make it a safer workplace.

EMC conducts pre-job and post job safety meetings each day with our key tradespeople to ensure that they are aware of the plan for the work that day, the hazards of the job, any operating experience, OPEX, that has been gained from similar projects and procedures and policies pertaining to the work at hand.

Employees and contractors are encouraged to report all incidents, accidents and near misses to improve the awareness of all workers on site. There was a strong focus on human performance and continuous improvement at Bruce Power and this focus cascades down to the contractors and vendors, including EMC. We continually measure our performance through observation and coaching, self-assessments and other proactive methods to provide Bruce Power with the assurance that EMC’s work is managed and executed safely and in full compliance with Bruce Power's procedural requirements.

Open lines of communication are key to the successful operation of the plant. EMC and Bruce Power staff conduct biweekly meetings to discuss any matters pertaining to work performed on upcoming projects. Our observation and coaching results are discussed, along with any other health and safety matters.

EMC has recently been involved in the contractor qualification process for the multiple task award contract with Bruce Power. We have been witness to the stringent expectations of Bruce Power during this process and can assure the CNSC that all measures are taken to ensure that vendors chosen by Bruce Power to engage in construction activities on and around the site are carefully screened to ensure that they meet all necessary safety quality guidelines appropriate for a nuclear site. For each RFP that EMC has been a proponent of, the Bruce Power supply chain has engaged in an extensive review of EMC’s quality assurance and safety programs, including our human performance policies and program, environmental health and safety program and our rating with the WSIB.

The Bruce Power proponent acceptance process focuses on assuring that EMC Power Canada's management system and quality procedures meet the standards required for their work in the nuclear environment, including CSA Z2991, CSA N285.0 and CSA B51. Bruce Power supply chain has audited EMC CSA Z299.1 quality program in 2011 prior to us being granted the contracts.

Upon award of contracts, we work closely with Bruce Power staff to ensure that all up-to-date procedures and processes are acceptable for use prior to the start of work for every project. We as EMC ensure our staff is trained to the latest qualifications as mandated by Bruce Power. At Bruce Power there are many quality and safety measures in place, focusing on safety for workers and the quest for an injury-free workplace.

Safety of plant equipment, a high focus on radiation protection and safety and safety for the environment and community, these are taken very seriously by EMC. Bruce Power has a comprehensive maintenance program to ensure equipment is maintained regularly. Employees and contractors, including EMC are given safety training at hire-on and also updated training throughout their employment with Bruce Power.

Radiation protection is a key focus for Bruce Power and all contractors are responsible for performing work using the principle of ALARA, as low as reasonably possible. Workers are required to comply with all radiation policies and procedures, submit regular bioassays and are scanned for radioactivity, wear personal dosimetry devices, be aware of radiation hazards in their activities and conduct these activities in a way which limits their exposure and are trained in emergency procedures. EMC provides trained radiation protection support to the station as required.

Bruce Power shows commitment to the community, to community safety by educating the public about nuclear power, emergency responses and innovations that make nuclear power a clean, cost-effective energy source for Ontarians. Bruce Power involves contractors and local businesses and environmental initiatives, as well as ensuring that all contractors are aware of the strict environmental processes and procedures that must be taken into account when performing any tasks on site.

Bruce Power hosts town hall meetings where local residents can learn about Bruce Power and ask questions or voice concerns. One avenue of innovation for EMC and Bruce Power is planning to be more efficient by saving on material, energy and waste costs. The early contractor involvement model can help us to do this by effective project planning from the design stage and viewing each project with a safety by design approach.

Bruce Power is registered to ISO 14,001 and encourages vendors to meet the same criteria. Bruce Power engages in research and restorative programs to ensure the people, animals and environment in the area that is home to the plant maintains itself for the years to come. In EMC's experience with Bruce Power, relationship building is a key priority. It may be interfacing with vendors during the selection process for an RFP, participating in a supplier day to ensure the best vendors will be chosen as partners, or in the community with the United Way, our Armed Forces, Easter Seals and the Saugeen Hospital Foundation. EMC supports this community involvement and is eager to help Bruce Power wherever possible. For example, EMC employees contribute weekly to the United Way through a payroll deduction.

Bruce Power is also committed to the employment in the community and improving the local economy by encouraging all vendors to hire locally before seeking to hire staff from out of the Bruce County area. EMC endeavours to hire from the communities surrounding Bruce Power wherever possible.

In summary, we would encourage the CNSC to grant a license renewal to Bruce Power. It is our opinion that the leadership and staff operate the plant with a determined focus on safety, a vision of continuing improvement for the future and strong, competent vendor partnerships, enabling Bruce Power to produce clean, safe energy to power Ontario.

Thank you.

THE PRESIDENT: Thank you.

Questions? Dr. Barriault...?

MEMBER BARRIAULT: Thank you, Mr. Chairman.

I take it that you are a company that contracts out employees to Bruce. And what trades do you contract out, all trades or just labour or --

MR. SAUTER: Charlie Sauter, for the record.

The principal trades that we bring to Bruce Power is the electrical trades. With the MATOC contract we now have with Bruce Power we are able to provide multi-trades.

MEMBER BARRIAULT: Okay. How many employees do you as a rule have contracted out? How many employees as a general rule do you have contracted out to Bruce?

MR. SAUTER: Charlie Sauter, again, for the record.

We would have in the range of 100 employees working for Bruce Power.

MEMBER BARRIAULT: All the time? Rotating?

MR. SAUTER: Yes. Approximately, yes.

MEMBER BARRIAULT: The reason I'm asking that is, for example, if one of your employees gets injured what happens?

