DARLINGTON NEW NUCLEAR POWER PLANT PROJECT

JOINT REVIEW PANEL

PROJET DE NOUVELLE CENTRALE NUCLÉAIRE DE DARLINGTON

LA COMMISSION D'EXAMEN CONJOINT

HEARING HELD AT

Hope Fellowship Church
Assembly Hall
1685 Bloor Street
Courtice, ON, L1E 2N1

Thursday, April 7, 2011

Volume 16

JOINT REVIEW PANEL

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Courtice, Ontario

--- Upon commencing on Thursday, April 07, 2011 at 1:31 p.m.

--- OPENING REMARKS:

MS. McGEE: Good morning, mon nom est Kelly McGee. Welcome to the public hearing of the Joint Review Panel for the Darlington New Nuclear Power Plant project.

Je suis la co-gestionnaire de la Commission d'examen conjoint du projet du projet de nouvelle centrale nucléaire de Darlington.

Secretariat staff are available at the back of the room. Please speak with Julie Bouchard if you are scheduled to make a presentation at this session, if you are a registered intervenor and want the permission of the Chair to ask a question or if you are not registered at this time, but now would like to make a brief oral statement.

Any request to address the panel must be discussed with Secretariat staff first. Opportunities for either questions or brief oral statements will be provided subject to the availability of time. We have simultaneous translation. The headsets are available at the

back of the room. The English is on channel one, la version française est au poste 2.

A written transcript of these proceedings will reflect the language of the speaker. Please identify yourself each time you speak so that the transcripts can be as accurate as possible. Written transcripts are stored on the Canadian Environmental Assessment Agency website for this project. The live webcast can be accessed through a link on the Canadian Nuclear Safety Commission website and the archived webcasts and audio files are also stored on that site.

As a courtesy to others in the room, please silence your Blackberrys, electronic devices for the sake of others. Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Kelly, and good afternoon everyone. Welcome again to those joining us in person or by the audio link or on the internet. I want to welcome everyone here again today. My name is Alan Graham. I am the Chair of the Joint Review Panel and the other panel members with me today are Madam Joselyne Beaudet on my right and Mr. Ken Pereira on my left.

We'll start this afternoon's

session with a review of undertakings, which we do every day and I will ask Mr. Saumure, our legal counsel, to review the ones that are due today and any other outstanding issues with regard to undertakings. Mr. Saumure?

--- UNDERTAKING STATUS:

MR. SAUMURE: Thank you, Mr. Graham. I will start with undertaking number 51, which was assigned to CNSC and it was to provide comparison with U.S. and international practice on set limits and standards with regard to CSA and 288.1 and 288.4, which was expected completion date today. The undertaking has been completed and the documents are posted on the registry.

Undertaking number 53, assigned to CNSC and it's with areas of concern regarding accident analysis approach with consideration of hardware and software. I'll CNSC to speak to that undertaking.

MR. HOWDEN: Barclay Howden for the record. Dave Newland is going to provide some information to the panel right now.

CHAIRPERSON GRAHAM: Mr. Newland.

DR. NEWLAND: Good after, Dave Newland for the record. So this is the response to

undertaking number 53. CNSC has established high-level regulatory requirements in RD-337, design of new nuclear power plants specifically in section 7.6 which covers issues such as designing for high reliability, common cause failure, single failures and fail-safe design.

And more detailed requirements are in a draft regulatory guide, C-138, on both design requirements and assessments of software hazards, including software common cause failures.

These regulatory requirements are designed to ensure adequate defence in depth such that the effects of a digital instrumentation and control system failure are appropriately limited; redundancy, independence and diversity in the design of digital instrumentation and control such that no software-based postulated initiating events would impinge on the safe operation of the nuclear power plant.

Despite these design provisions to ensure high reliability of both hardware and software, it is recognized that failures can occur and therefore hazards assessments are performed to evaluate the potential impact of failures on plant safety. So, for example, for Darlington A, OPG

submitted a systems hazard analysis including a software hazards assessment report for its computerized shutdown systems.

For new build, CNSC would require that during the application for a licence to construct, software hazard assessments would be submitted for the digital systems. I would also add that finally the impact of any such software and hardware failures would need to be further assessed during both the deterministic accident analysis and the probabilistic safety assessment. Thank you.

CHAIRPERSON GRAHAM: Thank you, Mr. Newland. Mr. Saumure?

MR. SAUMURE: Thank you, Mr. Graham. The next undertaking is number 56; it was assigned to EC and it was to provide the protocol used to determine toxic substances under CEPA. My understanding is that EC is not present at this point in time, but that we will follow up on this undertaking.

The next one is number 57, which was assigned to CNSC and it was to provide information on the co-operation between Canada and the U.S. in identifying and re-mediating

contaminated sites that may cause trans-boundary effects. This undertaking was completed yesterday. The documents will be on the registry.

Number 59 is an undertaking that was originally assigned to Health Canada and it was to provide information in co-ordination with Health Canada and Public Health Agency, on cancer incidence, causes in Canada, cross-referenced to areas with nuclear activity. I will just ask CNSC to speak to that undertaking.

DR. THOMPSON: Patsy Thompson for the record. We have obtained the information from both the Public Health Agency of Canada and Health Canada. The document -- I will be doing the final review during the supper break so we'll be able to file it today.

MR. SAUMURE: Thank you. The next undertaking is number 62 which was assigned to CNSC to provide excerpts from the study on European nuclear energy workers which pertain to Canadian nuclear workers. This undertaking is -- was also completed yesterday. A document is available on the registry.

The next undertaking is number 66. It was assigned to CNSC and it's to provide the

requirements for ground acceleration for the existing generating stations at Darlington and Pickering. CNSC?

MR. HOWDEN: Barclay Howden speaking for the record. Dr. Dave Newland is going to provide some information to the panel at this moment in time and we'll be submitting a longer, written submission this afternoon.

DR. NEWLAND: Thank you, Mr. Howden. David Newland for the record. Lake Ontario Waterkeeper asked a question through the panel regarding the peak ground acceleration values to which the Pickering and Darlington plants are designed. This was undertaking number 66, and I'll provide a brief summary and then the full response will be forwarded to the Secretariat later this afternoon.

Before answering the specific question of peak ground accelerations for the OPG existing plants, it is important to provide some context for these values to help avoid any misunderstandings. First, the level -- the earthquake level is characterized by a number parameters of which the principal one is the peak ground acceleration. This qualification includes

physical testing of structures and components to the design basis seismic level and in doing this it incorporates a high level of confidence in the tests that are done.

The Ontario nuclear power plants that went into service in the 1980s and thereafter, are seismically qualified to a design basis earthquake whose frequency of occurrence is one in 1,000 years. Prior to that, the Ontario nuclear power plants that went into service in the 1970s were designed to the National Building Code of Canada which did not have explicit seismic requirements.

Subsequently, these plants were assessed for seismic robustness using an internationally recognized approach which is referred to as a seismic margin assessment. As a result, these plants are now seismically qualified. So I want to stress that the specific values of PGA that I'm about to provide correspond to those used by either the design of the plant or for which a seismic margin assessment was performed. This information should not be taken to imply that plants are not capable of responding to more severe seismic events.

So moving to the specifics, Pickering A seismic qualification was revisited in 2000 using a one in 10,000 year review level earthquake with a peak ground acceleration of 0.235G. Pickering B was originally designed to a design basis earthquake value of 0.05G and finally for Darlington, this was originally designed to a peak ground acceleration value of 0.08G. So the full text will be submitted that will contain further details regarding the context this afternoon. Thank you.

MR. SAUMURE: Thank you. I will now move to undertaking number 69, which was assigned to OPG. It was to provide OPG's internal incident reporting records. OPG?

MS. SWAMI: Laurie Swami for the record. On Tuesday of this week, I described the process that OPG uses for identification of problems and our reporting system and how we go about evaluating and analyzing problems so that we can prevent recurrence. And the undertaking I understand was to provide the S99 breakdown between human performance events and equipment reliability issues.

So for the reported incidents,

there were 116 at Darlington in 2010. Of these 43 percent were attributed to human performance and 51 percent to equipment issues and six percent to other areas. And as an example of that, one of them was an emergency power reduction that was requested by the independent market operators. So those are the types of things that get reported in that other category.

Some of the events that -- some of these are fairly low level events so, for instance, if someone picks up the wrong TLD badge when they're going in to work, that would be reported as an S99 event as a human performance incident. So there's various levels of reporting within the S99 reports. Thank you.

MR. SAUMURE: Thank you. And the last undertaking is number 74. It was assigned to CNSC which was asked to report on time lines. I will ask CNSC.

MR. HOWDEN: Barclay Howden speaking. This is to provide details on operational financial guarantees and compare to the U.S. requirements. The due will -- that we've set for that is doing to be April 15th and we've asked our staff to do comparisons to other countries

besides the U.S. to give a broader range. Thank you.

CHAIRPERSON GRAHAM: Have you got a date for that?

MEMBER PEREIRA: Yeah, he said.

CHAIRPERSON GRAHAM: Okay.

MR. HOWDEN: April 15th.

CHAIRPERSON GRAHAM: Then I didn't get the date.

MR. HOWDEN: Sorry.

CHAIRPERSON GRAHAM: April 15th?

MR. HOWDEN: Yeah.

CHAIRPERSON GRAHAM: Yes. Colleagues, is that okay, April 15th? Yes, agreed. Thank you, Mr. Saumure.

Now, before we go into the respective questioners -- questioning today, I'm going to call on my colleagues just to close the loop on yesterday with regard to undertaking 15. I'll ask Madam Beaudet first and Mr. Pereira to make some comments and observations.

MEMBER BEAUDET: Thank you, Mr. Chairman. Good afternoon everyone. The panel, all through the process, had some indication that you were dealing with a very tight site, especially you

want to have four units and cooling towers and especially hybrid towers. And you spent a lot of time doing undertaking 15 and I think it was essential work and very enlightening for many, I'm sure.

That there are some limitations on the model used or the results, the worse case, we talked foliage I think, a minor point compared to the fact that you would have to build to four metre depth contour and that the plume still remains, although it is reduced in frequency, dimension and density by 50 percent or less. And you came yesterday very well prepared and I'm sorry -- we are sorry for the disappointment, if you felt we didn't ask questions. But the facts are clear and the only thing that -- for us it will be through deliberation that we will look at the different possibilities more in depth. And in order to do that, I just want to make sure of one thing, is that the slide of your presentation yesterday, slide three, which is this one, is the same as figures 28 and 32 of undertaking 29. And that's the layouts, where you have four ACR reactors with hybrid cooling, two-metre lake infill, but it indicates that you go up to four metres. That's

figure number 28 and figure 32 is four AP1000 reactors with hybrid cooling with a two-metre lake infill, but there's an indication that it goes to four metres. So we just want to make sure that what you've presented yesterday, slide number three, which indicates that you have to go far out more than other figures -- layouts submitted, corresponds to these two.

MR. PETERS: John Peters for the record. Madam Beaudet, in our presentation yesterday on slide three specifically, I have the written text here and I've checked the transcript. What we said is that the layout in this illustration is originally provided in the 2010 MPR report, figure I-4, and it's on page I-8 of that report, which was another undertaking that we have provided to you, undertaking number three, which we -- so let me just finish.

So we have undertaking number three which was the MPR 2010 report, which included a specific drawing that allowed us to -- using an autocad type system scale properly in the cooling tower layouts that you see in this figure three in the presentation. The drawing you refer to is a generalized, as we overview of the outlying area

that would be covered by a hybrid tower dimensionally on the site.

They are not identical for the reasons we described in our explanations yesterday in the presentation. But this is an accurate depiction of the optimized layout as we've described it in the MPR report and it stands as a very similar drawing to the one you're referencing. It's just this one gives specific locations of the actual towers that we've scaled these -- all the analysis and the visual effects to.

MEMBER BEAUDET: Thank you. Thank you for this clarification. And I have no other questions on that topic.

CHAIRPERSON GRAHAM: Thank you, Madam Beaudet. Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman. After your presentation yesterday and the questions we asked, I examined all the information you've submitted and there are some issues where it's a matter of judgment as to what the implications are, but other than that I have no further questions for clarification. We have enough information to take this matter forward and deliberate on where we go. Thank you very much.

CHAIRPERSON GRAHAM: Thank you, Mr. Pereira. And thank you, OPG, for those -- providing those answers to those undertakings.

Next on the agenda, we will move into questions from the panel for Transport Canada and the Ontario Ministry of Energy. Both departments have been asked to return today for follow-up questions from the panel and we'll start first with Transport Canada. And we'd invite Transport Canada to come forward if they're here. And they're not, they're on telephone conference I understand.

So Mr. Zeth, are you there? Is Transport Canada available? I'm getting a nod. Mr. Zeth, are you there? Mr. Bourgeon? Just stand by for a moment everyone and see what -- Transport Canada? Ms. Myles?

MS. MYLES: Transport Canada was on the line and we seem to have lost them. Would you like to wait till we get them back or proceed with something else?

CHAIRPERSON GRAHAM: If it's only going to be a minute or so, I think we should do that because the way we want to flow this was Transport Canada and then the Ministry of Energy

for Ontario, and then to have questions. We were going to do questions from the panel members for each one and then after both were done, do questions from the floor so --

(SHORT PAUSE/COURT PAUSE)

CHAIRPERSON GRAHAM: How are we doing, any luck?

UNIDENTIFIED SPEAKER: We seem to be connected, there's just nobody speaking.

CHAIRPERSON GRAHAM: Hello, is Transport Canada there?

(SHORT PAUSE)

MS. MYLES: It'll be at least another couple of minutes, Mr. Graham. Would you like to -- it's up to you if you'd like to wait or proceed.

CHAIRPERSON GRAHAM: I could always ask ---

MS. MYLES: They seem to be there, but they're not answering.

CHAIRPERSON GRAHAM: The Ministry of Energy for Ontario, you're here, I understand, so if you'd like to come up, we'll start with the Minister of Energy.

MS. MYLES: Thank you.

CHAIRPERSON GRAHAM: And, again, we have Mr. Jennings. We want to welcome you again. Thank you very much for taking time out of your busy schedule to come back to respond to some questions that our panel has.

So Mr. Jennings is the Assistant Deputy Minister of Regulatory Affairs and Strategic Policy Division at the Ontario Ministry of Energy.

Mr. Jennings, the floor is yours.

MR. JENNINGS: Okay. Well, I'm back just to respond to any of the questions the panel had. I can either make opening remarks or just go to questions, whatever is ---

CHAIRPERSON GRAHAM: I think we'll just go to questions and then --

MR. JENNINGS: Okay. That's fine.

CHAIRPERSON GRAHAM: --- we may need some closing remarks afterwards.

So I'll first of all to Mr. Pereira.

--- QUESTIONS FOR THE MINISTRY OF ENERGY OF ONTARIO BY THE PANEL:

MEMBER PEREIRA: Thank you, Mr. Chairman.

Mr. Jennings, over the past

several days since you came and spoke to us and gave us your overview of the way the plans for development of energy resources and electrical generation resources in Ontario were put forward, we've had interventions from many of our intervenors concerning decisions on energy choices and the energy mix going forward, and the scope of the application brought forward by Ontario Power Generation. And we made reference, on more than one occasion, to the information that you presented to us.

But the concern on the part of many intervenors is that they did not see the rationale for the alternatives being proposed for the energy mix and on the true need for nuclear generation as opposed to alternatives.

So with that as introductory remarks, we'd like to get from you your perspectives on how the decision to go with nuclear as opposed to other choices was reached for the long-term?

MR. JENNINGS: Okay. So in terms of then, the structure of the plan or the substance of the plan, a long-term electricity plan needs to balance several objectives, so it needs to balance

cost, economics, system reliability, system operability, and environmental issues as well.

In terms of the question about whether there are alternatives considered to nuclear, in fact, the plan has a very aggressive program of conservation, so they aren't -- I think -- kind of argument is one is an alternative to the other.

So we have an amount of conservation; the initiatives proposed in the plan which would effectively offset most of peak-load growth over the next 20 years, and offset about half the growth in overall energy and electricity consumption over the period. So this is, if you were to compare it to any other plan in North America, it's quite an aggressive plan.

In terms of renewable, so, again, trying to cite this as alternatives to the other. In fact, we have adopted very high targets for renewable. The renewables that are targeted or planned for in the plan would really be the total amount that could be connected to the existing transmission, plus including several major transmission investments over the period to 2017, which is the earliest you could build new

transmission, given approvals and other requirements.

So those particular options have been pursued to really kind of -- I wouldn't say the fullest extent of a prudent plan, but they aren't necessarily one exclusive of the other.

You certainly couldn't have a plan that was all conservation. You couldn't have a plan that was all renewables because the resources, solar and wind, are intermittent, so the solar is only operating in good wind regimes about 30 percent of the time. If you did even more wind, and some of this is constrained again by the transmission system, you get lower and lower availability as you go from the good wind resources to other ones.

And then that doesn't even reflect the fact that to be able to meet peak requirements because the wind is intermittent, it's blowing -- we've got more wind in the winter, we've got more wind at night. So you would actually have to build additional generations.

So to supply what we refer to as baseload in the plan, you would have to have wind -- if you wanted to do 2,000 megawatts, 2,000

megawatts of wind, an equivalent 2,000 megawatts of gas and then that's -- so the costs, then, obviously go up.

So, again, the plan, you don't just look at what are the total amounts and try to balance it, the plan has to result in a system that can meet need hour by hour, or actually minute by minute. And so you need a mix of generation, you need some generation that can operate and produce power 7 by 24. The nuclear would fall in that; large hydro like Niagara Falls, St. Lawrence plants fall in that category.