MR. SAUTER: Charlie Sauter again.

So if we have an accident at work there is a detailed reporting process. The first thing is the care of the employee, if you wish --

MEMBER BARRIAULT: Right, yes.

MR. SAUTER: -- and ensuring that he goes to the hospital and all that type of stuff. There is a thorough investigation immediately. Our manager of operations is notified. Bruce Power is notified. We follow a detailed process to investigate the causes and to learn the lessons, if you wish, as part of our operational excellence and ensure that there is no repeat.

MEMBER BARRIAULT: Is the injury credited to you or credited to Bruce in terms of registering the injury? I'm just amazed at their safety record and that's the reason why am asking that really, to understand the underlying conditions.

MR. SAUTER: Yeah. So the incident would be credited to us, to EMC. However, as I said before, we work together very closely with Bruce Power and this is something they take very, very seriously.

MEMBER BARRIAULT: How many lost time injuries have you had in the last two years?

MR. SAUTER: Charlie Sauter again for the record.

Zero.

MEMBER BARRIAULT: Thank you. Thank you, Bruce.

THE PRESIDENT: Anybody else? Any questions? Dr. McEwan...?

MEMBER McEWAN: So I'm really interested in the pre-job/post-job briefings that you do daily. So is this done locally on site or by the foreman or is there sort of a --

MS CASSIDY: It's Ashling Cassidy from EMC, for the record. It's done with each crew, so at the beginning of each job each crew goes out and it would be by the foreman usually, but sometimes they will take turns, the sub-foreman or the foreman giving these pre-job briefings at the beginning of each shift with each crew.

MEMBER McEWAN: Okay. And the post-job briefings are designed to look at the successes of the day, the problems of the day or anything more than that?

MS CASSIDY: Both. They would look at the successes and if there was any obstacles that they needed to look at or if the situation had changed during the day to inform the workers that the situation had changed during the day so they would be ready for the next shift.

MEMBER BARRIAULT: And would there be feedback to Bruce if there were issues related to the site?

MS CASSIDY: Yes, there would be.

MR. SAUTER: Charlie Sauter, okay.

Just to add to that, so we do have a biweekly meeting with Bruce Power and their construction forks to review just what you are talking about and also as part of the planning process every day and the planning the job and the tail boards, this is really part of our health and safety managed system. It is mandatory.

It is required by Bruce, but it is also part of our health and safety managed system to plan any work before it started so that we have -- that requires, we have what we call a job safety analysis. There are tail boards with the crew so that everybody understands what needs to be done and who is going to do what. And more so also if there is a change the crew stops, they discuss, they document and so on and so forth.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: Well, when you have a new employee and he's getting to the site, at the Bruce site, there is kind of training or introduction to the new employee? What is that? How long does it take, an hour, two hours, a week?

MS CASSIDY: It's Ashling Cassidy again from EMC. They do, do new hire training with each employee that comes onto the site at Bruce and it usually takes anywhere from two or three days to a week, depending on what their role is going to be at site. They would have orange badge training and work protection training as a minimum.

And they have nuclear general training as well to inform them about what goes on at the plant and the different rules and regulations that they are going to have to follow while on-site and then if they do have any job specific or trade specific training they would take that at that point as well.

MEMBER TOLGYESI: So it could happen that your employees are registered as a nuclear energy worker.

MS CASSIDY: That's correct.

THE PRESIDENT: Do you insist on some sort of security check?

MS CASSIDY: Yes. Each employee that comes on site has to be security cleared.

THE PRESIDENT: By...?

MS CASSIDY: By CSIS and by the Ontario --

THE PRESIDENT: But that by itself can take months.

MS CASSIDY: Four to six weeks usually, yeah.

THE PRESIDENT: Right.

MS CASSIDY: But do we have agreements with most of the unions that we work with that that takes place prior to them coming on to site.

MEMBER TOLGYESI: Is it lots of new employees or is the turnover of employees who are on the Bruce site?

MS CASSIDY: There is a mix. There are some employees that have been at Bruce Power for upwards of 20 years, but there is, as apprentices come on board and as different union members get to the top of their lists, we do have new employees coming on site from time to time. Especially something like the VBO where we are doing -- where we are upping our number of employees by quite a bit, there would be quite a number of new hires. I think we had 30 this time around.

MEMBER TOLGYESI: Well, to Bruce, you were saying that there are 4,100 employees. These contractors are not counted in?

MR. SAUNDERS: That's correct, they are not counted in that. The 4,100 are permanent employees.

MEMBER TOLGYESI: So when you are talking about your safety performance, I mean it's a great case, there is no lost time injury, et cetera, but with all other contractors, how many contractors do you have on the site?

MR. SAUNDERS: It varies of course depending on what's going on with the vacuum building outage that we just referred to. You know, there will be a couple of hundred contractors on for that period of time, you know, around a month or 90 days, depending on the particular outage, so how we count their accidents, that is depending on how they work. So if we are supervising the work and they are working directly for us, then they count in our stats. If an external company is supervising the work, then they count there.

The way we control that is through the contracting process that you heard about, which is to make sure that the external company is counting all those and taking care to do it. We would get the stats on their safety so that we can make judgments about future usage of those companies and there are future improvements that need to be made, so that is how we control that piece of it.

MEMBER TOLGYESI: So you said you have several hundred contractors on the site. How many of those are under your supervision or under the contractor's supervision?

MR. SAUNDERS: I think I said a couple of hundred, not several hundred, and it can vary of course. When you're doing something like a refurbishment project, you will indeed maybe even have a couple of thousand employees and most of those will actually be supervised by somebody else.