You would need some intermittent and peaking. So the intermittent variable, which is the solar/wind and this is clean, reduces some of your emissions, and then you would need intermediate and peaking generation, which not only means you need to operate that during peak times, you have to be able to move up and down as the demand moves up and down, as the supply and generation comes on and off. And so all these things have to be balanced in developing the plan.

So to characterize the plan almost as if it is somehow an exclusive expansionary nuclear plan is to, in effect, not to really look

what is in the plan.

So as noted, the 2,000 megawatts of nuclear identified is really looking at replacing -- there's about 4,000 megawatts of Pickering and 1,000 of that's not currently operating -- but at least 3,000 megawatts that are operating that it is replacing.

MEMBER PEREIRA: Thank you. Just one point of clarification.

You talked about renewals being initially a target to feed into the existing transmission grid. But that -- further than that, expansion was constrained somewhat by the need to build transmission infrastructure.

Is that something that is in your plan, to expand transmission infrastructure to enable more commitment to the renewables?

MR. JENNINGS: So the current plan, that 10,700 megawatts of non-hydro renewables is -- about half of that is dependent on additional transmission investments; so Bruce to Milton line, three projects in southwestern Ontario, connection to the east/west grid and another northwest Ontario project. So those would be -- the maximum -- there's timelines for this, so by the 2017, 2018

period, you wouldn't be able to start additional transmission projects.

So that's based on the current system. We also have to look at the constraints, as I said, about the operability of these units. There will be challenges incorporating that amount of renewable variable generation into the grid in any event, and we also have to consider ourselves – the customer impacts, so there is significant consumer resistance in the province to prices.

The renewables that we have identified in the plan to date, we have put forward an estimate of what the price increase is over the next five years. And the renewables envisaged in here would be about a 25 percent increase over the next five years in terms of customer bills.

MEMBER PEREIRA: Thank you.

Many of the intervenors seem to believe that we could achieve in Ontario considerable growth with recourse to combined heat and power backing up renewables.

Is this something that's in the Ontario Energy Plan to move towards higher reliance on combined heat and power, gas-fired combined heat and power?

MR. JENNINGS: Yes, we have a -- there's a Ministerial Directive to the Ontario Power Authority to procure 1,000 megawatts of combined heat and power. And this was actually a directive that was issued a few years ago. They did issue a competitive request for proposals.

And so I guess maybe to start off, it is often suggested that combined heat and power is very cost effective, very easy to do and there is a lot of potential for it. This competitive RFP was for 1,000 megawatts. They ended up only getting 414 megawatts of responses, so those were all taken.

In terms of the cost in that plan, they ranged. The cost of the products procured ranged from about 11.5 cents up to about 24 cents a kilowatt hour, so these are quite expensive projects.

There have been negotiations with some individual proponents since then. They would tend to be at the higher end of that range.

So I think it's characterized as if there is a lot of projects where you would put in this generation and there would be a year-round steam loader heat load, which is actually fairly

limited, so if you had one of these projects, you might have heat to use in the winter.

In the summer, it's basically operating with the same efficiency as a gas generation facility, so there is certainly some potential for it.

We have been pursuing, I guess, to get the rest of that 1,000 megawatts that we didn't get, so in the long-term energy plan and the subsequent directive to the OPA, we've called on them to continue procurement to try to get to the rest of that.

So that includes two things, a standard offer program for projects under 20 megawatts, which they would be launching soon, and then giving them the ability and the mandate to negotiate individual ones, usually with industrial companies, so there is potential.

In terms of the experience in the -- where we have tried to procure them, the costs have been quite high.

MEMBER PEREIRA: So that is an interesting point because we have had different costs put forward to us by different intervenors and they are all over the map, depending on whose

perspective is being presented to us, so we -- we end up being -- having to make judgements on how to value these different inputs.

So as part of our questioning to you today is a desire to obtain numbers that we can define and depend on for assessment. We have a very mixed bag of numbers on energy costs from different sources.

My final question before I go back to the Chair for this round concerns the option of buying power from either Manitoba or from Hydro-Quebec.

You did -- when you came before us the last time on Friday of our first week, you spoke about a certain capacity from Quebec, a supply line from Quebec.

We have heard from different intervenors on different potential for much higher supply from either Manitoba or Quebec and where can we get some clarification from you on what is the potential for supply from neighbouring provinces?

MR. JENNNINGS: Okay. So Ontario has had discussions over the years, a significant discussion with Manitoba and Quebec and Newfoundland as well. And of course that’s become

more topical lately, so those three we certainly had extensive discussions.

So the Quebec one, which I had -- I think I mentioned the last time, since the ice storm, which was about 12 years ago in Quebec, Quebec became interested in increasing the connection, the direct connection with Ontario.

So that process of negotiating, that started about then, so about 1998. It took -- because of various changes in what, I guess, people saw in their interest and environmental approvals -- it took until 2009 to get that completed. So that provides a dedicated 1,250 megawatt transfer capability between Quebec and Ontario.

And that line was used -- I have the numbers for 2010 -- 6.5 terawatt hours, so that is a billion kilowatt hours from Ontario to Quebec, 2.5 billion kilowatt hours Quebec to Ontario. Those could change, go up and down each year depending on market conditions, demand, supply, weather on each side, that there's more winter dependent or is it a more summer dependent system, so we have done that.

We would be on the Ontario side, I

guess, interested in an additional connection; we could talk about that with Quebec. I think there might be some interest on their side. Again, to note that this previous one which Ontario was interested in, Quebec was initially quite interested in and then when that -- that took 10 to 12 years to get done, so that would be something you would have to consider in that.

In terms of an actual contract or a purchase contract to understand what Quebec would be looking at or another province would be what the value of that -- selling that power is somewhere else. So we wouldn't buy a -- I mean, an industrial customer in Quebec might pay 4.5 cents a kilowatt hour for electricity. They wouldn’t sell us the power at 4.5 vrntd, they would be looking at natural gas what they could sell it in New England for.

And I’m not saying that’s unreasonable, but that’s how they would look at it, so that’s what we would have to -- in effect, it would be from an economic perspective equivalent to natural gas fired generation.

We had certainly discussions with Newfoundland. In fact, we participated with Quebec

in an RFP that Newfoundland had, I think, in 2005 to help develop the Lower Churchill River. So the Ontario Government partnered with Hydro-Quebec in that. That ended up not going forward and Newfoundland has been interested in moving power through Quebec, tried various regulatory avenues, and they have not been successful to date.

In terms of Manitoba, again, we've had extensive discussions with them over the years. And again to sometimes envisage that the cost of that power would be a real deal for Ontario, but again without saying that's not the right approach, they would be looking at what they could sell it to in the U.S. market, so that's certainly what the pricing is like.

A challenge with Manitoba is that the Manitoba/Ontario border, Kenora area, is very distant from the load in Ontario. And Northern -- Northwestern Ontario has, in fact, had a significant decline in load because of the pulp and paper sector in particular has been hard hit. Not just in the recession, but has been restructuring, I guess, for some time.

So the load there -- and I'd have to check the numbers -- but I think it was around

as high as 1,300 megawatts probably when we were first having discussions with Manitoba. It's fallen down to about 800 megawatts. There's a peak load in the northwest.

So there is also a lot of hydro in the northwest, so we would have -- you would be bringing it into an area of the province that was already kind of adequately served.

And just further, I guess, to illustrate that, there is a question in Ontario about what are called "constraint payments", which go to generators who could offer into the system but can't be taken, and most of those payments are in Northwestern Ontario. Some of that related to Manitoba, so there is -- it probably would require an investment transmission-wise to bring it at least to the Sudbury area through the northwest.

We do have, as these priority projects I mentioned, there is -- one of them is to strengthen the east-west intertie in Ontario, so that would be a first step that you would have to make -- that you would have to make. That's about $600 million. You would have to do much more than that to bring it all the way down to Toronto.

MEMBER PEREIRA: Thank you. Thank

you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you, Mr. Pereira. Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

You're talking of significant investments and trying to get more power from neighbouring provinces. I was wondering what would be -- what is the investment that you have made or that you will make in order to integrate wind power or other, what we call, green energies, but especially wind and solar into your grid?

MR. JENNINGS: So the integration costs rather than the investment in generation? The -- we have a couple of transmission projects, one underway. So the Bruce to Milton line will allow more wind to be integrated from the Lake Huron area. Most of the -- the good wind potential is near the Great Lakes. That’s about $700 million.

The other priority projects that we have identified, so they have to go through approvals, they would be in the order of about two -- a bit over $2 billion, so those would be the ones that are either underway or we’re moving

through approvals.

MEMBER BEAUDET: But also in terms of capacity for your already existing grid, you would also have to make some investments. For Hydro Quebec, for instance, in order to allow 4,000 megawatts, they have to make about $400 million investment to make sure technically that they can take that on the grid.

MR. JENNINGS: Yes. So much of the initial procurement for renewables was based on incorporating into the existing grid, but it was, of course, designed really for power to flow from generators to consumers. And it’s sometimes talked about that this is a more a -- a system where you're moving the power out so you can reduce your transmission, in fact, because the -- the load -- the generation you're building is not usually where there is much load in the case of -- of renewables, so you actually have significant transmission requirements.

We had -- you may have seen -- there was some publicity about a -- a lot of the solar projects that were procured under the feed-in tariff. They have not been able to connected -- be connected in certain areas because the transformer

stations aren't able to bring in the power. So that, just from the feed-in tariff that started in the fall of '09, that's been a significant challenge because a lot of the solar projects are in agricultural areas at Windsor-Essex area, so there will be very site-specific costs. So those costs are in the neighbourhood of 50 to $100 million just to incorporate those, but, I guess, I was talking about the larger transmission ones.

There is also, I guess, an estimate that -- the cost of what's referred to as a smart grid which a lot of that is to have greater controls in the distribution systems that -- expenditures on that in Ontario and that helps integrate renewables. There's some other benefits of it as well. That could be in the order of $2 billion over the next few years.

MEMBER BEAUDET: Still talking about costs and going further about what my colleague was discussing. A useful measure of energy cost is the LUEC or levelized unit of energy cost. And I wondering, because we had figures all over --

MR. JENNINGS: Yes.

MEMBER BEAUDET: -- the map and --

MR. JENNINGS: Yeah.

MEMBER BEAUDET: -- I was wondering if it’s possible to get official figures from you? You can find that on the internet, I mean, for gas, coal, CANDU and a comparison of these generating sectors. And I don't know if it would be possible to give us official data for, let's say -- in dollars of 2011 for -- in-service now for gas, coal, wind, hydro and nuclear, including or having a subsection CANDU and the technologies that are under revision here?

MR. JENNINGS: Okay. So what we do have actuals of is what is being paid for that generation now. So in Ontario, wind is paid thirteen and a half cents a kilowatt hour, and that is up from, I guess, about five years ago when we first did procurement for wind. The first procurement was about eight cents a kilowatt hour, so that’s -- that’s turned out to be a higher cost than -- than the original procurements. Wind is procured at 40 to 80 cents a kilowatt hour, depending on the size of the project, so the very small rooftop ten kilowatts and under would be about 80 cents.

MEMBER BEAUDET: You mean solar?

MR. JENNINGS: Solar, yes, sorry, sorry. I'm sorry. What was I going to say? So in terms of -- of ones like nuclear, we have what's paid to the existing generators, so Ontario Hydro -- Power Generation's nuclear that's regulated. It's between five and a half and six cents, and that would be similar to the contracted generation, about six cents, that Bruce Power has. They have other -- other nuclear that's getting -- has a floor price of about five cents. Then what are we talking about?

So the -- the coal -- yeah, the coal will vary with the -- the price of coal, but it's -- would be at the lower range of costs, so it would be like four -- four and a half cents, but again the province has a policy of phasing out coal and that's going to be done by the end of 2014.

In terms of natural gas, the contracts for those are more complicated than the other ones because there's a fixed monthly amount and then the -- basically the pass through the generation, so it's -- it's a bit -- they're not usually termed that way, but they would be, you know, less than 10 cents a kilowatt hour now.

The ones I had mentioned about the

combined heat and power -- and those will be very site specific and -- so some of the industrial processes. It'll -- and it’s actually difficult to see what -- those are done on a private sector basis, people who are, yes, competing for that. And I mentioned those have run from 11 -- 11 cents and a bit up to 24 cents a kilowatt hour.

MEMBER BEAUDET: Thank you. We had also from many interventions a request that was made and it seems there was never any answer as to how the 50 percent of baseload coming from nuclear was calculated?

MR. JENNINGS: So one factor is that nuclear has provided about 50 percent of our generation over the last significant period of time. It would have provided about 55 percent last year, so it, first of all, is -- we’re not talking about expanding the role of nuclear. We’re talking about recognizing its existing role in the system.

So baseload is really the generation or the -- or the demand on the system that is fairly constant throughout the year, seven by 24. So the minimum -- it can be a bit lower, but say the -- the lowest demand is -- in Ontario is about 12,000 megawatts. The all-time peak is

about 27,000, but if you look at -- so it's sort of the minimum levels. And what that is around all year, you'd be talking about a hundred billion kilowatt hours -- terawatt hours is the number usually used -- to 110 terawatt hours. So this is out of a total -- last year's consumption was 140 terawatt hours, a billion kilowatt hours, so this is -- really reflects the kind of ongoing demand to the system and so ways of -- of generating that. Certainly Niagara Falls operates that, although it actually operates a bit more at night because of tourism reasons.

The Saunders plant in the Saint Lawrence operates that way. The nuclear plants are effectively designed to operate that way, so they start, and they run.

Alternatives -- so some systems would rely significantly on coal for that, and certainly some of the jurisdictions that are often cited, Denmark or Germany, have much higher coal -- well, they're phasing out levels of coal out there in the sort of 50 percent of their energy from coal.

So we -- the government has, in effect, chosen not to use coal as a -- as a base

load or ultimately the rest of the system.

So this is kind of power that you need throughout, or you're not going to be able to just shut this on -- on or off, or you don't need to.

There is then the need for intermediate and peaking load, which is generation that will move up and down with the load, both on the demand side, and there's other supply moves off and on.

That was previously -- that role was taken up by coal and peaking hydro. We still have obviously the peaking hydro. There was some attempts to expand some of the hydro, but it's fairly limited without major transmission investments.

So there would be -- the role that coal was playing would largely be taken up by natural gas.

The role for other generations, such as wind and solar, is that that operates under the conditions when it can operate, wind, high -- high sunshine.

And so that comes in and out of the system when it's available. You have to have

other generation that can respond, come on and off as it comes on and off.

So is the -- the 50 percent, does it have to be 50?

It doesn’t have to. We would have to come up with another cost-effective form of generation.

I mean, if you were in -- we talked about Quebec or Manitoba. They operate -- their base load is hydro. They have very large hydroelectric resources. Other countries -- the US is 50 percent coal.

We have, again, chosen to move off coal.

Other jurisdictions might rely more on natural gas for that role. Traditionally that’s been seen -- worried about price volatility of the fuel, and we would have to be concerned about the carbon emissions. So one of the reasons we moved off coal was to reduce our carbon emissions.

If you were to replace the amount we’re producing from nuclear now, we would have -- with gas, we would have carbon emissions comparable to what we’d had before.

So I guess I'm maybe sorry to say, again, the plan is -- has to balance several different things. So we have to balance cost; we have to balance economic impact; we have to balance environment and system operability and reliability.

MEMBER BEAUDET: Thank you. I was wondering if it would be possible because we had -- you must be aware -- I'm sure you're following the hearings here -- that some groups have followed actually a lead, but quite a few submissions proposed that a phasing out -- a complete phase out of nuclear and indicating, for instance, how many megawatts you can get from solar, from biomass, from wind power, et cetera.

And I think, like you mention, that for Quebec, they had -- or in Manitoba, they have to go to approval process, and it's the same here.

There's a lot of wind power proposal that have already been agreed on or contracted out, and I believe the Province of Ontario for any wind power that includes more than 2 megawatts, they have to go through the Environmental Impact Assessment of Ontario.

And maybe it would be pertinent

too if you could prepare for us two tables with the -- the production projected energy balance in terra hours with, you know, the commitments you have, the introductions of renewable, illustrating the balance between the supply and the demand, and your safety margin, I think it could be instructive for people to -- if you -- if you do it over, let's say, your 20-year plan, 2011 to 2031, in five-year increments and do another table for the production projected capacity balance in megawatts including, again, the firm capacity you have for different energy sector and including the wind power that has to be integrated, whether it's contracted or planned, and possibly on other renewables.

I was wondering -- because we've had many figures, and it's all over the place, and we would like to have -- I think it would be interesting if you include in that the place of nuclear power so that, you know, everyone can be on the -- on the same scoreboard. And it would be instructive, I think, for the public.

You probably have all this data on the Ontario Power Authority site, but I think it would be useful --

MR. JENNINGS: Okay.

MEMBER BEAUDET: -- if it was produced, please.

MR. JENNINGS: So the long-term energy plan, which was the document I was referring to, we can -- certainly we can provide you with the information.

We do have pie charts which show what the split would be, what it is 2003, 2010, and 2030.

So one of the -- so I think in that -- in that case, nuclear is -- so the nuclear is 46 percent; the wind is 10 percent; solar one-and-a-half percent 2030.

And I guess the other relevant number -- we can provide you with this.

But the other relevant number we have in the plan, the estimated capital expenditures over the life of the plan, and in that case, we have -- so the nuclear is 33 billion. That's refurbishment and new build. And the wind is -- so 14 billion for wind, and solar -- solar is 9 billion.

So just -- and one of the -- actually some critiques of the plan have been if you look at the amount of expenditure and the

output -- so there have been people who've raised that question about the solar and the wind compared to the nuclear.

And some of that is about -- for the capacity you build, the generation is less for solar and wind than it is for nuclear.

MEMBER BEAUDET: I think we'd like the more detailed pictures in terms of what comes in. And, for instance, you have the commissioning of some decommissioning and Pickering and refurbishment in Darlington; some wind power are coming in; coal is going out.

I think -- I think we need a more detailed picture --

MR. JENNINGS: Yes, yeah, we can provide it, yeah.

MEMBER BEAUDET: -- of not just percentages over, let's say, the next 20 years, and I think it would bring a little -- I hope some realism into the discussion we're having here.

MR. JENNINGS: Okay.

MEMBER BEAUDET: Please.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: I'm going to make that an undertaking, but I want to go a little

further on it.

First of all, I don’t -- your energy plan is -- maybe it’s not confusing, but maybe it is.

And I would like to see some sort of chart. I think to follow up what Madam Beaudet has said, some sort of chart in five-year increments starting now that will show the amount of electricity that will be produced by each commodity, whether that be wind, whether it be solar, whether it be nuclear, whether it be hydro, whether it be gas, and so on; and how much is going to be the requirement on a base load and for peaking. I think that’s important, and we can draw a parallel to each of those as we go along because we have -- people have a hard job understanding, saying that a lot of the intervenors have said that we’re total -- we should be totally looking at wind and solar. And there’s a lot of discussion on that, but what I’d like to see or I think my colleagues would like to see, we would like to see a cost of what nuclear -- you’re saying it’s -- whatever, so many billion dollars for the refurb, for the decommissioning for the new build and how many megawatts that’s going to supply and so on.

So we'd like a breakdown of megawatts; we'd like a breakdown of cost; we'd like a breakdown also, I believe, of cost per megawatt hour or kilowatt hour for each of those so that we can simply just look at it on a page and be able to understand it, or several pages, because pie charts and so on, are fine, but they're not really putting in all of the aspects.

Another column I would like to see is the alternates and what flexibility you have in alternates and also what cost relates to those alternates, whether it be -- I know the Bruce line coming down, I thought it was around 865 million, I had read one time, but today I think you said it was 600 --

MR. JENNINGS: Seven hundred million.

CHAIRPERSON GRAHAM: Seven hundred million. But the infrastructure, the loss of power, we were aware of loss of power and transmission and so on from long distances from the Manitoba border, and what the pulp and paper industry has done and so on and -- and the downturn on that,

But the big need of power is in

this area and what transmission costs. You gave us the other day, I think 1,200 megawatts coming from Quebec. Is that all they can give you or is that -- have they got a long-term contracts to the U.S. that they can't give you more or is it just because we don't have enough transmission? And those are things that I think would be helpful, but I'd like to see it in columns based on dollars and cost -- and kilowatt hours or megawatt hours and cost for each of those.

MR. JENNINGS: Okay. So we can certainly provide you with more information. I think the level of detail you're talking about, is really what would end up coming out of the integrated power system plan that the Ontario Power Authority will be preparing in light of this plan and the supply mix directive. So I -- and so we won't provide you with more detail, but you're talking about the level of a very detailed planning level that would come out of the IPSB.

CHAIRPERSON GRAHAM: Been sitting here for three weeks, there seems to be an awful lot of confusion and I got to say that if you take everyone's presentation at their sincerity and so on, it's all over the map.

MR. JENNINGS: Yes.

CHAIRPERSON GRAHAM: And we have to get a handle on that. And I think to get a handle on that, we have to see it in simple terms so that when we make a decision that the general public will understand how we made that decision. And that's -- that's what we need so I -- I don't know how long it will take you to do that, but we need it as soon as possible, and that undertaking is going to be undertaking 75, but we need clarity.

MR. JENNINGS: Okay.

CHAIRPERSON GRAHAM: And you don't have the clarity today in pie charts.

MR. JENNINGS: Okay. So I think just -- another thing I might mention then is the long-term energy plan which was released November of last year, is actually the government's initiative to provide in as layman-type language, to explain these different tradeoffs, these different issues, so there has certainly been an attempt on the government's part to do this.

And I guess, you know, the intervenors can portray it however they want, but I think this is probably a more easily communicable message in this than, for instance, the integrated

power system plan which itself will be several volumes. So this was an attempt to do that.

CHAIRPERSON GRAHAM: That's correct, and we would like it in five-year increments from now, going forward at least 20 years.

MR. JENNINGS: Yeah.

CHAIRPERSON GRAHAM: Is that correct, colleagues? So with that -- that's the way I see it so that's undertaking number 75. How long do you think before you could get that back -- that information back to the panel?

MR. JENNINGS: Within a week.

CHAIRPERSON GRAHAM: In a week. Very good then. The Secretariat will work with you to get it channelled in the right direction. I'll go back to Mr. Pereira, do you have any other questions in round two?

MEMBER PEREIRA: No, I think we've covered quite a bit. Just to put some context to as to why we need this information, it's not just to inform the public who seem to be -- to have different views on what the picture is like, but it's also a part of how -- the climate under the *Canadian Environmental Assessment Act* to consider

the application from Ontario Power Generation and to have evidence that they have considered alternatives.

At present, they're focused on just delivering nuclear, but as part of the assessment, we've got to look at the consideration of alternatives. And these numbers will help flesh out the basis for this decision which we need to be able to understand when we write our report.

Having heard all that we've heard from intervenors because what we have received as we have said, is sort of -- you know, we could interpret many different pictures on consideration of alternatives, but we'd rather get it from Ontario Power Generation and perhaps from the Ontario Ministry of Energy, to make sure that we have a good handle on the picture coming from the applicant. And of course, they take their direction from your ministry. Thank you.

MR. JENNINGS: Maybe I guess as to respond --

CHAIRPERSON GRAHAM: Mr. Jennings?

MR. JENNINGS: --or expansion on that, the -- so the question of what alternatives Ontario Power Generation would put forward. Some

of that questioning seems to relate to -- the previous Ontario Hydro, was an integrated utility that did all the top down planning and the generation transmission and all forms of generation would have customer interaction.

So since 1998, we've actually restructured the sector so there are five -- five different entities. So Ontario Power Generation is really -- its role, its mandate is its existing assets and expansion of existing assets of nuclear hydroelectric. They do have some gas where they are in partnerships, but basically that's their role, managing the system, just as Hydro One does transmission.

The Ontario Power Authority is responsible for planning. They would also -- so the question is should there be more renewables? Well, it's the Ontario Power Authority that purchases renewables. It has an ongoing, again, Ministry-directed -- minister-directed -- a feed-in tariff program to purchase renewables. So the plan reflects the numbers that will come out of their procurement, reflects their conservation initiates, as well as those of the local distribution companies.

So some of it is that the -- the planning -- or OPG is really reflecting what their part of the contribution is just as if Hydro One came to some -- and they say, well you should be doing generation. Well, they don't do generation.

CHAIRPERSON GRAHAM: Thank you, Mr. Pereira. Madam Beaudet?

MEMBER BEAUDET: To follow up on this, the *Canadian Environmental Assessment Act* for the purpose and alternative means, the proponent always has to answer that because it's always a requirement. And OPG has done that. They've looked at different condensing, cooling system, different ways of managing waste, et cetera.

The need of the project and the alternatives to the project are always, in fact, discretionary to the minister and here he said in the guidelines -- and the guidelines were prepared before this panel was formed, he said in the guidelines that it was required. Now, if you look in the guidelines it's article 7.2 and, for instance, if we look at the purpose, he says it shouldn't go against Ontario, the provincial energy policy.

But he did use his discretionary

power and when he says that for each identified alternative to the Darlington project that are within the control and/or interests of OPG. This section of the EIS must explain how the proponent developed the criteria to identify the major environmental economic and technical costs and benefits of those alternatives.

We understand very well that OPG's expertise is nuclear, hydro and thermal. We are not asking that they should consider wind or biomass.

The project here is not to review an energy policy, but a proponent has to answer the guidelines and a lot of interventions have underlined that this part I've just read was not answered. Now, I don't know who's going to do that task; whether because OPG is under the ministry, you have to do it. Usually it's the proponent. I'd like to have your comments on that.

MR. JENNINGS: Well, I think how OPG has addressed it is that they are responding to the supply-mix directive and the plan that the ministry has prepared. So again, the evidence for that is the plan and the supply-mix directives, which I believe have been filed with the panel --

so that plan and then the subsequent integrated power-system plan which falls under the supply-mix directive does identify the need for about 2,000 megawatts of nuclear. Also sets out that while the plan is based on a medium-growth rate, the plan should provide the flexibility to deal with higher load growth which is also a scenario as put out -- put forward in this. So I think based on that, what OPG has submitted is that their proposal is consistent with the government's directives and we have commented in terms of our submission to say that in our view it is consistent.

MEMBER BEAUDET: It is consistent in terms of need for the project, but the alternatives -- as a proponent competent in hydro, nuclear and thermal; it should have looked at alternatives within that competence and which one will create the less environmental impacts.

MR. JENNINGS: So the nuclear -- there is a government directive in terms of the site. I mean obviously you could look at alternative sites. I mean the hydro is limited by what sites and capabilities are. They are doing hydro. There's a new hydroelectric project on the Lower Mattagami. It's 450 megawatts. They're

doing the Niagara Tunnel which is an expansion of the existing output at Niagara Falls. You know, they are pursuing all the things within their mandate so whether they are alternatives to each other, I mean it's not that if you say that they won't do those or they can do -- you can't get twice as much water from the different projects. I mean what they're really doing is following the plan which is where those trade-offs and balances are trying to be achieved.

MEMBER BEAUDET: They're following the plan of the Province of Ontario, but the *Canadian Environmental Assessment Act* is a federal requirement and I mean, even if it's just a fact sheet, sort of, summarizing, you know, the different directives, but not to say that they have to follow what the Government of Ontario says is a bit of a shortcut of what is required in the act.

MR. JENNINGS: Okay, so the ---

MEMBER BEAUDET: And so I don't know if we can do an undertaking. We've been going in circles with this because we tried in June. We tried again the other day and usually public hearings are good to try to fix, you know, the little hicks that come up and this has been a very

strong concern for many of the intervenors and we're trying to find a solution. And it's not by saying that -- obviously, the submissions that we have so far are not satisfied with what has been done and we have to find a solution.

MR. JENNINGS: So in OPG's submission, they proposed four alternatives. Is it in part that the -- how those are described? Are you looking for more elaboration on that or -- I think because they do talk -- there's do nothing, less amount of generation at the site, a non ---

MEMBER BEAUDET: I have it here.

> "Do nothing, seek approval for a modified project with a generation capacity less than 48,000 megawatts, seek approval for the project at a different location, seek approval for a non-nuclear generation option."

And the other day what I was giving as an example -- because I did ask a group that was requiring this what would be satisfying, you know, your association. If we ask an undertaking, "What are you exactly looking for" and

I give the comparison when a proponent, for instance, who does refined products he'll look -- in order to diminish the impact on the environment, he'd look first if he can expand his existing facility or if he can outsource and use one of his partners to produce more refined products associating himself with another refinery. There are different ways of approaching it, but here if you have do nothing which, I mean, obviously that's not the purpose. The purpose of the project is to produce nuclear power. Seek approval for a modified project; so yes, what is the other project that you can have within your competence to generate capacity less -- up to 4,800 megawatts. Seek approval for a project at a different location; you already have to decommission Pickering. Bruce is not within your realms necessarily of properties that you have control over. Seek approval for a non-nuclear generation option; nobody's asking them to do that because they don't deal with biomass, biofuel and wind.

So if you -- I can understand why a lot of intervenors have brought up -- believe me, it's -- I don't have the statistics, but I don't think I'm wrong by sayings it's at least 50

interventions. So we have to come to grips with that as a panel and we're just trying to see how we can go around it.

MR. JENNINGS: Okay. But is it that you think that each of those options they have put forward, they need to go into more detail or more rationale as to why they haven't chosen those and more rationale about the different economics or are you looking for different options which ---

MEMBER BEAUDET: I think the first one "to do nothing", I don't think that's relevant, but possibly in terms of the context of what's happening with the nuclear production in Ontario, I think there's a fair case in saying that the power, for instance, has to replace decommissioning. I think this is one of the purposes of the project and maybe go further as to why it's been decided that this is the prospect.

"Seek approval of the project in a different location", I think the site was chosen to have the new build here.

And then "seek approval for a non-nuclear generation option", I think this should be looked into a bit more forward because, you know, it may come out that within the portfolio, there's

less environmental impact.

We don't know; maybe economically it's not feasible possibly to use other options, as you say, with the thermal expertise, they have culled the provinces you're trying to phase out. If you look, for instance, at hydro power, a lot of intervenors have come with the impression that hydro power has no impact. It's not the case, but here we have absolutely nothing to work with and I think the fourth option should be looked into a bit more closely.

MR. JENNINGS: Okay. Well, I think I would, I guess, defer to OPG to talk about what -- if there is anything different they could do to address that. I guess just to go through, in terms of the options, if it was a hydro project, you would have to have a site that had the same characteristics as providing base load generation which there aren't certainly in Southern Ontario such sites; pretty limited even up in Northern Ontario. So you would have to -- for it to be comparable would be a bit of a challenge. Again, if it's things like should they be doing more solar/wind, the Ontario Power Authority has an open-ended procurement program for that. So, yes.

MEMBER BEAUDET: No, I'm not including solar/wind at all. I'm just staying --

MR. JENNINGS: Okay.

MEMBER BEAUDET: -- within their competence, because if you ask a -- let's say you have a project that is smelter, aluminium, you're not going to ask them to look at copper. I'm just asking within their competence and within the portfolio of properties.

MR. JENNINGS: Okay. Well, I think I would suggest that OPG could address your question; what they think they could do with that.

MEMBER BEAUDET: Yeah, can we have comments from OPG, please?

MR. SWEETNAM: Albert Sweetnam, for the record.

My understanding is that you would like us to look -- or suggested that we should have looked at other methods of generation other than nuclear, but methods that were within our portfolio. Is that correct?

MEMBER BEAUDET: Yes, other ways of producing what is required here, what's on the table.

MR. SWEETNAM: Okay. Albert

Sweetnam, for the record.

As you know, OPG is 100 percent owned by the provincial government. As a result, we work very closely with the other government agencies, including the OPA, that are responsible for the planning of the electricity for all of Ontario. As part of that planning, we look at the possible hydro-electric generation across the whole province, and that's reflected in the long-term plan.

Ontario's hydro capabilities are minimal in terms of what's left available for development. There is a Lower Mattagami which also already under development and is already part of the long-term energy plan.

The only other development that could be possible is Lower Jackfish, which is a small development that requires a significant amount of transmission lines. That is also being looked at, at the OPA. Sorry, not Lower Jackfish, but Little Jackfish, that's also being looked at at the OPA, and that would fit into the hydro-electric development part of the overall long-term energy plan.

So there's no available excess

hydro development that we could take -- or that Ontario -- OPG could find to replace the nuclear that we have because the available hydro-electric development in the province is already accounted for in the future growth of hydro-electric in the long-term energy plan.

On the thermal side, we have a joint venture on gas and we have coal plants. The coal plants are being shut down, and some of them will be converted to gas and some of them converted to biomass. Again, this conversion of the existing plants is already part of the growth in the long-term energy plan, so it is accounted for.

So we would have to -- in order to replace nuclear at our site, we would then have to build additional gas plants. The policy of the Ontario government is that additional gas is done on a competitive basis. OPG does not have a monopoly on that, so it would be bid out to the market as a whole and OPG, along with other providers, would have to bid in competitively, and whoever wins that bid would be able to build that gas plant. So that would not really satisfy the need for baseload in terms of Ontario's requirements.

So when you look at those two scenarios and that our capacity for hydro-electric is already booked in terms of growth on the hydro side in the long-term energy plan and the fact that gas -- gas and coal, coal being shut down, gas being bid competitively only -- there are no other alternatives other than to build the nuclear.

So we've looked at all of this and it's clearly laid out in the long-term energy plan, and maybe the rationale was not quite clear in terms of an alternative, but there really are no alternatives for us to go to.

MEMBER BEAUDET: If I may say, you're doing pretty well and that's what was required, with some figures in terms of capacity and megawatts and also in dollars.

If it is a dead-end, I mean, that was supposed to be in the EIS with, you know, more data in terms of costs et cetera.

And I don't know if we could ask for it as an undertaking, but that's what I believe we were looking for.

I think here it was assumed that because, you know, you looked at all this and it was included in the Ontario Plan that it shouldn't

be covered in EIS, but the rationale behind it -- behind the plan is also important. I mean, if there are dead-ends like with coal, I mean, it has to be said.

CHAIRPERSON GRAHAM: Yes, this has to be or should be an undertaking.

The only question I have is, who wants to take the undertaking? Is it OPG or the Ministry? And that's -- where would you suggest, Madame Beaudet?

MEMBER BEAUDET: Well, I think usually it's the Proponent who does the evaluation of alternatives.

CHAIRPERSON GRAHAM: Just -- are you prepared to proceed with this undertaking? Would you like to speak to it?

MR. SWEETNAM: Albert Sweetnam, for the record.

I will assist my colleagues at the Ministry and take the undertaking, yes.

CHAIRPERSON GRAHAM: Yes, okay.

MR. SWEETNAM: And my understanding of the undertaking would be to provide the rationale, as I've just described, in terms of what we looked at and why we continued

with our proposed proposal for new nuclear.

Could we have a week to prepare this?

CHAIRPERSON GRAHAM: Okay. Yes, you can. And that's the evaluation of undertakings, and give that -- that's Number 76. And one week? Satisfactory, colleagues?