The variation, it's really quite flexible. During something like the BBO there will be distinct jobs which are under the charge of individual companies. So a number of those, you know -- probably most of those people will probably be supervised by somebody else and we'll supervise them indirectly.

There's no one answer to that question. It's quite variable depending on the time that you ask the question.

MEMBER TOLGYESI: So it could happen that there's a contractor who is on the site, he has a lost-time injury but because he's not under your supervision, it doesn't count in your stats but it counts on his stats as the employer?

MR. SAUNDERS: Yes, that's true.

THE PRESIDENT: I think what Mr. Tolgyesi is saying -- the cynic would say that's the way you look good, put all the heavy duty work on the outside contractors.

MR. SAUNDERS: I don't think we put all the heavy duty work on the outside contractors.

Yeah, I know this is a theme that we've discussed before and it's come up before. Our view is you put the accountability where it belongs. You put the accountability on the company that's managing the work to do the job properly and if they don't do the job properly, you don't hire them to do the work again.

We don't think that Bruce Power taking the accountability for other people's supervision is actually going to create a lower accident rate. Our expectations are clear. We expect the person doing the supervising and the company running that to have a safety program that works and that they have the accountability and the responsibility to do it.

I believe firmly that's the right way to do it and I've been doing safety for a long time. As soon as you take over for somebody, it's a different story. The responsibility has to be where the accountability is.

THE PRESIDENT: Okay.

MEMBER TOLGYESI: The compensation board, you know, how do they look at it? Because you are the final accountability, the final accountability belongs to you, really. You are giving the work, you are giving the contract.

MR. SAUNDERS: The compensation board will work with the employer. So it's whoever the individual's employer is. The registered employer is who the WSIB works with.

MEMBER TOLGYESI: Okay.

MR. CLEWETT: I think just to add there, if I may. Len Clewett.

I think it's important to note that we treat every person that comes on site there the same, whether an investigation, safety programs.

I think you've heard Babcock & Wilcox talk about 18 million hours without lost time. I think they said nine years worth of work. EMC, you know, talked about no lost time accidents.

So I think it's important to note the performance is very similar with the contractors. The same programs that we implement, they implement. And we take any injury, whether it's medically treated or first aid, whether it's contract or our own staff, seriously and do the exact same investigation.

THE PRESIDENT: Okay.

Just in reading your submission, I was intrigued with your practice. I'm just wondering whether it's a practice we should adopt. Each week a supervisor is assigned to monitor other supervisors' work. How is that working? Tell me a little bit, there's no friction, there's no -- how does it work?

MR. SAUTER: Charlie Sauter.

A big part of that is culture, is bringing in that type of a safety culture. It's not easy. It takes a while. It takes, you know, a year or two to get that adopted.

But basically, it's what we call an open and transparent culture where nothing is swept under the carpet and everybody learns from what's happening, right, so that nobody --

So really, the key is that every worker goes home safely at night and that's something that I personally have a lot of experience in over the years and I believe very firmly in. And it has to be from the top down, if you wish.

THE PRESIDENT: So the supervision is for one week or is it -- I'm trying to understand how you assign a supervisor to look at another supervisor. For how long?

MR. SAUTER: It would be an observation. It might take an hour, it might take a half-hour, an observation and coaching. It might take a couple of hours to do. And it could be a sub-foreman on the crew doing the observation and coaching. It could be a sub-foreman from another crew, right? And that's really decided at the Manager of Construction level.

And then they report weekly. What we have at EMC is a weekly operations meeting. Safety is the first topic on the agenda, where we go through, you know, how we're doing on our observation coaching, are there trending areas that are of concern that we need to focus on. We also share that with Bruce Power. They share their observation and coaching with us and all leading towards operational excellence, if you wish.

THE PRESIDENT: Okay. Thank you. Any final words?

MR. SAUTER: No. Just thank you very much for the opportunity. Thank you.

THE PRESIDENT: Thank you very much for your intervention.

CMD 15-H2.136

Oral presentation by

Canadian Manufacturers & Exporters

THE PRESIDENT: I'd like to move to the next submission, which is an oral presentation by the Canadian Manufacturers & Exporters, as outlined in CMD 15-H2.136.

I understand that Mr. Clipsham will make the presentation.

MR. CLIPSHAM: Yes, thank you.

For the record, I'm Paul Clipsham,

Director of Policy and Programs for Canadian Manufacturers & Exporters.

I'm pleased to be here in support of the Bruce Power licence renewal.

I have some slides which you have in your kit that I will go through and then I'm happy to take any questions that you may have.

A little bit about Canadian Manufacturers & Exporters. We're a national not-for-profit business association representing companies that manufacture and export goods. Our membership accounts for about 82 percent of Canada's manufacturing production and 90 percent of exports. Through partnerships with other associations, CME's network extends to more than 100,000 companies from coast to coast to coast.

I would be remiss -- this is not in your package but I would be remiss if I didn't point out a couple of things about the importance of manufacturing to Canada and to Ontario.

It represents about $600 billion in annual sales across the country and in Ontario $285 billion in sales annually, which is about 12 percent of GDP, and 800,000 Ontarians are directly employed in manufacturing. For every dollar invested in manufacturing, it generates about $3.50 in total economic activity, which is the highest multiplier of any major sector.

Key areas of engagement with Bruce Power:

- economic development and balanced energy policy -- they're very involved in the activities there with the organization;

- health and safety, which is critical to both Bruce Power and the CME; and

- environment and sustainability.

And I'll talk a bit about each of those.

The CME, along with the Southwest Economic Alliance, Ontario Building Trades, the Power Workers’ Union and the Society of Energy Professionals released an economic impact study in October 2014 looking at the economic benefits of the Bruce Power Site. This report has been provided to the Commission, I believe.

This licence hearing is not considering future refurbishment, so the focus of this presentation is on the economic benefits of operation.

The CME believes that the safe, reliable operation of nuclear facilities in Ontario is not only good for the province’s economy but keeps electricity prices low and stable.

Slide 5 just shows a bit of detail that's in the report specifically about stable and affordable rates. So it shows clearly that nuclear is at the lower end of the scale with respect to the cost of power.

And the Global Adjustment Mechanism is something that our members talk a lot about. It's a significant part of the cost. So the chart on the left is intended to show that relative to the percentage of supply, nuclear power is not a significant contributor to the global adjustment.

Again, this just shows graphically where nuclear power, nuclear energy falls with respect to the cost of power, and again, it's clearly at the lower end of the spectrum in terms of the cost of electricity produced.

It's a critical source of electricity supply. The image on Slide 7 shows some of the key areas that are connected via Bruce Power's supply, and not surprisingly, most of those are significant manufacturing jurisdictions: London, Sarnia, Windsor, Niagara, Toronto, Mississauga, GTA.

The next slide, 8, shows the economic benefits of operations. This is again in the report but I'll just point out the Ontario employment figures: 4,600 direct employment in the operations; secondary benefits of 13,892, so that would be the spinoff jobs associated with the operations; and a total of 18,492. And then the total from a financial perspective: $1.9 billion of direct benefits; $2.1 billion in indirect; and a total of $3.9

billion in total economic activity.

Health and safety, as I mentioned, is a critical engagement between CME and Bruce Power. Bruce Power is recognized as an industry leader in health and safety and over the past 13 years has worked extensively with the CME on this issue.

CME worked with Bruce Power on the creation of the CEO Health & Safety Leadership Forum that is now being managed by the Conference Board of Canada. In fact, Duncan Hawthorne is really a key driver of that initiative.

And they've sponsored a range of initiatives to share best practices learned at the Bruce Power site with the CME membership. In fact, we had a health and safety focus tour where we brought manufacturers, key members, up to the Bruce site and had a talk about health and safety and a tour of the site, which is still talked about to this day, very well received and strong sponsorship of this number one value for the Bruce Power leadership team.

Bruce is a company that's committed to environment and sustainability. We partnered with Bruce on a number of areas, including the Bruce Power Saver which is an energy information management system that allows you to understand, better manage and control electricity consumption and spending and the company, through its free online App, has also made a tool available to households to better understand their electricity bill as well.

So in summary, CME has a strong and engaging relationship with Bruce Power. The operations of the Bruce Power site play a key role in meeting the electricity needs of Ontario while stimulating economic growth and keeping electricity rates stable and affordable and the company is an industry leader in health and safety, not only through performance, but also by working to share its experience with other companies.

The company not only produces emissions-free electricity, but also recognizes the role of conservation for families and businesses and has developed innovative tools to support this.

So I'm very pleased to be here to, again, support the licence renewal and thank you for the opportunity and welcome any questions or comments.

THE PRESIDENT: Thank you.

Questions? Anybody?

All right. Let me start then. So in your study, which I'm trying to find the page numbers, page --

MR. CLIPSHAM: Slide 9 I think.

THE PRESIDENT: No, Slide --

MR. CLIPSHAM: No?

THE PRESIDENT: Page 8 in your actual report.

MR. CLIPSHAM: Okay.

THE PRESIDENT: It's the same table you also had about this totally misunderstood -- I still don't understand this GAM, G-A-M.

MR. CLIPSHAM: Right.

THE PRESIDENT: And your cost, or the prices are megawatt hour. Are all these include all the investment, all the fuel cycle, all in?

MR. CLIPSHAM: Yes, and that's what we would describe as the end of the wire cost of power to the end user.

And again, yeah, the global adjustment mechanism is very complex, but it's effectively a lot of the fixed charges on the system go into that cost and it's between that and the commodity price that's kind of the significant aspect of cost for businesses.

THE PRESIDENT: And so in the prices here, there is $60 and wind -- I mean, you know, every time you see this kind of table there's a lot of controversy about its validity.

MR. CLIPSHAM: M'hmm. Hmm...

THE PRESIDENT: So how did you guys derive this?

MR. CLIPSHAM: Yeah. So I believe it uses what's known as the levelized unit energy cost of power which is beyond me how that comes about, but essentially it looks at a combination of the commodity cost and the cost of operation to come up with some sort of equal weighted -- and I think the LUEC is a fairly well recognized kind of comparable in terms of the cost of power or assessing the cost of power.

THE PRESIDENT: Mr. Tolgyesi...?

MEMBER TOLGYESI: Distribution costs are included in? Because that's something -- you know, production of power, that's one thing, and the other one is distribution cost.

MR. CLIPSHAM: Yeah.

MEMBER TOLGYESI: Distribution, it's shared by I think all producers, solar, nuclear, hydro, et cetera.

MR. CLIPSHAM: Yeah.

MEMBER TOLGYESI: So it's included?

MR. CLIPSHAM: I'd have to, to be honest, look into that. I'm not certain whether that would be included in the cost or not.

MEMBER TOLGYESI: And the same thing for other ones, it's capital investment for, say, refurbishing or --

MR. CLIPSHAM: M'hmm.

MEMBER TOLGYESI: -- new power generator or new nuclear, it's included in or it's not?