Madame Beaudet?

Madame Beaudet, you have any other comments/questions?

MEMBER BEAUDET: No, thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Okay. That has exhausted the questioning by our panel members. Go the floor.

OPG, do you have anything else to add?

--- QUESTIONS BY THE PROPONENTS:

MR. SWEETNAM: Albert Sweetnam, for the record.

No questions, but I -- actually, yes, a question.

We appreciated the Ministry going on the record in terms of what the actual costs of electricity is in Ontario. It actually helps a lot

given that we've all been hearing a variety of prices proposed by many, many people over the last three weeks. So thank you for that.

I was just wondering if you could actually complete the numbers that you had quoted? You had given prices for wind/solar, nuclear, coal, gas, combined heat and power, but you've excluded offshore wind and hydro, so I was wondering if you can give the prices for that? That's the first part of the question.

And then the second part of the question was, could you also comment in terms of planning purposes on the reliability of wind and the requirement to back up wind with some sort of other generation?

CHAIRPERSON GRAHAM: Thank you, Mr. Sweetnam. Mr. Jennings, have you got that right at your fingertips ---

MR. JENNINGS: Yes.

CHAIRPERSON GRAHAM: --- or do you want to incorporate it in the Undertaking Number 75? If you have it right there now then ---

MR. JENNINGS: Well, I'll start with it and then if there's something else we can -- so the one is -- so offshore wind has a price

point of 19 cents a kilowatt hour. Now, at the moment, new projects and that have been suspended based on some further environmental work, but that was the price, 19 cents a kilowatt hour.

One, I guess, was not mentioned, so biomass projects are in the range of 13 to 14 cents. And, again, it depends on the size of the project.

The small hydro in the feed-in tariff is in the range of 11 to 13, and I think again that that there's some size difference.

In terms of the planning assumptions with wind, I think the question is how it's recognized in terms of its contribution at peak or the reliable peak-meeting capacity.

So what the Ontario Power Authority has used, and this is based on experience we have both here and in other jurisdictions but principally based on Ontario experience, is that it's about 11 percent. So in other words, if you had, from a planned purpose, if you had 1,000 megawatts of wind, you would only be assuming that you'd have about 100, a bit over 100, available at peak. Does that respond to your question? Okay.

CHAIRPERSON GRAHAM: Thank you.

CNSC, do you have any -- Mr. Howden, do you have anything, or Dr. Thompson?

DR. THOMPSON: Patsy Thompson, for the record. No, we don't have any questions. Thank you.

CHAIRPERSON GRAHAM: Government agencies, anybody have anything; any questions?

If not, we have two people from the floor that have questions and we'll cut it off at that. CELA, I believe, Ramani, you have a question?

--- QUESTIONS BY THE PUBLIC:

MS. NADARAJAH: It's Ramani Nadarajah, counsel with CELA.

Yes, this is a question for OPG, Mr. Chair.

My question is, are they considering biogas or alternative fuels for the phased-out coal plants?

CHAIRPERSON GRAHAM: OPG, would you care to answer that?

MR. SWEETNAM: Albert Sweetnam, for the record.

We are considering biomass for several of the plants that are being phased off of

coal.

CHAIRPERSON GRAHAM: Thank you.

The next one is Sean Ascott, and you're not an intervenor but we'll permit a question.

MR. ASCOTT: Okay. Yeah.

CHAIRPERSON GRAHAM: Even though it's not within rules, I've been bending them a little bit, so we'll permit one question.

MR. ASCOTT: Okay. For the record my name is Sean Ascott.

I have concerns over the five to six cents per kilowatt of nuclear power and whether that is including the cradle to grave.

And also, say a 1,000 years into the future of storage maintenance, that's all part of it, so this should be part of the cost?

CHAIRPERSON GRAHAM: Mr. Jennings?

MR. JENNNINGS: Yeah. So I was referring to the cost of existing generation. There is a -- the cost, or the estimated cost, for spent fuel and decommissioning are recovered as part of that cost, and there is a fund that OPG administers which has the costs for dealing with those two. So that's incorporated in those costs.

Again, those are our existing generation.

CHAIRPERSON GRAHAM: Could you also maybe for the benefit -- because it has been questioned before -- roughly what's in that decommissioning fund?

MR. JENNNINGS: OPG maybe better set to answer that, but it's certainly in the several billions of dollars.

MR. SWEETNAM: Albert Sweetnam, for the record.

As we said previously before, there are two funds. One that deals with decommissioning and the other one that deals with the long-term storage of fuel waste.

And the funds at the moment are between $11 and $12 billion.

CHAIRPERSON GRAHAM: And that's a segregated fund and that is a fund that government or OPG cannot touch? That's a committed fund.

Is that correct?

MR. SWEETNAM: Albert Sweetnam, for the record.

That's correct. And the statement made by the Assistant Deputy Minister is also correct that the full costs of these funds is

incorporated in the 5.5 cents per kilowatt hour that he talked about, so it's a cradle to grave number.

CHAIRPERSON GRAHAM: Thank you. Thank you, sir.

MR. ASCOTT: You're welcome.

CHAIRPERSON GRAHAM: Okay. We will now go on to -- I guess that's all for Mr. Jennings.

Thank you very much and I appreciate your coming here today to clarify a few things and also with the undertakings that have been presented, both you and OPG.

We now go back to the Ministry of Transport and, I believe, Mr. Zeit is on the line?

Are you there, Mr. Zeit? Is Transport on the line?

MR. ZEIT: Yes, this is David Zeit. Are you able to hear me now?

CHAIRPERSON GRAHAM: Yes, we can hear you very well.

I'm going to open it right up to panel members who may have some questions with regard to your department. I'll start off ---

MR. ZEIT: I also have

Jean-Stephane Bergeron joining me as well for any technical regulatory questions related to rail safety.

CHAIRPERSON GRAHAM: Thank you very much and we'll start right off with Madame Beaudet.

--- QUESTIONS FOR THE TRANSPORT CANADA BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman.

My question is regarding rail safety. In your submission on page 17, you say that:

> "Currently, there are no regulatory requirements with respect to the construction or alteration of buildings and other structures on properties adjoining the land on which rail line is situated."

But you do mention that such regulations may be developed in coming years.

I would like to know why you say that? What problems have already been identified

and is there any draft version on the table yet?

Because, I mean, we know that there is a railway line going through the site here. There has been some adjustments with respect to security, but I'd like to know if you have in mind other requirements that would be coming?

MR. ZEIT: David Zeit, for the record.

I'll refer that question over to Jean-Stephane Bergeron.

MR. BERGERON: Thank you, David.

Yes, Madame Beaudet, Jean-Stephane Bergeron for Transport Canada.

I conferred with my colleagues yesterday to make sure I had a full understanding of that part of our submission.

We are, again, focusing primarily on proximity issues and the impact or the interaction projects around or about a railway and how that would affect the operation of a railway. So we're not suggesting at this point to develope regulations beyond what is in place now or beyond regulations that would affect access or activities impacting the railway.

And we're really focusing in any

future regulatory development that is in place now, keeping in mind that this is very speculative, on access control and issues of trespassing and crossings, and not specifically with respect to the nature of an operation by a railway or a railway right-of-way.

MEMBER BEAUDET: Thank you. You make also a point on the same page where you say that you also -- that:

> "Any proposal must be designed in order to prevent those buildings or structures from constituting a threat to safe railway operations."

I think there is a bridge that is crossing over. There may be other things, but do you -- what did you have in mind here and do you have any proposal coming for -- you know, from the railway company, standards or requirements that they would put forward and it would affect eventually the project we are studying?

MR. ZEIT: That seems to be related to the first question, so Jean-Stephane, if you can take that one as well?

MR. BERGERON: Yes, Jean-Stephane

Bergeron again.

Yes, there are currently regulatory requirements that impose a notice process when work on or about a railway right-of-way or a railway operation can affect its neighbours. So in the case of an overpass, for instance, in the case of construction of facilities close to a railway right-of-way, there is a notification requirement between parties.

There are no specific requirements with respect to restricting the nature of the construction or the activity, but we're trying to ensure that neighbours speak to each other so that they're aware of each other's operation or projects, proposed projects, so that they can consult each other and ensure that the work being undertaken won't affect negatively the safety and security of the railway operations.

So, for instance, if excavation is required close to the railway right-of-way that would somehow affect the integrity of the railway structure or the land that the rail structure is built on, then that notice process would ensure that, in this case, the Proponent would contact their operating railway and advise them in advance

of the nature of the work they are about to undertake, so that both parties could meet and ensure that there is no threat to the safety and security of the rail operations.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

I have no other question.

CHAIRPERSON GRAHAM: Thank you, Madame Beaudet. Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman. The second response covered the question I had. Thank you.

CHAIRPERSON GRAHAM: Thank you. And I apologize, Mr. Zeit. I -- I introduced you as the Ministry of Transport and it was Transport Canada. So I will now go to OPG. Do you have any questions?

MR. SWEETNAM: Albert Sweetnam. No questions, but a quick comment going to Madame Beaudet’s question.

We have all read -- OPG’s already contacted CN and we are in discussions with CN in terms of the crossing required. In order to cross a CN right-of-way, they have specific standards that we need to meet and we will comply with these

standards and work in conjunction with CN to have the correct structures designed to cross the right-of-way.

CHAIRPERSON GRAHAM: Thank you very much. CNSC, do you have any questions?

DR. THOMPSON: Patsy Thompson. No, thank you, we don't.

CHAIRPERSON GRAHAM: Thank you very much. Any other government agencies? If not, any questions from the floor? Do I have any questions from the floor? No? I have no questions from the floor. Well, thank you very much, Mr. Zeit and Mr. Bergeron, for staying on the line for the duration of the other information that we were gathering and we thank you for participating today.

MR. ZEIT: Thank you.

CHAIRPERSON GRAHAM: I think what I'll do now just before we take a break, we'll do one more bit of business and we'll go with the written intervention from the Canadian Transportation Agency. Do you want to read that -- someone has their phone -- if you don't mind silencing it, we'd appreciate it. So, Kelly, would you go ahead, please?

--- WRITTEN SUBMISSIONS AND COMMENTS BY PANEL:

MS. McGEE: Thank you, Mr. Chair. The Joint Review Panel will now move to the review of one written submission. This is from the Canadian Transportation Agency and it is PMD 11-P1.5. Thank you.

CHAIRPERSON GRAHAM: Questions from panel members? Madame Beaudet?

MEMBER BEAUDET: I have two questions and maybe OPG can answer them.

In the submission, it says that there's no additional information offered concerning the potential rail-related noise and vibration impacts on realignment and it seems the Canadian Transportation Agency -- and that’s what is my question. Would they do their own study or would it be complementary to OPG’s noise study that is already done?

MR. SWEETNAM: Albert Sweetnam for the record. In -- in our past experiences with this agency, we would have to do the studies and they would review it.

MEMBER BEAUDET: And my second question is what are the standards applied that would preclude realignment of the rail?

MR. SWEETNAM: Albert Sweetnam for

the record. The standards are -- are the -- the vertical alignment of the rail and the horizontal curvature of the rail. These are the two restrictions that would restrict realignment.

MEMBER BEAUDET: Thank you. Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Just one question.

Does OPG plan to seek construction of temporary lines to support the construction effort on site?

MR. SWEETNAM: Albert Sweetnam for the record. We have not decided this as yet. This will be done in conjunction with the vendor. Our anticipation is that we will request a siding at the site in order to bring in the heavy equipment.

MEMBER PEREIRA: And then that will require approvals under what legislation?

MR. SWEETNAM: Albert Sweetnam for the record. I'm -- I'm being told by -- by my colleagues that St. Mary’s has already agreed that we -- we could use their existing siding, so we probably will not have to do a siding. If we did have to do a siding, we would have to come to

agreement with CN Rail.

MEMBER PEREIRA: Thank you. Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you very much. That concludes that written intervention and I think what we'll do is take a break for 15 minutes and we'll come back at 3:35. Thank you very much.

--- Upon recessing at 3:15 p.m.

--- Upon resuming at 3:30 p.m.

CHAIRPERSON GRAHAM: Just before we start with the next intervention, just one little bit of procedural matter that I'll ask my co-manager to read into the record.

--- STATEMENT BY THE PANEL PRESENTED BY MS. McGEE:

MS. McGEE: Thank you, Mr. Chair. Good afternoon again. I have a brief statement to make on behalf of the Joint Review Panel.

On April 6, 2011, the Joint Review Panel received a letter from the Canadian Environmental Law Association, Lake Ontario Waterkeeper and the International Institute of Concern for Public Health, asking the panel to reconsider the limitation of 2,500 words imposed for the final written submission. The groups

submit that considering the voluminous record, the scale and complexity of the project, the potential environmental impacts and the public interest, the limit imposed would not allow them to make appropriate detailed submissions.

In light of the concerns raised, the panel has agreed to increase the maximum length of the final written submission to 10,000 words. A revised notice containing the updated information will be sent to all participants shortly and also posted on the registry.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Kelly, and good afternoon again. Thank you very much for the next -- the next presenter, Families Against Radiation Exposure, which is found in PMD 11-P1.174. And we thank you for the patience this afternoon in getting started and welcome here. And you have a group of people. If you'd introduce yourselves, we'd appreciate that.

--- PRESENTATION BY MR. HASKILL:

MR. HASKILL: Thank you, Mr. Chairman. My name is Sanford Haskill. I'm the acting chairman of F.A.R.E. and we thank you very much for letting us come here this afternoon. I

guess your stagecoach broke down like mine so, anyway, I'll introduce the people with me.

On my extreme left is the president, Mr. Derek Kelly. Next to Mr. Kelly is the secretary treasurer, Karen Colvin, and the presenter for today will be Mrs. Holly Blefgen. Thank you, sir.

CHAIRPERSON GRAHAM: Ms. Blefgen, the floor is yours. Please proceed.

--- PRESENTATION BY MS. BLEFGEN:

MS. BLEFGEN: Good afternoon, Chair, Joint Panel Review, Ontario Power Generation, and the Canadian Nuclear Safety Commission. Thank you for the opportunity for F.A.R.E. to speak today.

Port Hope’s Families Against Radiation Exposure, founded in 2004, is a not-for-profit organization. It is composed of a volunteer board of directors and a membership. Today, we have the following board representation present: Sanford Haskill, Derek Kelly, Karen Colvin and myself. Currently, we also have two key advisors, Dr. Stan Blecher, M.D.; medical geneticist; professor emeritus molecular biology and genetics; and director emeritus, School of Human Biology,

University of Guelph. The other being Dr. Lyndon Harvey, M.D., University of Toronto, master of science, neurosciences, and a family practitioner.

Our presentation will be about F.A.R.E., its origins and objectives, and we'll relate activities that F.A.R.E. has been involved in order to inform this forum on matters which we believe are experiences that we hope will assist this inquiry.

Briefly, F.A.R.E.’s objectives are to monitor radioactive waste and emissions released in the municipality of Port Hope and surrounding regions and to work towards the elimination of these; provide information and educational materials so as to inform the public as to the issues regarding the effects of human and environmental health from radioactivity and emissions.

F.A.R.E.’s contributions. In a relatively short period that F.A.R.E. has been in existence, it has achieved major milestones in its efforts to accomplish these and other objectives. F.A.R.E. was formed in 2004 to raise questions and provide education to the public about the proposed down-blending of enriched uranium in the floodplain

of the Ganaraska River. Our strategy was to get a full panel review or to get council to call for a so-called peer review.

It should be noted that the term peer review is used differently by scientists on the one hand and by some members of the public on the other. Here the term is being used in the non-scientific sense that the Port Hope council uses. I will describe the scientific usage shortly.

Council called the peer review and the rest is history. Our community is safer as a result. After Cameco abandoned its proposal for enriched uranium, F.A.R.E. continued to work towards its goal of minimizing radioactive emissions in the municipality and to monitor the clean-up of low-level radioactive waste. Much of this was done without publicity.

Our achievements have included making the Canadian Nuclear Safety Commission aware that Cameco and the former Zircatec lacked the training and equipment to respond to a radiological fire at their facilities. The CNSC ordered them to correct that, and they have.

Detecting neutron radiation on drums stored in public areas of the company’s

facility. The company now monitors its workers for neutron radiation, which it did not before.

Demanding greater accountability on emissions. The company now reports its emissions publicly in language the public can understand.

Protesting the secrecy of the low-level radioactive waste management office. Thanks to our intervention, anyone can now request and receive the full radiological history of any property in the community.

Only a few residents have done so. It is not advertised. And more than one has told us, if I'd been allowed to see that, I wouldn't have bought a house here.

Informing the low-level radioactive waste management office about 36 public locations in Port Hope where soil samples showed elevated levels of uranium, arsenic, and other toxic metals. The testing was done by Cameco and filed with the CNSC, but the municipality was not informed for four years.

The municiaplity's peer reviewer has promised that these locations will be cleaned up.

Receipt of award-winning environmental recognition from the Canadian Geographic Society in Vancouver 2006.

Our written submission to the Joint Review Panel focused on a factual overview of hazardous radioactive waste, emissions, economics, and risk assessment that applied to the proposed Darlington new nuclear plant.

We have felt compelled to address this joint panel review because of what our community has been exposed to for over 70 years.

We have had radioactive waste randomly dumped, disposed of, mismanaged, and transferred throughout our town and the surrounding natural environment with a continuous output of radioactive contaminants through emissions released at Cameco’s facilities in the heart of Port Hope.

We offer a human perspective to this joint panel review which we hope will be given every consideration and acted upon wisely.