MR. CLIPSHAM: Yeah, that's -- again, it's the price that individuals are paying that's associated with these various power costs, if you will, at the end of the wire.

So it's really just to demonstrate that nuclear is not at the end of the wire, you may have, you know, significant up-front capital costs, but when you put it all together and how Bruce is into the stack, if you will, it's a relatively low cost compared to a number of the other technologies.

MR. SAUNDERS: Yeah, I can't speak to global adjustment costs there because I didn't do the numbers, but the levelized unit cost certainly includes the capital investment as well as the decommissioning costs and all the operating costs in between.

And it just divides the -- I can't work it out, but the financial guys can, and they take

-- it's the whole life of the project and typically they assume, when they look at some of these things, a 30-year or 50-year life depending on the project and they calculate the cost.

It's the same cost that we would use when we're looking at investing in a project, so it's the same basic calculation, that's where it comes from.

THE PRESIDENT: Anything else? Dr. Barriault...?

MEMBER BARRIAULT: Thank you.

I guess I'm kind of baffled at the cost of solar power and how is it rationalized. Is it subsidized in this province, because obviously nobody's going to go and build a solar industry...

MR. CLIPSHAM: Yeah, there's the *Green Energy Act* and the Feed-In Tariff Program which is essentially a subsidy program that pays a fixed rate for solar power.

MEMBER BARRIAULT: Thank you.

THE PRESIDENT: So as you know, we don't have an economic mandate so we're not really -- but out of curiosity, we hear a lot, the negative about, as you heard, about the price of wind.

MR. CLIPSHAM: M'hmm.

THE PRESIDENT: On the other hand, they claim that -- I take it for manufacturing, would generate a lot more jobs, wind and solar, because it's small companies, et cetera.

MR. CLIPSHAM: M'hmm.

THE PRESIDENT: So on balance, where are you guys on that?

MR. CLIPSHAM: Yeah, I do believe that there is job creation associated. I know the initial projections for the *Green Energy Act* were 50,000 jobs. I haven't seen any recent numbers about what the actual output is, my guess would be it's lower than that, but not insignificant. So there certainly is, you know, job creation associated with renewables.

But I think, you know, what this is trying to show is that there's also a significant employment associated with nuclear power and Bruce's -- you know, there's 4,600 direct jobs involved in the operation of the nuclear plants, that's significant, and then the spin-off jobs that are associated with that as well.

THE PRESIDENT: Okay. Anybody else? Anything else?

Any other comment?

MR. CLIPSHAM: No, just thanks again

and appreciate the opportunity.

THE PRESIDENT: Thank you for the intervention.

MR. CLIPSHAM: Thank you.

THE PRESIDENT: The next submission is an oral presentation by the Southwest Economic Alliance as outlined in CMD 15-H2.137.

I understand that Mr. Bitcoff(sic) will make the presentation.

MR. LEBLANC: Mr. Grace.

THE PRESIDENT: Oh. Mr. Grace. Wrong name. Sorry about that, Mr. Grace.

CMD 15-H2.137

Oral Presentation by Southwest Economic Alliance

MR. GRACE: That's okay, I've been called worse.

--- Laughter / Rires

MR. GRACE: Mr. President and Commission Members, good evening.

I am here on behalf of SWEA in support of the re-licence for Bruce Power.

A little background of myself and SWEA. SWEA is the organization that represents

Southwestern Ontario and its long name is Southwestern Economic Alliance. I'm here speaking on behalf of the board.

I myself have spent the last 17 years as a Goderich town councillor and the last eight years as a county councillor in the County of Huron.

Bruce Power, as it reaches deep into all of our communities in Southwestern Ontario, not only as employers, but also as good corporate citizens with a strong vision of community and what it takes to be a strong community.

And I have seen this first hand from Bruce Power in response to community meetings across our region and most recently in August of 2011 when Goderich received an F-3 tornado. Bruce Power and the unions that work at Bruce Power, the on-site unions responded quickly, efficiently with resources, equipment and money.

But I'm really here to talk about the larger picture of Bruce Power and their involvement in the larger community of ours through Southwestern Ontario.

But first, a little background on SWEA itself. Well, maybe.

The organization is focused on

building Ontario's economy in the southwest region through strong regional leadership and cooperation.

SWEA itself is a very unique collaboration of local governments, academia, the broader public and private sectors throughout our region.

SWEA is committed to promote regional economic cooperation, identify where economic cooperation will pay dividends across our region, signal benefits for important cooperation among key sectors of our economy, outline the challenges and enhance productivity, produce a regional economic base.

Bruce Power, as a member of SWEA, plays a very large and key role as one of the largest employers in our region impacting every aspect of our prosperity and essentially everything that we do as promoting regional economic development.

In October 2014 SWEA, along with the previous presenter, was one of the groups, joined a coalition of respected businesses, economic development people, trade unions and released, as a contributor, the economic impact study on the positive role of Bruce Power site plays in this province.

A copy of the report, which was just

previously addressed, you have.

As outlined in the report, the economic benefits of the continued operation of Bruce Power at this site is as follows. As the previous presenter indicated, there are 4,500 direct jobs. But direct and indirect jobs annually is closer to 18,000; $4 billion in annual Ontario economic benefits through the direct and indirect spending in operational equipment; supplies, material and labour income.

This really affects our region in the municipalities that surround the site, to the north, to the east and to the south and Huron.

Training, employment opportunities has been huge for our area. Bruce Power, who just announced the building of a $25 million training facility. This emergency training facility now can be used by neighbouring municipalities, by fire departments from across our region, which will just help us meet the standards in which we have to deliver services.

Whether it is this initiative or support hospitals, recreational facilities, educational outreach facilities, they continue to invest in our communities; not just in Bruce County, but the communities of the region.

When speaking of collaboration, advocacy for southwest region is always ongoing with Bruce Power employees.

The intelligent region, which is one of the largest initiatives that SWEA has taken on, is all about promoting the high-speed broadband connectivity from our downtowns to our farm gates. This is critical for rural Ontario, and Bruce Power is helping us recognize the need for connectivity and making sure that if we are going to compete in this world today, in rural Ontario, we must be connected.

Bruce Power is at the table with resources and also a member of their key staff as a board member.

Regional transportation is an issue in rural Ontario and was first sponsored by Bruce Power at a regional level as we all recognize the need for a strong passenger transportation network across this region because it plays a key role in not only our work as employees/employers, but our play and our health for all of us.

Transportation will be a challenge for Southwestern Ontario in the next 10 years, especially in the rural areas.

James Scongack, one of Bruce Power's

lead executives, sits on our Board of Directors of SWEA. This give SWEA a linkage to the private sector from a regional perspective.

The communications and dialogue of Bruce Power are very important to all of us. Bruce Power regularly and effectively communicates with SWEA and the entire region on its plans and addresses issues in a very proactive and positive way, regular communication, updates with municipalities, and county councils throughout the region.

I have been a recipient of some of those communication pieces where they actually come and speak to the councils, and that is a very important aspect of our engagement with local politicians, local bodies, to keep everyone informed.

Bruce Power is active in various forums that are not directly tied to Bruce Power's core business, but are important to the region; as in broadband, as in transportation, as in the core economic development initiatives across the region.

An open door policy which Bruce Power has with their bus tours and other briefings, and numerous bus tours I must admit, this makes Bruce Power not only accessible, transparent, and also really helps with that communication to the general public.

I have also had the privilege of being on a phone panel which I participated in a couple of months ago, and which Bruce Power's CEO, Duncan Hawthorne, was also on the line. It was very impressive.

Bruce Power is not only an active participant in SWEA, but the entire southwest.

An economic impact study that demonstrates the positive impact of Bruce Power clearly identifies its operations and its needs for the entire region.

The company makes a positive contribution to a range of issues facing southwest with a particular focus on transportation.

And tomorrow I will meet with the group of Network Southwest, which is really a start up from an initiative that SWEA, sponsored by Bruce Power, put together a year and a half ago all about rural transportation.

SWEA supports Bruce Power's continued role in Ontario under a strong regulatory framework established by this Commission.

I thank you, Mr. President and Commission, Commissioners, thank you for the opportunity to speak to you.

THE PRESIDENT: Thank you.

Questions?

Ms Velshi?

MEMBER VELSHI: The economic impact report that you have attached to your submission, and we have seen it by a few interveners, who was the target audience or who is the target audience for this report?

MR. GRACE: I wasn't part of the actual development of it, but the target audience is the greater area of Southwestern Ontario, and actually to look at what impact Bruce Power does have. I suppose the target audience is also yourself and other government agencies to look at and to review the impact of Bruce Power.

And even as a public document, you would be surprised when I have mentioned different things in this document, although I was not part of the authorizing of it, people are surprised how big Bruce Power is, even in our region.

In communities and counties just south of us, they had no idea how many employees Bruce Power has directly or how it impacts our communities. It is far-reaching, far-reaching more than we ever thought it was.

MEMBER VELSHI: Bruce Power, did you want to add to that? Like, how widely has it been disseminated and who do you see it going to?

MR. SAUNDERS: Well, knowing Mr. Scongack, it has been distributed very widely I would guess.

Yes, it was all part of the work that we did in evaluating I think for ourselves and for the government and others what the impact of the site is. This is important information to know. And that was really its purpose.

I mean, we are considering long-term operation, the government is considering contracts with us to buy power, and I think there we wanted to have an understanding of just how significant that impact was.

So we did it on that basis and on the basis of communicating with people. We do kind of hide down there. I mean, you would think a place as big as ours not actually all that easy to hide, but when you consider we are down over the escarpment, sitting on the lake, people don't see you ever, I mean unless you drive out there. So they kind of forget you are around.

And I think this is just a good opportunity to look at the impact overall.

THE PRESIDENT: Questions?

So maybe I missed it. I don't know if you mentioned, who are you guys? How many members do you have? Are they all government, educational institutions...?

MR. GRACE: Okay. We actually cover the area from Windsor all the way to Tobermory, down towards Kitchener, Norfolk County. We are 15 counties, seven separated cities. We have I think seven academic institutions and we have a number of private and public sector groups.

We are a board of -- the maximum is 27, and we are considered one voice. The board members are representative of all the counties, so we quite often would have the wardens of all the counties in the southwest region.

THE PRESIDENT: And how are you funded?

MR. GRACE: We have no core funded, we are funded by membership only. So each municipality, each county, depending on the size or depending on the size of the city would either give $5,000 or $10,000. We run on a very limited budget of about $100,000 a year.

THE PRESIDENT: So on behalf of all the region, would you be involved in emergency planning?

MR. GRACE: No. We are really here, you know, as catalysts for economic development, research, to develop forums for people to come together to talk about economic development issues, to put private sector and academia together in rooms to plan strategy around economic development, whether it is gas issues, whether it is water issues, or whether it is a larger concern around transportation in rural Ontario or whether it's even a larger issue with connectivity.

That's the kind of work that we do. I'm a volunteer, I'm not a paid employee. We would have just contract employees, contract researchers from academia.