Otherwise, the collective voices of our members, their families, and those of many people in the Municipalities of Clarington, Whitby, Port Hope, Kincardine, Owen Sound, Durham Region, Bruce County, the City of Oshawa, Pickering,

Peterborough, and elsewhere in the Province of Ontario will remain unheard.

Based on our experience with the everyday layperson to understand the complexities of the nuclear fuel cycle, nuclear power generation, radiation science, and waste contamination, much study and knowledge is required.

Just recently, an incumbent Port Hope municipal councillor stated that he had participated in CNSC's Forum 101. He advised he was science illiterate and he found that by lunch hour, he was overwhelmed by the information and could not manage to digest the full eight-hour session.

We expected an objective of this hearing of the joint panel review was to provide the public with an opportunity to learn, observe, and question intelligently the CNSC, OPG, and others.

However, we understand many have felt they cannot come forward to give input and participate in a quasi-judicial setting.

As well, has simply turning the lights on become too easy; an expected convenience

we take totally for granted without giving thought to the question of the cost of nuclear power?

As commented by Madame Beaudet on numerous occasions, the lack of public involvement creates a silence that should leave us with a nagging doubt.

There remains the question as to what degree are we disconnected from the real world and are we in a state of denial?

Silence can also be an indicator of grave apprehension, fear, possibly terror.

In a time when the country of Japan and its people are besieged by a catastrophic nuclear disaster of a magnitude that is beyond what any one of us here in this room can imagine, the fact that we here are contemplating the refurbishment of a nuclear plant leaves me feeling sick inside, especially when I think of the insidious and horrific nature of radiation contamination, fallout, and waste to be left in perpetuity.

My thoughts are with my sister living with her husband in Tokyo, her students, her community, the children, youth, and parents-to-be, witnessing such an atrocity that is out of control.

It is day 28 facing a fate rapidly exceeding the suffering the people of Japan endured following the release of the atomic bombs of Hiroshima and Nagasaki.

When studying Japanese, I learned a traditional Japanese expression. A man comes home from work each night to his wife. He says, (foreign language spoken) dinner, bath, sleep.

However, now iodine 131 contaminants the tap water. There is no gas for the government to distribute clean water. There is no food, no heat to prepare a warm meal. There is hoarding. There are rotating electrical outages. It is not safe to bathe.

Such hazardous contamination that cannot be seen, tasted or smelled, but affects all human and animal life upon intake via inhalation and ingestion has caused, and will cause, thousands of people as well as numerous species to suffer and die from radiation sickness and its related ailments.

It will cause genetic mutation and damage to be passed on to future generations and forever contaminant their food supply chain and bio-accumulate throughout various ecological

systems.

It has been stated at this hearing that a disaster such as that of Fukushima could not occur here because the location of Ontario's nuclear reactors and various operating facilities are not on a fault line, but this ignores several points.

First, earthquakes can happen anywhere, not at all only in known fault lines, but very often in places where they are not expected. Only last summer we experienced an earth tremor of 3.2 in Ontario.

We also have the fault area that created the Fosmill drainage that flows into the Ottawa Valley, and we know that in our continent, as in every other, the earth's crust is constantly moving on plates and determining seismic activity cannot be predicted.

Furthermore, the damage to the Fukushima nuclear plant reactors was caused by power failure. This can happen without earthquakes. For example, it can be a result of other natural catastrophic events such as a hurricane. Some seniors in this room may remember Hurricane Hazel that hit Southern Ontario November

1954.

Nuclear disasters can arise without earthquakes and without power failure, for example, by human error.

Are OPG workers monitored for alcohol and drug use at work? If yes, at what blood alcohol or drug levels are they not permitted to work?

Outside incidents such as the recent train derailment on the Port Hope-Cobourg boundary that spilled toxic jet fuel and hydrofluoric acid could also impact Darlington.

The main and only entrance into Darlington’s current plant is from Holt Road with a railway level crossing.

If an emergency evacuation was required, how would this occur?

And what about Darlington’s proposed back-up diesel generator system, will it be tested weekly? Is the storage of the diesel fuel rotated regularly and renewed?

Finally, in discussing disaster scenarios, nuclear stations are tempting targets for terrorist attacks.

But even without any of the above

disaster scenarios, the two central issues remain. There is no safe dose of radiation, and there is no safe way to dispose of nuclear waste.

It has been estimated that Darlington's aging reactors have produced to date 5,000 tonnes of highly radioactive used fuel.

The proposed decommissioning of the plant will increase this volume and the need for greater space provisions for the management and storage of it onsite.

We understand that the Darlington new build of up to four reactors -- the potential new reactors will be hotter and more radioactive, thus enhancing the toxicity of the new waste and adding significantly to management, transfer, and storage requirements where there appears to be no guarantee of a final repository being readily available for the waste.

We also understand that based on Undertaking Number 30, the number of transfers of waste to the Western Management Facility could be as many as 250 trips per year. This requires clarification.

Thus, we asked ourselves if the CNSC and OPG do not have answers to the issue of

disposal of the by-products of this energy source, why are proceeding down this path? It violates the precautionary principle.

Turning to the overall economic equation of this new nuclear power, if we consider the cost of the overall fuel cycle, its processes and power production, shorten long-term waste storage management, transfer of the trained labour force required, we believe the cost projected to the taxpayer of 38 billion is grossly underestimated and lacks the credibility of portraying the real costs we have heard so often spoken of over the course of these hearings.

We have precedents for misleading underestimation of cost in the nuclear arena.

The proposed final cost of the clean-up of Port Hope will far exceed the negotiated 260 million, as will the time to complete the project also far exceeds the official estimates.

Numerous delays have already postponed it by several years.

By way of contextual background, Port Hope acquired its historic low-level waste from Eldorado Gold established in 1932. This

company later became a Crown corporation; the Port Hope Conversion Facility. The facility's waste management practices from early operations resulted in wide-spread radioactive and non-radioactive contamination throughout the community.

A partial clean-up was conducted 1976 to '81 removing a hundred thousand tons of contaminated soils to the Atomic Energy of Canada's Chalk River Waste Management Facility. The so-called clean-up process was discontinued because the Chalk River Facility could accept no more. In 1982, the Low-Level Radioactive Waste Management Office was created and operated by AECL to monitor and manage 600,000 tons of radioactive waste and contaminated soils that remain in Port Hope.

A controversial proposal to undertake a further clean-up in Port Hope was recently approved by the municipal council. A pilot or trial remediation at one site was performed in the fall of 2010.

Living with radioactive wastes; it is our experience that notwithstanding what may be said to the contrary, when it comes to the actual, practical implementation of projects with supposedly government-regulated protocols, these

are not always fully met. For example, we've been waiting eight years for implementation of a comprehensive dust-management plan from Natural Resources Canada.

Expectations of contract delivery and fulfillment also require constant and vigilant attention by the community; otherwise, inexperienced workers may be taken advantage of and put at unnecessary risk without adequate training while the public is expected to continue business as usual. For example, a young person 18 years of age working an excavator at the trial remediation site mentioned above was not told he was working in a low-level radioactive site, did not receive any prior training, wore no protective clothing or equipment and after work had his boots washed off and his body checked with a Geiger counter without being told for what or why.

Living with nuclear waste in our community is a cause of daily concern for us similar to the situation of those living in the backyard of a nuclear power plant. The problem never goes away. Much as in the case of Port Hope's so-called clean-up, the declared objective of which is to remove the perception of stigma of

radioactivity in the town, we noted at the hearings that council of Durham Region's only concern was that cooling towers should be hidden from view from the highway. Ironically, this provides a fascinating insight into the local politicians' perception that if covered up or hidden behind a berm, the problem will not exist or would not have impact psychologically, medically, socially or economically on their citizens or tourism to this community. This is known as oxygen-fanned response. If the tower is so considered to be unsightly, could we have the assurances that the signage along Highway 401 for OPG will also be removed?

With respect to the Darlington situation, as OPG conducted open, frank, public presentation in laymen's terms on their new operations to advise the community that they will be conducting daily, unscheduled emission releases and that tritium releases from the new nuclear reactors in the water and air will be of higher concentrations than any previous such releases just maybe the citizens, out of concern for their health, would get involved.

And how about the degradation of

the environment? We cannot understand how the Central Lake Ontario Conservation Authority, CLOCA, could give permission for OPG to infill Lake Ontario's little remaining natural shoreline of up to 40 hectares. We share this concern about environmental protection against this proposed infill presented by Lake Ontario Waterkeeper in their intervention. The stigma persists. Even Madame Beaudet referred to this area as the "nuclear belt" that surrounds the Golden Horseshoe. Maybe Canada's economic centre of 9 million needs to wake up.

Port Hope's trial remediation this past fall revealed, in the first site exam, a far greater amount of contamination than anticipated. The clean-up process will, over a period of many years, put a large amount of contaminated material back into the air, transfer waste to the streets of Port Hope from one site to another site, deposit it in a wetland area that drains into Lake Ontario and construct, of all things, a children's playground on the new radioactive dump. All this will proceed while Cameco continues to produce new radioactivity at the harbour. It's still not clear how this process can remove the perception of radioactive

stigma.

Mayor Linda Thompson has said, “Public awareness is key to the clean-up.” She added on CTV’s Canada AM recently as well as at this hearing:

> “They, members of the public, continue to ask questions, which is great, and it’s made the community and regulatory authorities more accountable to make sure we are a safe and healthy community.”

We agree with her that citizen dialogue is needed, but question how much the municipality has done to foster that dialogue. To date, despite our own repeated efforts to meet with the mayor and council, F.A.R.E. and its advisors have never been formally invited or permitted to openly discuss issues related to radioactive waste and emissions. Furthermore, in her distinctly pro-nuclear presentation, the mayor added that 87 percent of a survey conducted by the Port Hope Area Initiative supported the clean-up; unfortunately, she omitted to add that the survey comprised a sample size of 350. The municipality’s population

is 16,500; thus, this survey represents the opinion of 2 percent of the community.

Chair Graham, you also asked the question of the mayor if a referendum had been undertaken or considered. To date, such a vote has not been addressed. Instead the mayor and council, on behalf of the municipality, have employed Temple Scott Associates, a PR firm. In an open letter to the residents of Port Hope, Northumberland News, March 25, 2011, the mayor informed citizens that this was done to ensure the facts are heard and that those who would spread misinformation are challenged.

We have since learned from a municipal councillor that Temple Scott services will be paid by the municipality and that the municipality will be reimbursed by the Port Hope Area Initiative and Cameco.

For the past six years, F.A.R.E. has been the main organization raising questions about nuclear safety in Port Hope. Evidently, the factual information we have provided has been labelled misinformation.

Peer review; in 2008, the Mayor of Port Hope repeatedly stated in public that council

was in possession of peer-review studies that proved that there has been no negative health impact from radioactivity in Port Hope. Since the mayor had, on these occasions, used the words “peer review” in the context of the word “study”, it was believed that she was, in this case, claiming to use this phrase in its scientific sense.

In science, a peer-reviewed study is one that has been published in an official, recognized scientific journal after it has been scrutinized and its acceptance for publication has been recommended to the journal editor by anonymous referees; the choice of referees being unknown to and not determined by the authors of the study.

Science journals are ranked for excellence. Those that publish excellent science are known as prestigious journals. Only articles that have been through this arms-length referring process are considered by practicing scientists to meet acceptable standards for rigorous scientific reporting. Reports that have merely been reviewed by the authors’ colleagues or acquaintances and then copied and circulated by the authors are non-peer-reviewed studies and are not considered to be

equivalent in scientific validity. This usage of the term “peer-review” is quite different to the everyday non-scientific usage that council and others employ in a non-scientific situation.

F.A.R.E. requested of the mayor to provide copies of the peer-reviewed studies that the mayor had mentioned. We were given a computer disc and told that the relevant material was on the disc. F.A.R.E. obtained the voluntary assistance of our medical geneticist and asked him to review the content of the disc. The medical geneticist reported the disc contained 11 files. Of the 11, none were peer-reviewed studies. Five (5) were not studies at all, but merely opinions that had been publicly expressed or solicited by the council and which provided no new information on the issue of the safety of Port Hope. The remaining 6 files were non-refereed; non-peer-reviewed reports of the type described above as being non-equivalent in scientific validity to peer-reviewed studies. However, all 6 of these reports, nevertheless, suggested that there were indeed negative health impacts in Port Hope contrary to what the mayor had indicated.

F.A.R.E. attempted to bring this

information to the attention of the mayor and council and through them to the citizens of Port Hope. This effort was thwarted.

Following this, the Canadian Nuclear Safety Commission released a so-called Synthesis Report which gave Port Hope a clean bill of health and stated that no further studies were necessary. This conclusion was also found by our medical geneticist to not be based on peer-reviewed science. F.A.R.E. submitted a letter of concern to the CNSC. This letter was posted on our website and was turned over to the municipality. This too has had no effect.

The issue of the CNSC claimed that harmful effects of radiation never occurs at doses of less than 100 millisieverts was raised again by Dr. Farley at this hearing with Dr. Thompson of the CNSC. Just this past month, March 8th, 2011, the Canadian Medical Association Journal published work by Dr. Louise Pilote and co-workers from McGill University that showed increased cancer risks for doses of 10 millisieverts or less from low-level radiation from cardiac imaging.

This confirms older research work. In the 1950s, it was shown that a single x-ray to a

pregnant woman could cause leukemia in the infant. Recent work in Germany on occurrence of leukemia in the vicinity of nuclear power plants has shown that leukemia occurs in increased frequency in children living in this exposure where radiation doses are estimated to be much less than 1 millisievert per year. In other words, the CNSC has been conveying incorrect and misleading information.

Where do Port Hopers go for scientific information? This episode is indicative of the problem that we believe Port Hope and other communities in the nuclear belt face. The information that Port Hope and other citizens receive on the health effects of radiation come mainly from sources as CAMECO, the mayor and council, OPG, AECL, CNSC, Health Canada, and the Ontario Ministry of the Environment.

These parties are, respectively, a component of the nuclear industry, of municipal government of elected officials, an agency staffed by civil servants of provincial and federal governments.

All of these support nuclear power. None of these institutions is staffed by MDs or practicing medical scientists with expertise

in the effects of radiation on humans, and all of these bodies are, because of their support of the nuclear industry, in a conflict of interest with respect to the issue of nuclear safety.

The citizens of Port Hope, of Durham, of Pickering and of elsewhere in Ontario are not being informed that independent science, science independent of the nuclear industry funding, independent of pro-nuclear government agencies, does not agree with the information that citizens have received about the safety of radioactivity and its emissions. The citizens have been and are being misled by the very government agencies that we should be able to rely on for our information.

Contrary to what citizens have been informed, there are no comprehensive publications and prestigious peer-reviewed journals that show humans in our area to be safe from nuclear radioactive contamination.

Those few outdated and incompletely rigorous studies that do exist suggest the opposite, and medical scientists state that there is no safe dose of radioactivity, just as we have heard from Dr. Caldicott, Dr. Fairley, and

Physicians for Global Survival.

Unfortunately, the agencies that are dispensing misleading information are also in possession of overwhelming financial and media resources, thus improving ---

CHAIRPERSON GRAHAM: Mrs. -- sorry. I know your trying to read fast to get in within the time. Translators are having problems. If you want to slow down a little bit.

MS. BLEFGEN: Could I? Oh, could I? Thank you.

CHAIRPERSON GRAHAM: We'll allow you a couple of extra minutes if you go over, because they are having problems.

MS. BLEFGEN: I apologise, but this is so important to us.

Unfortunately, the agencies that are dispensing misleading information are also in possession of overwhelming financial and media resources, thus increasing the difficulty of FARE's role as the watchdog that tries to keep all parties honest and responsible.

In November 2010, Dr. Helen Caldicott visited Port Hope, in part sponsored by FARE through funding received from CEAA, Canadian

Environmental Assessment Agency, for Vision 2010 with regards to the decommissioning of buildings and waste at Cameco.

Prior to arrival, she had said in a widely-publicized interview that she thought that the citizens of Port Hope should be moved at the government's expense to another location. This viewpoint attracted much negative attention, and unfortunately obscured the informational message that Dr. Caldicott was here to deliver on the biological effects of radiation.

Because of reaction from local officials and some citizens to what Dr. Caldicott had said prior to arrival in Canada, FARE thought it prudent to move the location of her presentation to Oshawa, where in spite of extremely poor weather, over 250 people attended her talk.

However, FARE and its members continue to experience threats, harassment, defamation, and cyber-bullying. In our opinion, this anger should be directed at the source, those who propagate and support misinformation.

Following the attention given to the nuclear disaster of Fukushima, we notice new advertisements for OPG in the local papers. These

stated, “Nuclear is clean, green and safe”. We know that these marketing attributes cannot be met.

Is this another deceptive lie? The entire nuclear fuel cycle creates a much larger carbon footprint than any alternative source. This should have been stated and needs to be addressed in the environmental impact statement.

I thank Madame Beaudet today for her questioning of that. We want all citizens to know that independent scientists believe there is a problem, and we urge the public to consider that where there are differing opinions, it is better to err on the side of caution. When it comes to human health, environmental health, and especially that of children, it is better to be safe than sorry.

Our recommendations.

One: In our opinion the Proponent, OPG, is unprepared and this hearing is premature. OPG has not met the criteria of the EIS Guidelines, thus we ask the joint panel review to refuse Ontario Power Generation’s application.

Two: We support the request of a non-partisan Royal Commission of Inquiry into the future of nuclear power in Canada, and ask the joint panel review to endorse this request.

We ask for a moratorium on new licences for nuclear power plants, be it for new-build or refurbishment projects or off-site transportation of nuclear wastes, and a solution to storage of nuclear wastes produced by nuclear reactors in Canada.

Three: We request that there be a full panel review and implementation of funding availability for peer-reviewed scientific epidemiological studies of populations situated in and around nuclear facilities and refineries, as well as studies of the natural environment.

Four: We'd call for an international commission of inquiry into the future of nuclear power in the world and full investigation into the Fukushima Daiichi disaster, including complete, long-term epidemiological health and environmental studies of the people of Japan.

Joint panel review, your decision will be of monumental gravity. There is no meaningful public trust because an uninformed public cannot offer this. We have no assurances. Fukushima represents the third strike of the nuclear industry. May we, the earth, bear no more.

Thank you.

MR. HASKILL: Thank you, Mr. Chairman.

That concludes our presentation and we have a hard copy for the Secretariat if so desired, or to the person that's doing the talking because I had her wound up here. I cranked her up to get in our time, so thank you again, and we'll answer any -- to the best of our ability, we may not have the answers, we're only lay people, but we'll try our best for you, sir.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Haskill, and thank you very much, Ms. Blefgen.

First of all, even with getting you slowed down, you still were within your time, but we were prepared to let you go a little longer because of the significance of what -- the message you wanted to deliver.

Before I go to my colleagues, I just want to respond to one part of your -- when you started out and you said, a lot of people felt uncomfortable to come before us and so on.

We have bent a lot of rules to

make people comfortable and to try and make people comfortable, and in every case to try and make everyone's view get on the record.

So I just hope that the way we have -- the panel has gone forward in the last three weeks here, that we have made people -- given people the opportunity not to be afraid of speaking out here and so on. That's the only point I want to make.

Mr. Haskill?

MR. HASKILL: Thank you, Mr. Chairman. My name is Sanford Haskill, for the record.

I have to agree with you 100 percent. You've been very kind to the people, but we just feel that people get a little bit scared when they've got to come here and -- yep, I mean, I'm an old hat at this, I've been going since the day you started in '99, so -- but we just felt that way, and if we offended you, we're sorry, sir, we did not mean that.

CHAIRPERSON GRAHAM: You didn't offend me, I don't give -- I have a very thick skin. The only thing -- I'd be quite happy to be up here without a tie on also and be quite natural,

but it's just we have to have some sort of forum and formality.

Anyway, we're going to get -- because we have a long agenda this afternoon. I'm going to go to Madame Beaudet first for questions to Families Against Radiation Exposure.

Madame Beaudet?

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman.

Thank you for your testimony. My question was a bit in line of what Mr. Chairman has just said.

We had other interventions also complaining about the massive amount of documents that have to be read, et cetera, and I think there are lessons to be learned here and we would like to have your input as to how we can do better next time.

MR. HASKILL: Thank you. Sanford Haskill, for the record.

If we knew, Madame, we would tell you. We're not experts. That's your job, you figure it out.

MS. BLEFGEN: May I respond?

Holly Blefgen, for the record.

I think, number one, you have to look at the whole process and the information getting out to the public. I did not see one advertisement for the hearings. I have not seen much coverage at all by the media inviting people to come here.

I checked what the capacity of this room was because I have been here, I would say, about 50 percent of this hearing to listen and to learn, but outside people, have they made the time to come? I don't think so, they're trying to make a living. And it's a hard compromise, but it does have a big effect on our future and our children's future.

So I think if it is to happen again, which I think there'll be many more, outside advertising that it's happening, outside preparation be provided to the people, and consideration given to the volume of information that we have to review and understand is another major undertaking for anybody. But those types of lessons would help.

We don't even teach nuclear science anymore in our high schools and it used to

be part of that back in the ‘70s and ‘80s, so there’s a problem, a big one.

MEMBER BEAUDET: Thank you for your comments.

Many of the aspects -- you say, you’ve been here for many sessions and you know many of the aspects we have already addressed, and I hope for health concerns, we’re trying to sort out with CNSC.

As you probably know, we asked the question to try to get a proposal of what health studies should be done because the there is -- we have taken note that there is serious concern with people regarding their health.

And one aspect that you did mention in the many things that you have raised, and I don’t think we have looked at that to the extent of other subjects, is flood protection.

I know OPG has done some research and has in the documents for the licence to prepare site, you did evaluate the danger of what can happen on Lake Ontario, like storm surge, et cetera. And you did come to the conclusion that the protection wall or whatever would be three metres high.

And I think you did consider, and correct me if I'm wrong, climate change impact, and I would like to bring to your attention by what has happened in Fukushima, do you still consider that three metres high is -- for the flood protection wall or whatever structure you're going to do -- is still sufficient?

MR. SWEETNAM: Albert Sweetnam, for the record.

The analysis that we did indicated that a three-metre wall was sufficient.

You've also heard evidence from a variety of people with regards to the seismic -- or seismic zone that the site is located in.

You've also heard evidence indicating that there is really no chance of a tsunami in Lake Ontario that would produce the sort of effects that happened in Japan.

So you are correct that the three-metre wall is adequate for the present site.

MEMBER BEAUDET: Thank you. Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: I'm just getting some direction on who the intervenors are going to be from my co-manager.

Mr. Haskill?

MR. HASKILL: Sanford Haskill.

I personally was here when Hurricane Hazel hit in 1954. My family owned a half a mile og Lake Ontario frontage. And certainly three metres is going to be very interesting with the storm surge we had that day. And I've got a real big concern. I think it should be higher.

I'm speaking as a citizen who was here when Hurricane Hazel hit us and no doubt they keep saying we're going get another one of them blows, so -- and I heard last night on TV that this is going to be a very bad year for hurricanes.

So I've got a concern about that, sir. Thank you.

CHAIRPERSON GRAHAM: Thank you, Mr. Haskill.

Madame Beaudet, did you have any other questions, or Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman.

One of the concerns raised by the FARE is the public information and awareness on the part of the public on the impacts on health and the

environment from the construction of a new nuclear generating station.

Could Ontario Power Generation outline what they've done in terms of communicating with the public in the region about the sort of consequences of having a nuclear generating station in their community?

MS. SWAMI: Laurie Swami, for the record.

OPG has had a very long history of communicating with the public in the communities that we operate in, whether it's our nuclear facilities, hydro-electric or fossil stations, and we have provided information

We have a Speakers' Bureau where we have people go out and speak with whoever may be interested in learning more about nuclear power.

We have a number of committees within the community that we facilitate their operation and provide information to them, and I'll point specifically to the Durham Nuclear Health Committee, which is a committee that the Durham Chief Medical Officer of Health sits on.

And he chairs that meeting and he chairs that with public members and some of our

staff participate in those meetings, providing information about the health studies that have taken place, our ongoing operation, and a lot of information is provided at those sessions. So we do that on a regular, on-going basis. It's not unique or different.

When we have a project such as the new nuclear project, we then enter into a fairly extensive consultation program where we have open houses and we very broadly go through the community. And I know Ms. Pawlowski talked a lot about that last night in terms of the breadth of the consultation program that we have.

We have a website that is publicly available. We have a 24/7, 1-800 number that we return calls to. And in this particular case for such a large project, we set up what we call a community kiosk in the Bowmanville Mall where we were in the community directly as opposed to having people having to come to find us.

We sat in the community. We opened that facility so anyone could drop by, visit our facility and learn more about the project, ask their questions and participate.

We also held a number of workshops

specifically on specific topics. One was on the project description, where we invited members of the public and public interest groups, including the Sierra Club and Greenpeace, to participate in those discussions so that we could get input before we even submitted the project description.

We had a similar function on health effects, which we met with the Durham Nuclear Health Committee specially to discuss the types of health concerns people might have, so that they could provide us input to our studies and make sure that we were covering all of the interests in the community.

So it was a very broad program that we had and we feel as OPG that we are out in the community extensively, making ourselves available to the public to answer any questions at a level that anyone, you know, could understand.

We send out our senior engineers and we send out people that can talk in schools, so we cover the broad range of potential avenues to communicate to people.

MEMBER PEREIRA: I heard a reference there to schools. Do you have a program to reach out to the school communities as a regular

activity?

MS. SWAMI: Laurie Swami, for the record.

That is correct. We have a program where we have set up what we call kits. They're a little program that's been set up so teachers have aids to help them in teaching about electricity and other parts and nuclear hydro-electric, all of the types of generation.

We also provide staff that can go into the classroom to assist teachers with that when we're requested to do that, and we like to do that because it gives an opportunity for some of our staff to interface directly with community members, as well as providing information to the public.

MEMBER PEREIRA: Just beyond the new project with the operation of your stations in the region, when there are incident spills, accidents, what does Ontario Power Generation do to provide information to the community and to make -- to provide access to answer questions and concerns of the public?

MS. SWAMI: Laurie Swami, for the record.

So if there is an event at our sites, there is a number of ways we communicate that information.

We typically have a media release, which is sometimes picked up by the wires, sometimes not, but it's posted on our websites.

We provide staff, again, to answer questions through phone calls. We have our normal information centres that are available to people.

Our senior executives will go to council meetings and provide an overview of the type of event that took place and answer questions in those forums.

And, of course, we will meet with anyone that may have a concern or interest to make that they understand the potential events, so that's on the public side of the communication.

As part of our regulatory requirements, we also have to report these events, whether it's to the CNSC or if a spill to the Ministry of Environment in Ontario, and all of that reporting takes place as well.

And so there is a number of different ways we report information, but our intent is to get the information to people so that

they can understand what's happening at our facility and make themselves knowledgeable and aware of the things that are taking place within our facilities.

MEMBER PEREIRA: Thank you.

And in terms of -- you are doing all of these activities to communicate to the public, how do you measure whether your communication activities are being effective and the public is, in fact, taking up on the information you're putting out there, whether it's understandable or whether they are -- they're motivated enough to come after the information or they find that it's not of interest to them?

MS. SWAMI: Laurie Swami for the record. There's a couple of different components to that question, Mr. Pereira.

The first one is how do we know we're getting the right message out? And what we typically do is when we have something new and different that we have to get out and communicate on, we will go to, for instance, the Pickering community advisory council or the Darlington planning committee. We'll take the information to them and get their feedback on the best way to

communicate it to ensure we're getting the right messages. And -- and I know specifically the Pickering community advisory committee has provided us that very specific feedback of, "That's too technical. You're not getting enough information to people," whatever it might be, so we get that direct feedback from them as we develop our communication protocols, et cetera.

The second thing you asked was how do we know we're getting to people and -- and is it an effective means of communication? And -- and we don't go out and poll to find out if people are receiving this information. We generally judge that by the reception of our programs. And so as an example, we have March break camps and this year, March break happened just -- just after the Fukushima event and we still had, you know, over a thousand children come to our facilities, meet with our staff, go through the programs that we had developed and -- and we found that through that, while we had some interest in -- in the events through questions, we didn't have a groundswell of people coming out and saying, "This is unsafe." They still came to our facilities. And we use that as a judge of whether people are understanding our

programs and are accepting of what we're communicating to them.

MEMBER PEREIRA: Thank you. I'll now turn to the CNSC. The intervenor expressed a concern about the susceptibility of our nuclear generating stations in this region to the sort of accident that occurred in Japan, in particular, a power failure due to other causes, not necessarily earthquakes or tsunamis, but the risk of a total black out of a station. How do you, as a regulator, assure yourselves that the station is protected against the type of consequences that arise from a black out of the station?

MR. HOWDEN: Barclay Howden -- Barclay Howden speaking. I'll start and then I'll ask Dave Newland to fill in.

But basically as they go through their -- go through the licensing process and they do the design, in concert with that, they -- they do safety analysis which is a combination of quite a few techniques, but the focus on it is to ensure that the defence-in-depth concept is being met because that provides the redundancy and diversity of the systems needed in case a barrier is challenged or breaks; there's other barriers there

to support it.

But I'll ask Dr. Newland to describe how we do our assessment to provide ourselves assurance that the plant, one -- a station blackout would be a very rare event, but if it did occur, what systems would be in place to allow the plant to continue for a period of time until power was restored.

DR. NEWLAND: Dave Newland for the record. I guess I would like to initially draw a distinction between -- and I think it’s important -- the -- the plants and the design of the plants for Fukushima and the existing stations and the future designs. And I think there -- there is an important distinction that allows the existing stations and any future new build designs to ride out for a certain length of time and certainly much longer than what we saw in Fukushima a station blackout event. There are natural phenomena that allow the plants, the new designs, to maintain the fuel to be cool for a number of hours, if not days, so that -- that’s the first thing that I -- that I would like to draw out.

The second thing is that for new designs, we would expect some very specific

features, backup power features, specifically to deal with station blackout events.

MEMBER PEREIRA: Thank you. Does Ontario Power Generation wish to add to that question of the risks that come with total loss of power at a station?

MR. SWEETNAM: Albert Sweetnam for the record. I'll ask Dr. Jack Vecchiarelli to answer this question.

DR. VECCHIARELLI: Jack Vecchiarelli for the record. So I would refer back to Undertaking 8, which I delivered on March 28, where I spoke about the length of time that would be available following a total loss of power. And as Dr. Newland indicated, we’re talking a matter of at least several days just from passive means alone. And as Dr. Newland mentioned, the new build designs have, in addition to the regular standby diesel generators, a dedicated set of station blackout diesel generators in the highly unlikely event that the normal standby diesel generators are not available.

MEMBER PEREIRA: Thank you. And a final question goes to OPG again and the concern on the part of the intervenors about the cost to the

taxpayer of nuclear power generation. And we had the assistant deputy minister of the province talk about that to a certain extent and quoted some prices for electricity from nuclear power as the cost charged to the customer. But are you able to comment on the total cost of nuclear to the taxpayer and assure us that we can have here -- the public here on where this project is going in terms of the risk of cost overruns and the economic challenge of building a new nuclear power station?

MR. SWEETNAM: Albert Sweetnam for the record. Basically, I understand two questions. One is the -- the actual costs of nuclear power and then the other one related to how do you deal with potential cost overruns on a new build of this sort?

The first one, as the deputy minister said earlier, the -- the LUEC price for nuclear in Ontario at the moment is about five and a half cents for a kilowatt hour for nuclear power generated by Ontario Power Generation and six cents for nuclear power generated by Bruce Power. The LUEC cost includes all the costs of nuclear including the -- the costs for decommissioning and the long-term storage of fuel waste, as well as the

operational and construction costs.

In terms of cost overruns and -- there's been a lot of -- a lot said during these hearings about cost overruns in the past. This is true, but, in particular, the -- the Darlington situation, that there were significant overruns at the Darlington plant, but when people talk generically about these sort of overruns, you actually need to look at the specifics of that project. That project was elongated by several decisions to -- to stop the project. This project was stopped twice when it was at full swing. This increased the costs significantly.

In addition to that, the holding costs of this sort of construction, this large construction, increased the interest costs significantly. During those times, you will all recall those were the times of very, very high interest rates, so the interest rate -- the interest costs went -- went up by a large amount, adding to the overruns. In addition to that, there were changes -- design changes that were required both from OPG and from the regulator, and these were the three causes of the -- the cost overruns.

The present situation is -- is

that the government is fully committed to nuclear and they're fully committed to a 50 percent baseload of nuclear. Both the current government and the opposition are committed to proceeding with nuclear. The only difference in their political positions is that the opposition would have proceeded with the project quicker than the present government. This is the only difference. So if there is a change in government in the middle of the project, we could, I think, safety anticipate that there should be no stoppage this time around.

In terms of processes that are available to the construction industry and the project management staff that operate or manage these sort of projects now, very, very different from what was available then.

The electronic age is fully upon us. The tools that are available are exotic in nature. There’s extensive experience in terms of managing multi-billion-dollar projects, multi-disciplinary projects.

In addition to that, these units would not be first of a kind. The first-of-a-kind kinks that have been experienced elsewhere in the world would be -- the lessons learned from those

projects would be incorporated into this project so that these things would be avoided.

So this gives us fairly good confidence that there would be no cost overruns.

MEMBER PEREIRA: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Okay. For the benefit of the intervenor, and I know there's been documentation, but could OPG explain if the model of the 1954 hurricane and the model of the biggest storm surges has been modelled into this proposal, this EA process?

MR. SWEETNAM: Albert Sweetnam for the record.

The modelling that we did in terms of the storm surge that would come off of Lake Ontario included a full assessment of the effects of Hurricane Hazel.

CHAIRPERSON GRAHAM: Just another comment. The intervenor had commented about ordinary people couldn't come. We have deliberately set two evenings aside last week, two evenings aside this week. We've met both Saturdays all day so that people could come that were working and then could come here.

And we have spent, so I'm told, about $12,000 on advertising over a two-year period in all the local newspapers and all of the media in this area to let them know that we were.

So I had hoped -- and also we held two information sessions, I believe, also.

So I just wanted to say that we've done our best to try and get out to the people.

Do you have a comment?

MS. COLVIN: Karen Colvin for the record.

Yeah, is this being relayed on local cable television? And why isn't it if it isn't?

CHAIRPERSON GRAHAM: We were in radio. We were on local radio. We didn't -- I don't think we advertised anything, like, in the Globe and Mail or anything national, but it was all local.

We were on -- we did it through newspapers, radio, and all the community interests.

No, I --

MS. COLVIN: No. I think you misunderstood my question.

I mean, today they have live

streaming. I know it's available on the internet, but could it not be made available on local cable television as a live event?

CHAIRPERSON GRAHAM: Oh, you mean the sessions?

MS. COLVIN: Yeah, for people who, you know, could maybe --

CHAIRPERSON GRAHAM: I don't know whether the local cable would want to -- would make much money watching us up here for three weeks at 13 hours a day.

That may have been -- that may have been offered. I imagine it could -- that's a suggestion, but it's -- I think they have other priorities that may be of more -- they might be able to do one or two or -- presentations, but to do it for three weeks, I don't that is possible, but take your suggestion and pass it along for the next time some of these are done.