THE PRESIDENT: Thank you.

Any other questions?

Thank you for your intervention. Thank you.

MR. GRACE: Thank you very much.

--- Pause

THE PRESIDENT: I think we've reached the last submission for tonight. It doesn't mean anything, just that I wanted to say it for all the people who are worried about the score of the hockey game. I don't know what it is.

--- Laughter / Rires

UNIDENTIFIED SPEAKER: 2-2.

THE PRESIDENT: 2-2. Are you watching it inside this room?

--- Laughter / Rires

THE PRESIDENT: So the next submission is an oral presentation by Kinectrics Inc. as outlined in CMD 15-H2.119.

I understand, Mr. Harris, you'll make the prestentation.

MR. HARRIS: That is correct.

THE PRESIDENT: Over to you.

CMD 15-H2.119

Oral presentation by Kinectrics Inc.

MR. HARRIS: Good evening.

Mr. President, Commissioners, thank you for this opportunity to talk in support of Bruce Power being granted a five-year extension to the licence.

I have to say I do admire your stamina for keeping going at this, so I will try and make this to the point and interesting.

I am the CEO of Kinectrics. I'm an engineer by training. I've worked in the nuclear industry for 35 years, both in the United Kingdom, briefly in the United States, and now in Canada for 12 years.

I don't claim to be an expert in all of the areas that I'm going to talk about, but I do think the range of different areas that we provide support to Bruce Power gives us a good basis on which to suggest that they should be granted a five-year extension to licence. It shows to us that they take safety and the environment extremely importantly. Bruce Power is our largest single customer.

I plan to briefly talk about Kinectrics, our role in the industry, to give you a flavour of the type of work we do, the services we provide to Bruce Power, safety and reliability of Bruce Power's operations, environment, because we also provide and help Bruce with its environmental responsibilities, and the impact that it has on the Ontario economy.

So Kinectrics, we are a Canadian

company. We provide testing, inspection, certification and consulting services. We generally classify our work as lifecycle management solutions, and I there, therefore, a lot of work that we do is relevant and appropriate to Bruce Power in managing the life of their reactors.

We were originally Ontario Hydro's research division. We were demerged in the late 1990s. We've been an independent private company now for about 15 years. We work for Bruce, OPG, Hydro One and 200 other global companies.

We have about 400 staff, most of which are based on our campus in Etobicoke, on the outskirts of Toronto, but we do have also staff in the U.S.A, Europe and Middle East.

We operate on our campus in Etobicoke about 25 laboratories, and there we undertake a wide variety of work, from nuclear and conventional power generation, transmission, distribution.

I mention that because I think that a lot of the work we do is backed up by practical work and practical testing. We get components from Bruce Power, which we work on, which gives us and allows us to validate the conclusions that we draw about the life of the components at Bruce Power.

We operate a radioactive lab and we are ourselves licensed by the CNSC.

As a major supplier to Bruce Power, we undertake a wide variety of work. It's listed there. In the interests of time, I'm not going to read it, but I shall just on and talk about some of the examples in a few minutes. But, as you can see, it ranges from doing the inspection, primarily on the primary heat transport system, through to dosimetry, to deterministic and probabilistic safety assessment. It is a wide variety of work.

Our views on safety at Bruce Power is based on the type of work that we do for Bruce. So if I firstly just talk about inspection services.

We develop new inspection tools for the CANDU industry, particularly for the primary heat transport system, and we've developed inspection tools for steam generators, feeders, and, of course, the fuel channels themselves.

Recently, Bruce Power has paid us to develop a new pressure tube inspection tool. Bruce Power asked us to come up with a tool that would allow more data to be collected in a shorter period of time in areas where hitherto it had been more difficult to collect data and with significantly less dose to operators.

I think the fact that Bruce has been willing to invest in this is a testament to the fact that they take the aging, the management of aging, the safe managing of the aging to be extremely seriously. The dose reduction for the operators of the tool is 90 per cent, so it is nearly a factor of 10 down on the dose from alternative methods of collecting the data.

Another area of work that we do for Bruce Power relates to the hydrogen levels within pressure tubes. As part of a joint program with other CANDU operators, we undertake work on managing the life of the fuel channels, predicting that they can be safely extended. We do that on the basis of theoretical work, with world-class scientists, but also on practical experimental work.

In the probabilistic safety assessment field, we do work focusing on external events, such as fire, seismic events, flooding. We've teamed with some of the best companies in the world in terms of seismic assessments to ensure that all of the information we have takes into account the recent events at Fukushima, and that those lessons are integrated into the probabilistic safety assessment.

Other areas of work that we do for

Bruce relies on the provision of safety-related components, so any component that goes into safety systems needs to be proven that it will operate successfully. We apply rigorous QA to the provision of such equipment.

We also for type testing and environmental qualification demonstrate that the equipment will work reliably to their end of their live after it's been aged, after it's been through irradiation, after its been through a seismic event, and if there is a loss-of-coolant accident, and we test components to ensure that they will meet the most rigorous standards.

Finally, we provide dosimetry services to show that the dose to the public and people on the site is safe.

So Bruce holds us, as a contractor, to a high standard of safety, quality and environmental protection, the same standards that the CNSC demands of Bruce Power.

We can attest to the fact that Bruce takes safety very, very seriously. We work as part of a joint team with Bruce Power. The discussions are always fact-based on how we can verify the quality that goes into the reports. We are never asked to shy away from difficult areas, they are always exposed, and we talk through how and whether additional work is needed to take care of any concerns that there are. So we have no doubts about recommending extension of the licence.