MS. COLVIN: I --

CHAIRPERSON GRAHAM: But we did try and get out to as many people as possible and tried to make it as assessable as possible, like through the night sessions, Saturdays, and so on.

MS. COLVIN: Well, there's usually

a community channel. I didn't mean like a commercial channel.

CHAIRPERSON GRAHAM: No.

MS. COLVIN: But, I mean, usually there is a --

CHAIRPERSON GRAHAM: Okay. I appreciate --

MS. COLVIN: -- a community channel.

CHAIRPERSON GRAHAM: I appreciate your comments. Thank you.

MR. KELLY: Derek Kelly.

Over and above, I think that the panel has done a great job of making it accessible.

And I've been to a number of the sessions over the last couple of weeks and been very impressed as to how accommodating you've been.

I've been at other actual CNS [sic] hearings where it certainly is far more intimidating.

But over and above that, I think part of the reason -- even though you've done everything you can to get people to come out and talk, is there not a sort of -- maybe a bit of fear of reprisal that some may have for speaking ill of

a huge industry and a government that limits them to coming out and saying their piece?

I wonder if -- you know, how are those -- you know, how are those countered? I don't know, but I'm sure that there's a lot of people that would like to say things, but -- and they feel it, and they mean it, but they don't want to be ostracized for their -- for their opinions.

CHAIRPERSON GRAHAM: Well, I thank you for that observation.

We've tried -- as I -- I can't speak for everyone. We've tried to make it as friendly as possible. We've tried to make it as open as possible. We've bent the rules to try and do it in that atmosphere.

We have five or six, seven or eight oral presentations that aren't written. There are going to be people speaking from the heart, as the saying is. Whether it's pro or con, I have no idea what those are going to be this afternoon and this evening.

And we're trying to make it -- get everybody's expression.

I haven't sensed anybody concerned about reprisals at some of the interventions we've

had, and we hope that we can gather as much cross section as we can in this process.

I'm going to -- after we get done, I'm going -- I -- there's still a bit more in this process I want to do. We have questions from the floor. I go to OPG, go to CNSC, go to government agencies, and then I'm going to give Mr. Haskill the last word anyway, so if you can just wait --

MR. KELLY: I'd just like to say that if you could check out some of the websites, particularly revolving around the Pope Hope situation, and you might understand a little bit what I'm talking about.

CHAIRPERSON GRAHAM: I understand exactly, and I do sympathize with where you're coming from, but, as I say, we've tried to go that extra mile, set the bar a little higher so that people do have that chance.

Anyway, thank you very much.

I'll now go -- on the process to OPG. Do you have any questions or comments with regard to this intervention?

MR. SWEETNAM: Albert Sweetnam for the record.

No questions.

Just a quick comment that we share the Chair's opinion that we -- at OPG, we welcome the opinions that come forward in these hearings, and anything that we can learn from them, we will incorporate in the project to make sure that the project is delivered safely and on time and on budget.

CHAIRPERSON GRAHAM: Thank you.

CNSC, do you have any questions or comments?

DR. THOMPSON: Patsy Thompson.

Thank you. No, we don't.

CHAIRPERSON GRAHAM: Government departments?

I don't see any government departments, so I will go directly to the floor.

We had four. Now we have three. And I'll close it at that.

Natalia Moudrak?

I hope I've pronounced that correctly as you go to the microphone.

--- QUESTIONS BY THE PUBLIC:

MS. MOUDRAK: Hi. It's Natalia Moudrak.

And thank you for this

presentation and chance to ask you the question.

So my question is inspired by the beginning of your presentation actually.

I'm not sure who it should be directed to. Great, okay.

What are your thoughts on the fact that there were 33 nuclear accidents in the last 59 years? That's according to the International Atomic Energy Association.

Specifically, have you got any statistics on how many were due to human error?

That's it.

CHAIRPERSON GRAHAM: I think I'll direct that question to Mr. Howden. Would you like to entertain that first? Or I can go to OPG. But I'd like to get CNSC's perspective on that.

MR. HOWDEN: Barclay Howden speaking.

I don't have that information at our fingertips. We'd have to check with IEA in terms of what the breakdown is.

CHAIRPERSON GRAHAM: Mr. Sweetnam?

MR. SWEETNAM: Albert Sweetnam.

We echo the same response as the CNSC.

That information is available on their website. We don't have it at our hands at the moment.

CHAIRPERSON GRAHAM: I haven't got an answer for you, but I suggest -- and we will also go to the IAEA website and see if we can get the -- get that information for our decision making and suggest you do the same.

MS. MOUDRAK: I -- there's some discussion as to how many were, but it's not detailed per accident, so there's -- what they have is accident scale. They have accident dates up to the most recent one.

And I was hoping that the human error was considered as part of this project's proposal, especially in lieu -- in consideration of cyber attacks, which is human error -- well, human malicious intent.

So I was hoping that would the question that would actually be addressed by OPG in their preparation.

CHAIRPERSON GRAHAM: Ms. Swami?

MS. SWAMI: Laurie Swami for the record.

The question, as I understand it,

is whether or not we consider human performance as part of our analysis from a safety analysis perspective, and I'll start generally speaking about that, and if we need more information, I know that Dr. Vecchiarelli can provide a lot more detail than I can.

But when we do the safety analysis -- and we've talked a lot about the probabilistic risk assessment process we consider in that the human interface with the various processes or equipment that they need to operate, and that's taken into consideration as we do that assessment. And as part of the construction licence going forward, we will do the detailed analysis and submit that to the CNSC per the normal protocol for their review on the construction licensing phase.

CHAIRPERSON GRAHAM: Thank you very much, I'll go to the next questioner. Oh, I'm sorry, is Dr. Vecchiarelli going to -- somebody's telling me yes, somebody's telling me no. Is it no? If it's no, fine. Thank you very much. Joanna Bull.

MS. BULL: Thank you, Mr. Chair. I really appreciate FARE's perspective coming from a community that is accustomed to controversial

decisions being made without consensus, and where the fairness of the process isn't really clear. I'm wondering if FARE can speak to how this perspective informed their participation in this hearing?

CHAIRPERSON GRAHAM: Mr. Haskill.

MR. HASKILL: Thank you, Mr. Chairman. Sanford Haskill. I'll turn to Derek Kelly, he's probably better at answering this than me. Derek.

MR. KELLY: Derek Kelly. What it really boils down to is we have to have people that are going to come out and challenge, and it's very important to challenge. And we need independent people from communities to look at what we're being told by the industry, by the government, and then ask the tough questions. And that's what FARE has tried to do, is ask questions.

The other thing that FARE has tried to do is to find alternative information from independent experts and bring that to the forefront to further challenge the industry and the regulator, the government. I've got to tell you, it's a tough job to do, particularly when you're a

voluntary organization like FARE because we don't have the finances and the resources to really be able to do the PR work to let people know that we're not scary and that we're trying to do this for the benefit of our neighbours.

And so that's one of the things that FARE is still trying to learn how to do is, you know, try and look like we're being balanced and just being a clearing house of -- of information that people might not otherwise be hearing. But what we'd really like to have happen is we'd really like the information that we present and other non-governmental organizations and non-profits, environmental groups, so on and so forth, is that to have their information seriously considered through, like, proper public hearings where there's opportunity for -- or not interrogation, sorry, but the opportunity that the people that are giving the answers could cross-examined, and -- by experts.

CHAIRPERSON GRAHAM: Thank you very much. Mr. Kalevar, you are the last questioner. That's going to be for you, Mr. Haskill.

MR. KALEVAR: Thank you very much,

Mr. Chairman. This is Chait Kalevar from Just One Word, for the record. And through you, Mr. Chairman to -- I have to say that I came to hear this Port Hope presentation and I thought I'll be excited with hope, but contrary, I lost it.

Having said that, one of the things I miss in this hearing since apparently over 200 presentations and interventions or whatever call it, we haven't had a single presentation by the first responders, the police and the fire chiefs. That is a big hole in our deliberation so far, because they are the first responders, they are going to risk the most when anything happens.

CHAIRPERSON GRAHAM: Do you have a question please?

MR. KALEVAR: Yeah, the question is to the intervenors then, through you, they have talked to the mayor. I would like to know if they have talked to their police chief or fire chief?

CHAIRPERSON GRAHAM: First of all, the police -- Mr. Kalevar, when the Emergency Preparedness of Ontario were here, they did give us an overview. The fire department -- fire chief was here with another group. There were first responders here, and we have heard on that -- on

that behalf, we heard -- we had a whole presentation from Emergency Preparedness, which included that. So we have been covered, but if -- Port Hope, if the group care to respond any further, you can. And I know that in other -- at other times, fire chiefs have appeared and so on. Mr. Haskill.

MR. HASKILL: Thank you, Mr. Chairman. I can't comment on fire. We have not talked to the fire people in Port Hope. I think that was his question, and no, we have not. So thank you.

CHAIRPERSON GRAHAM: Thank you. I said that was all, but my understanding is that Fay Moore has a question, and knowing her interest in Port Hope, I'm going to permit this as the last question. Ms. Moore, the floor is yours.

MS. MOORE: Thank you, Chair Graham. I'm Fay Moore, chair of the Port Hope community health concerns committee.

I didn't follow the process fast enough to ask this question when Transport Canada was on the line, but I wanted to ask the panel if you had done an undertaking around the uranium hexafluoride cylinders traveling through Port Hope,

and the issue, first of all, of the doses of neutron and gamma radiation happening through the community and on the highways.

And then secondly the issue of blanketing as they do in the European Union. I wasn't sure if you had actually -- we had raised this during our presentation, and whether you had done an undertaking on that. I've not seen anything on the website yet. Thank you.

CHAIRPERSON GRAHAM: I think we did. Mr. Pereira, do you care to --

MEMBER PEREIRA: No, ask CNSC.

CHAIRPERSON GRAHAM: Yeah, I'll go to CNSC, Mr. Howden. I thought we had covered that, but Mr. Howden?

MR. HOWDEN: Yes, Barclay Howden, for the record. It's Undertaking No. 40 where the panel requested information on the transport of low-level radioactive waste, intermediate level radioactive waste, and the UF6 cylinders. And we provided the information that said that the requirements were to transport these -- the UF6 cylinders, which are certified cylinders that the -- under the regulations.

The dose rate on contact is 2

millisieverts per hour, and at one metre is .1 millisieverts per hour. And then we provided the information on those cylinders, the typical dose rate off -- on contact was .04 millisieverts per hour, and at one metre was .004 millisieverts per hour. Then we provided information on the neutrons as part of this dose, because this had been raised by FARE or people from Port Hope, and --

CHAIRPERSON GRAHAM: Mr. Howden, I want to interrupt you just because of time. That is under CEAR -- C-E-A-R No. 867, that's been filed and I think it's -- think that --

MR. HOWDEN: It's on the registry.

CHAIRPERSON GRAHAM: -- and that's by referring to the registry. It's on the whole response because of -- so it was under response -- Undertaking No. 40 to CNSC of 30th of March, and it was given on the 2nd of April, and it's found on the website number 867.

MS. MOORE: Thank you. And I'll assume that it includes comparison to the requirements in Europe, which have been more stringent?

CHAIRPERSON GRAHAM: We'll check it out and --

MS. MOORE: You'll check that?

CHAIRPERSON GRAHAM: -- and check that out. Thank you very much.

MS. MOORE: Thank you.

CHAIRPERSON GRAHAM: Just one little bit of information, Roger's Television have been here, apparently, every day filming. We can't tell them what to put in it. They'll cut and edit and clip and so on, but they are here. I don't know whether they're here now or not, but they've been here every day filming. So they're -- that may answer your question.

So with that, Mr. Haskill and -- thank you very much for coming. I'll give you ten seconds, 15 seconds to sum up.

MR. HASKILL: Thank you, Mr. Chairman. Sanford Haskill. I'd like to thank you again for allowing us to speak. I would also like to say that we live 22 kilometres from the Darlington site. OPG does not come into our area to talk to us very often. I would like to see that done.

And one thing further, Mr. Chairman, it is pretty close to the 10th of April. I've got a request for you, sir, and that is get

back to New Brunswick, plant the potatoes, so I can enjoy my Thanksgiving dinner. Thank you.

CHAIRPERSON GRAHAM: We'll try and do that. Thank you very much. Still a little snow on the ground there, in New Brunswick yet.

The next -- the next intervention is the Organization of CANDU Industries under PMD 11-P1.163, and PMD 11-P1.163A. And I understand we have two representatives at least from the CANDU industry, and we invite you to come forward. Marinacci and Brown, David Marinacci and Ron Brown.

(SHORT PAUSE/COURTE PAUSE)

CHAIRPERSON GRAHAM: Get your water before you start if you'd like. And you have overheads which I think they'll be assisting you on those.

--- PRESENTATION BY MR. MARINACCI:

MR. MARINACCI: My name is David Marinacci and I have with me Ron Brown from Comstock. I'd like to thank you, the panel, for allowing us to give our presentation today. My name is David Marinacci and I'm the general manager of the Organization of CANDU Industries.

The Organization of CANDU Industries is an industry association that

represents the interests of the suppliers of goods and services to the Canadian nuclear industry. OCI represents 160 companies spanning Canada's major engineering firms such as AMEC, Hatch and SNC Lavalin and construction -- constructors and large-scale fabricators such as Aecon, Babcock & Wilcox, Black & McDonald, Comstock and E.S. Fox to the many small and medium providers, logistics operators and even nut and bolt manufacturers that make up the Canadian nuclear industry.

These companies provide goods and services to the nuclear industry and employ over 30,000 people. For the most part the jobs provided by the Canadian nuclear industry are highly-skilled and well-paying.

Today my presentation will cover the -- a number of topics, the performance of Ontario Power Generation’s nuclear fleet; socio-economic benefits of the Darlington project, greenhouse gas emissions that are avoided, environmental benefits of the high energy density uranium fuel, impact of generating technology on land requirements, and then I’ll provide some summary and conclusions.

On OPG’s performance record,

Ontario Power Generation and before it, Ontario Hydro, has owned and operated CANDU plants for over 42 years. Ontario Power is a pioneer in the development, construction and operation of commercial nuclear power plants and is recognized as a world leader.

Ontario Power's performance and operational record for the Darlington station are particularly relevant to this application. The Darlington station produces 20 percent of Ontario's electricity and is a world-class award winning performer. In 2008 three Darlington plants were ranked first, second and third in the world for unit capacity factor. In addition, one of the Pickering plants was ranked fifth.

Unit capacity factors at Darlington are routinely above 98 percent. It should also be noted that while CANDUs only represent ten percent of the world's reactors, they are routinely ranked as top performers in capacity factor which is a major indicator of OPG's operating excellence and the strength of the Canadian technology.

The Organization of CANDU Industries represents a vast number of engineering,

construction and fabricating companies who have worked on and with Ontario Power Generation sites for over 40 years. OCI members are experts in all aspects of construction, fabrication and nuclear technology.

Over this period, our members have worked closely with OPG and the nuclear regulators and are confident in their track record and ability to operate a new plant safely and efficiently, while meeting all environmental regulations. In fact, OPG has an exemplary operation safety and environmental record and regularly wins awards for this.

As you can see from this slide, there are a number of awards that Darlington station has won in both environmental and health and safety in addition to performance. Socio-economic benefits. Construction of the new Darlington reactors will have a significant impact on the local economy as well as a major impact on the Canadian nuclear industry and Ontario's GDP. Over the next 60 years there will be significant direct and indirect economic benefits generated from building and operating this new plants.

If approved, these nuclear plants

will be the first to be built in Canada since Darlington was completed in 1993, almost 20 years ago. These plants would act as a catalyst to rejuvenate the nuclear industry and revitalize the Canadian nuclear supply chain creating thousands of high-paying jobs locally and across Ontario. They would also help to position Canada's nuclear industry to seize additional domestic and global opportunities.

Supporting this industry requires the collective efforts of many stakeholders in the Ontario economy, for instance, our high schools, colleges and universities would be called upon to prepare and train the highly-technical workforce. Trades of all kinds would be needed requiring recruitment, training and apprenticeship programs. Engineering, construction and manufacturing companies would require engineers, technologists, technicians, planners, machinists, fitters, electricians, all of this activity trickles down into the local economies who service the workforce and their families with food, housing, cars and entertainment.

According to the Canadian Nuclear Association, nuclear energy is already a $6.6

billion a year industry, generating $1.5 billion in federal and provincial revenues through taxes. Over 70,000 jobs are driven by the industry. In addition, 150 firms reported over 1.2 billion in exports. This project would have a major impact and significantly grow these numbers, and along with them, the Canadian economy.

The benefits to the local community are also exceptional. This slide highlights the significant economic benefits that I already highlighted in the environmental impact statement so I'll not go over them now. But as you can see they're very significant.

Although the environmental impact statement is technology neutral, there would be significantly greater socio-economic benefits generated for Ontario and the region if domestic technology was selected over foreign. This was detailed in a 2009 report prepared by the Conference Board of Canada entitled, *"The Economic Impact of New Nuclear Investments in Canada."* This report evaluated the economic benefit of building CANDUs in Ontario versus foreign designs. It also drew conclusions around building the CANDU in Ontario, it would kick start the entire Canadian

nuclear industry and create billions of dollars in incremental GDP for Ontario.

In summary, building CANDU reactors would result in 24,000 more person years of employment than foreign designs. Building CANDUs in Ontario and successfully exporting reactors would create an incremental benefit of 187,372 person years of employment. The impact of exports would contribute between 34 and $55 billion in gross domestic product to the economy. Building CANDUs in Ontario and exporting reactors as described in the report, would result in almost 500,000 person years of employment between 2009 and 2030. Unfortunately, delays in the project have shifted this time line.