We're also one of the providers of Bruce for environmental services. If a potentially hazardous material is to be sent off the site, be it radioactive hazard, be it conventional chemical hazard, then we are one of the providers who will provide analysis of that material, be it in the form of a solid, liquid or gas, to show that there is no environmental concern before it is removed from site.

Samples are taken from around the Bruce Power site and from the lake itself. The samples are sent to us to analyze that there is no radiation and no growth of radioactive contamination. On the basis of that we can again attest that there is no major environmental issues concerning the site.

Finally, then, in terms of the operations in Ontario, of our 400 staff, about a third are directly involved in work for Bruce Power. About another 40 per cent do work in the CANDU industry. These are good-quality jobs. Generally a third of our staff have PhDs or second degrees, about two-thirds are technically qualified, so this materially contributes to the economy of Ontario.

I would also add that, based on this work, we are able to leverage the skills, and we now sell our skill successfully in Romania, Korea and to other CANDU operators around the world.

To sum up, and in conclusion, based on the scientific and technical knowledge of our staff, we, without any hesitation, would say that we don't have concerns about the way safety is managed at Bruce Power.

We also are intimately involved in environmental studies, and again can recommend that there are no concerns about the environmental and the way they handle the environment. It also provides long-term jobs for the company.

We would therefore support Bruce Power's application renewal.

THE PRESIDENT: Thank you.

Questions?

Mr. Tolgyesi.

MEMBER TOLGYESI: I was seeing that most of work, what you are doing, you are doing for OPG, Bruce, Hydro One, okay, but you are not dedicated only to those three?

MR. HARRIS: Correct. They are our biggest three customers, but we are -- have a growing business in the United States for Westinghouse, for instance, for light water reactors, for transmission and distribution companies globally.

MEMBER TOLGYESI: Are you doing also competitive or shared research or you are doing that on contract basis? Bruce is coming, you do it, or you share that, Bruce, OPG and other companies from U.S., also they are coming, they say we have a research project and we share?

MR. HARRIS: So through the -- for the record, David Harris.

For the -- as you are probably aware through the CANDU owners group, a lot of the funding is pooled from OPG, but also the offshore operators as well in some areas. And we are the second-largest supplier to the CANDU owners group.

We do have our own new product development funds which we use to fund developments which do support Bruce Power. An example of that would be a bio assay lab to look at alpha contamination which we funded to support the industry, and we do also support, through capital expenditure, equipment which is used to support Bruce Power.

MEMBER TOLGYESI: Last two short ones.

What is your global budget?

MR. HARRIS: We have a total revenue of about $115 million -- Canadian dollars.

MEMBER TOLGYESI: Okay. And what you do with intellectual property? It belongs to you, or it belongs to those who are contracting the research?

MR. HARRIS: Generally, the funder or the people who provide the funds own the intellectual property.

MEMBER TOLGYESI: Okay.

MR. HARRIS: We have some very good examples of working with Bruce Power in an innovative way where they own the intellectual property, but they license us to exploit it. And that provides a modest return to Bruce Power on their investment.

And the inspection tool that I talked about fits that model whereby any sales or deployments that we make of the tool returns money to Bruce Power.

MEMBER TOLGYESI: Okay. Merci, monsieur.

THE PRESIDENT: Thank you.

Anybody else?

Question?

I don't know if you had a chance to

listen in to this debate about PSA. I notice on page 3 of 9 that you undertake PSAs, and on 5 of 9, that you have actually -- have undertaken PSA. So a couple of questions on that.

First of all, do you have your own PSA software or you use Bruce software? How does this work?

MR. HARRIS: My -- I'm not an expert in this area. It is one of --

THE PRESIDENT: Should have brought somebody.

MR. HARRIS: -- 14 teams that we operate. But my understanding is that we operate our own software and -- yeah, that we operate our own software.

THE PRESIDENT: So there was a big debate about whether the PSA as presented was a correct one, whether there was enough credit for EMEs, the mitigation equipment.

If I understand correctly that you've done the fire, seismic events, flood. What's your assessment about all of this?

MR. HARRIS: I believe that the -- I'm not an expert in this at all, but I would say that the PSA work that we do for Bruce Power is done in accordance with international standards, that is it done and uses the best methodology that is available.

We have teamed with some of the leading companies in the world to ensure that the methodology, the way that it is applied is done in a consistent manner with the rest of the world.

THE PRESIDENT: So you -- do you have a view about how to aggregate and to do a site -- whole site PSA?

MR. HARRIS: I'm sorry. Can you repeat the question, please?

THE PRESIDENT: It's a leading question.

MR. HARRIS: Yes.

THE PRESIDENT: Do you have an idea how to do aggregation of all those PSA, you know, fire, seismic, et cetera?

MR. HARRIS: Absolutely we do, yes.

THE PRESIDENT: And also, you know, this is now a hot topic, how do you do a site, a whole site PSA.

MR. HARRIS: So we -- my experts within the company have ideas as to how to do that in detail. I do not understand and do not know the detail of that.

THE PRESIDENT: Okay. Anybody else want to jump in?

Okay. Well, thank you. Thank you for your presentation.

So this concludes the list for presentations for today. We don't have to move to written submissions. I'm just glad to say that.

And we will reconvene tomorrow at 8:30. Thank you.

--- Whereupon the hearing adjourned at 8:54 a.m., to resume on Thursday, April 16, 2015 at 8:30 a.m. / L'audience est ajournée à 20 h 54 pour reprendre le jeudi 16 avril 2015 à 8 h 30