Greenhouse gas emissions. As international pressure increases on countries to reduce greenhouse gases and curb global warming, it has become increasingly clear that nuclear power is one of the only low-cost emission free energy sources available to countries in sufficient quantities to meet the growing energy demands. Even oil-rich Saudi Arabia is moving -- is turning to nuclear power to conserve their fossil fuel reserves, reduce carbon emissions while meeting

their increase in power requirements demanded by a growing economy.

Nuclear power does not emit carbon dioxide, nitrous oxides or sulphur dioxide because there is no combustion, there are no emissions and therefore Ontario’s nuclear power reactors generate over 50 percent of Ontario’s electricity and emit no global warming smog or acid rain gases. According to the Canadian Nuclear Association, if electricity produced by Canada's nuclear power plants were generated by coal, there would be an additional 90 million tons of carbon dioxide emitted into our atmosphere each year. Canada's emissions of nitrous oxides and sulphur dioxide would also increase by 10 ten percent, adding to smog and acid rain.

All countries with significant nuclear power and hydroelectric capacity has significantly lower CO2 emissions than countries relying on fossil fuels.

France, for example, has lowered its CO2 emissions by more than 80 percent over the past 30 years.

We must also not lose sight of the fact nuclear plays a crucial role in delivering the

province's emission-free base load energy. This is becoming increasingly critical as Ontario shutters its coal-fire stations and brings online additional solar and wind-generating assets.

While those solar and wind produce environmentally friendly power, it is intermittent and costly when compared with nuclear. This is detailed in the Ontario Power Authority's Integrated Power System Plan.

In addition, solar and wind cannot be relied on for base load generation and require construction and operation of alternative backup assets.

The OPA has selected gas-fired stations for this purpose, however, they produce approximately 50 percent of the greenhouse gas emissions generated by coal stations.

The cumulative environmental impact of building, fueling and operating gas-fired stations, along with their carbon emissions, must be weighed against adding additional nuclear capacity.

I'm going to talk about the environmental benefits of high-energy density fuels. Nuclear power plants use uranium, an

extremely high-energy density fuel. This high-energy density characteristic has many environmental advantages over lower density fuels.

The International Atomic Energy Association undertook comprehensive evaluations of fossil fuels, nuclear power and renewable energy sources and compared a wide variety of significant issues and impacts linked to energy options.

A report determined that direct emissions to the environment are normally the main focus in environmental studies. However, it concluded that there were many other significant impacts, such as depletion of natural resources and large fuel and transportation requirements.

These secondary considerations include occupational and public safety, as well as environmental impacts on national transport systems, and influence a wide variety of environmental concerns.

Ultimately, the energy density has a direct relationship on the size of the industry’s operations; mining, transportation requirements and quantities of environmental releases and wastes.

In essence, the energy density of fuels affects the quantity required to produce a

fixed amount of energy and hence uranium has a significant environmental benefit over fossil fuels.

Comparing the environmental impacts of mining, processing and transportation, as well as the land requirements for these fuels, is very revealing.

Let’s look at the comparative electricity generated for one kilogram of fuel. One kilogram of coal produces three kilowatts of electricity. One kilogram of oil produces four kilowatts, while one kilogram of uranium produces 50,000 kilowatts of electricity, and with new processing, this could increase to 3.5 million kilowatts.

Now, let’s compare the annual fuel requirements for a 1,000 megawatt plant. A 1,000 megawatt coal plant requires 2.6 million tonnes of coal, which is equal to 2,000 train cars at approximately 1,300 tonne each.

A 1,000 megawatt oil-fired plant requires 2 million tons of oil, which is equal to 10 super tankers. And then a 1,000 megawatt nuclear plant requires about 30 tonnes of uranium, which translates into about 10 cubic metres.

Finally, let’s compare land requirements for a 1,000 megawatt plant. A 1,000 megawatt fuel or nuclear -- fossil or nuclear plant requires 1 to 4 square kilometres of land.

A 1,000 megawatt solar, thermal or photovoltaic park requires approximately 20 to 50 square kilometres of land, which is equivalent to the area of a small city.

A 1,000 megawatt wind farm requires approximately 50 to 150 square kilometres of land.

And then a 1,000 megawatt biomass plant requires a plantation of between 4,000 and 6,000 square kilometres to feed it, which is approximately the size of Prince Edward Island.

As you can see, there are significant local, regional and global environmental benefits from the reduced amount of mining, transportation and land use requirements for nuclear plants built compared to other fuel types.

The environmental footprint of land -- footprint of land impacted by nuclear plant is small when compared to a solar wind farm capable of producing the same energy output.

A nuclear plant generates an average output of about 90 percent of its installed capacity. This varies by comparison, the solar wind farm produces, on average, energy output of between 13 and 25 percent of their installed capacities.

Therefore the installed capacity of a solar and wind farm must be substantially larger than a nuclear one to produce an average output equal to it. In addition, generating power only when the sun shines or the wind blows also requires a means to store it until it is needed.

The feasibility and environmental impact of electricity storage has not been addressed in this paper. For this analysis we are simply assuming it’s possible.

The proposed 4,800 megawatt Darlington Station with a 90 percent capacity factor will produce on average an output of 4,320 megawatts. According to the Environmental Impact Statement, the proposed new station will only require development of an additional 1.6 kilometres of the existing 4.8 square kilometre site.

To replace the nuclear stations average output by solar, a solar farm with a

13.5 percent capacity factor would require an installed capacity of 32,000 megawatts and a means to store this energy. Using information contained in the IAE report, a solar farm of this size would require about 1,100 square kilometres of land.

To replace the nuclear station's average output by a wind farm with a 25 percent capacity factor, requires an installed capacity factor of 17,200 megawatts and a means to store the energy. Using information, again, contained in the IAE report, a wind farm of this size would require about 2,592 square kilometres of land.

However, the land requirements for a wind farm is impacted by its location and surroundings. The larger the wind farm is, the more it will infringe on streams, rivers, valleys, homes, roads, transmission lines, et cetera.

Based on an analysis of the Enbridge Ontario Wind Farm in Bruce County, a 1,000 megawatt wind farm actually requires 309 square kilometres.

Based on this real-life example, the 17,200 megawatt farm would likely cover an area of up to 5,300 square kilometres.

I prepared a diagram just to

demonstrate the size of this, and you'll see here that the diagram visually compares and demonstrates the land requirements for nuclear, solar and wind.

The Darlington Nuclear Plant requires the development of that 1.6 square kilometres, which is that red dot there on the site.

An equivalent solar farm would require 1,100 square kilometres of land or a semicircle with a diameter of 54 kilometres, and that's the red line.

An equivalent wind farm would require somewhere between 2,952 to 5,330 square kilometres or a semicircle of land with a diameter between 80 to 160 kilometres. As you can see, there is an enormous difference in land.

In summary, the Organization of CANDU Industries strongly supports the Proponent's Environmental Impact Statement for the Darlington Project on the basis that a new reactor will ensure Canadians benefit from the socio-economic and environmental benefits generated from that for over 60 years.

OCI is satisfied that the Environmental Impact Statement is comprehensive.

It identifies all potential environmental concerns the project will have and that -- and that they have all been or are in the process of being addressed.

OCI believes that Ontario Power Generation's safety, operational and environmental leadership, as well as its 40-year track record and recognition as a world leader in nuclear operations, indicate that it can be counted on to operate the proposed plants efficiently and safely while meeting all environmental standards.

Construction of the new Darlington reactors will have a significant impact on the local economy as well as a major impact on the Canadian nuclear industry and Ontario's GDP.

Over the next 60 years, there will be significant direct and indirect economic benefits generated from building and operating these new plants, and this would enable Canada's nuclear industry to take advantage of the global nuclear renaissance.

Approval of this project is essential for Ontario to reduce emissions and comply with international obligations while meeting increasing energy demands.

Canada’s nuclear plants already avoid production of 90 tonnes of carbon dioxide and reduce nitrous oxides and sulphur dioxide by 10 percent. Approval of these plants will avoid the emissions and negative environmental impacts of other forms of energy production, those that would be needed to replace it should this project not go ahead.

The use of high energy density uranium fuel has a direct relationship on the size of the industry’s operation, mining and transport requirements and, along with it, the quantities of environmental releases and wastes produced.

The proposed four-unit Darlington station requires only 1.6 kilometres of land compared to 1,100 square kilometres for solar and between 2,590 and 5,300 square kilometres for wind.

In conclusion, the Organization of CANDU Industries supports the proponents’ environmental impact statement for all of the reasons stated and the fact that a new station will ensure Canadians continue to benefit from them for 60 years. The Organization of CANDU Industries recognizes and respects the need for the review panel to be thorough; however, we encourage it to

take -- make the decision as quickly as possible. The sooner this project is approved, the sooner Ontario and Canada can take advantage of the vast socioeconomic and environmental benefits it will create. Thank you.

CHAIRPERSON GRAHAM: Thank you very much for your presentation. The floor is now open to the panel -- or not the floor, but the panel -- is now open to panel members and we'll start off with Mr. Pereira.

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you, Mr. Chairman.

Thank you for your very interesting presentation. I note that you're talking primarily about CANDU and -- but the benefits of nuclear power.

One of the challenges that we have to address in this environmental assessment is the question of sustainable development. Have you got any comments on that aspect with respect to the development of the nuclear industry and the continued construction of nuclear generating stations?

MR. MARINACCI: Dave Marinacci for

the record. I haven't really considered that. I mean we believe nuclear power is a sustainable energy program.

MEMBER PEREIRA: In particular, one of the principles of sustainable development is benefit for the current generation without leaving undue legacies for future generations and clearly here the challenge of long-term management of waste arises.

MR. MARINACCI: Well, the Organization of CANDU Industries believes that the management of CANDU's waste is, I guess, being handled in a very proper way through the Nuclear Waste Management Organization. You know, it's a federal organization set up to manage it. And all the utilities, as well as AECL, are investing money in that to manage that waste.

I would also have to say we also look at -- you know, we talk about nuclear waste, but it is really spent fuel that we're talking about and a lot of that spent fuel could be used as fuel for future generations, so the amount of energy that could be recovered in the future is -- is substantial.

MEMBER PEREIRA: Thank you. Thank

you, Mr. Chairman.

CHAIRPERSON GRAHAM: Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

I'd like to go a little bit over the interesting figures you have proposed here. We had a lot of interventions, as you probably know, suggesting to phase out nuclear power with solar and wind. And I was wondering -- I think this is on page 11 of your presentation -- what utilization factor -- because my preliminary calculations would be that we need 12,000 megawatt of windmill power. You have slightly a higher figure which is still a lot of land of shore area needed, but I was just trying to understand how you came to 17,200 megawatts on page 11, last paragraph?

MR. BROWN: Ron Brown with -- I'm an OCI member -- or represent an OCI member. I assisted David with some of these calculations.

And basically the -- the mathematics of it is that -- that the wind doesn't blow all the time, so you have -- if the wind is too low, the wind turbine won't turn. If the wind is too high, it won't turn either to protect it.

So if you have an installed capacity of 17,200 megawatts, you can only count on 25 percent of that installed capacity as an average amount of power that you get from them. So that would bring it -- the 17,000 down in line with -- with the power that you would get from the Darlington plant at its 90 percent capacity factor, so we tried to work from what capacity factor the Darlington plant would have times its installed capacity to get a reliable amount of energy that you could get from Darlington. And then compared that reliable amount of energy to both wind and solar at -- at the expected capacity factor from -- from the different technologies.

On solar, we looked at information on various capacity factors for solar. And in -- in Germany, it was 11 percent. It's a cloudy kind of country. In -- in New England, it was between 12 and 15 percent. And in Arizona, it would be 19 percent where you get a longer, stronger sun. So we used an average of the New England range of 12 to 15 and we used thirteen and a half percent on -- on solar to -- to do our calculations and that's -- that's the basis we went forward on.

MEMBER BEAUDET: Because I was

referring more to wind. Usually it's between 32.6, 33 percent in -- in Quebec anyway. Some wind farms don't do better than that, others do like 55 percent depending on -- on the location and so I was trying to look if you've taken an average or --

MR. BROWN: This is from IAEA, you know, published -- go ahead.

MR. MARINACCI: Yeah, Dave Marinacci for the record. Yeah, we took the published information from the IAEA, but if you look at the Ontario Integrated Power Authority's plan, I think the maximum is 33 percent you can get in Ontario. I think on average, it's more like between 20 and 30, so, yeah, you can use 25 to 30, but it's not any higher than that.

MEMBER BEAUDET: Thank you. The other point is on page 10, you talk of biomass plantations. Do you mean for biofuel because usually biomass -- I mean this is a new concept to have biomass plantations. Usually, you use wood shavings, whatever, fallen trees and -- when you -- you do projects, et cetera, but to have specifically plantations, I'd like to hear more about that.

MR. MARINACCI: Okay. This again

is from the IAEA report on -- on nuclear sustainability actually. And actually in the presentation that I sent, the -- the formal document, it has all the references to the -- to those sources, so you can go on the internet and find that report and it's quite interesting. It talks about the biomass and what it would take in terms of -- so those numbers came from that number. All we did was multiply it times the 4,300 equivalent megawatts that was being produced by Darlington.

MEMBER BEAUDET: Thank you. Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you, Madame Beaudet. We'll now go to the floor and I go, first of all, to OPG. Do you have any questions to OCI?

MR. SWEETNAM: Albert Sweetnam. No questions, but just a quick comment on the biomass.

Yes, biomass plantations are required if you're converting, for instance, a coal plant to biomass because of the -- the volume of material that is required. Just through wood shavings and fallen trees is by no means enough and

actually OPG had run a -- an RFP for -- to supply biomass recently and we're still reviewing the results of that.

MEMBER BEAUDET: I believe in some countries they plant eucalyptus trees that grow very fast, but I'm trying to look in the Canadian context more than worldwide here. Thank you.

CHAIRPERSON GRAHAM: Yes, and I can add that in places like Sweden, they take all of the rest of the biomass out of the wood, the limbs and everything else, after they do the harvesting and there is a considerable amount. And there are some biomass projects in New Brunswick in which the pulp and paper industry are using the waste wood, so it's -- and that's just from existing growing of trees.

CNSC, do you have any questions?

DR. THOMPSON: Patsy Thompson.

No, thank you, we don't.

CHAIRPERSON GRAHAM: And I'll go to the floor, and I understand I have four questions or at least four questions.

Raymond Leistner? Mr. Leistner, do you want take the -- go the mic, please?

--- QUESTIONS BY THE PUBLIC:

MR. LEISTNER: This is Raymond Leistner.

There was mention of capacity utilization factor of 90 percent for a nuclear reactor.

Now, let's assume that the price of retail electricity continues to rise and the price of photovoltaic panels on the rooftop, which require no transmission lines by the way, continues to fall, leading to a proliferation of photovoltaic panels.

And on certain sunny days of the year, the demand on the grid may drop to zero leading to no utilization of the electricity produced by the reactors; maybe two to three weeks out of the year, at noon for a few hours.

Will this -- how will this affect the capacity utilization calculations in the future as this solar cell technology gets cheaper and cheaper, and how will the reactors respond to a no-load condition, which may occur more frequently in the future?

CHAIRPERSON GRAHAM: I'll first of all go to Mr. Sweetnam with regard to no load. You did some explaining the other day about certain

aspects of being -- of meeting requirements and peak requirements and so on.

Perhaps you'd like to attempt to answer that?

MR. SWEETNAM: Albert Sweetnam, for the record.

The intervenor is mixing two concepts here. A capacity factor for reactor basically is the efficiency of that reactor, i.e. how long does it stay online when you look across a year's production. And as the presenter had said, good nuclear reactors are in the 90 percent range or thereabouts.

In terms of the actual load following, as we indicated, the RFP that is out there for the new nuclear reactors require the reactor design to be able ramp down, and then ramp back up on a regular basis.

And the reason that Ontario is insisting on this is because of the introduction of renewables into the mix as we know that the renewables actually come off line quite quickly if the wind stops or when the sun goes down. And as a result, in the future it will be required for these reactors to be able to achieve ramping up and

ramping down, and this is being planned in the procurement.

Thank you.

CHAIRPERSON GRAHAM: Thank you, Mr. Sweetnam. Thank you for your question.

Mr. Kalevar?

MR. KALEVAR: Thank you, Mr. Chairman. Chait Kalevar for Just One Word.

I really enjoyed your presentation. It makes it very clear that firstly, as I see it, the solar and wind and biomass product, all that requires a lot of area, right? And nuclear is very risky and costly and so on.

Is it not time to think of how we can use less energy? I mean, do we have to be always going the energy intensive route or energy conservation route? It's time to make that decision. I mean, today, just look at this hall, if I may ask ---

CHAIRPERSON GRAHAM: Mr. Kalevar, a question, please.

MR. KALEVAR: Yeah, it's a question.

CHAIRPERSON GRAHAM: Okay. You've got your question, you're talking about

conservation. Would the ---

MR. KALEVAR: No, no, my question is coming. I'm saying, would you support some sunlight in this roof rather than these lights here?

CHAIRPERSON GRAHAM: Mr. Kalevar, thank you. Would you like to answer Mr. Kalevar's question?

MR. MARINACCI: The question. Well, I think we support all types of energy production, including saving energy. So I think we all agree that there is room in the mix for all types of energy production, and we also know conservation is a major part of that, so I think our support his concept.

CHAIRPERSON GRAHAM: Thank you very much.

Mr. Cameron, Ian Cameron.

MR. CAMERON: My first question will be directed to the CANDU associates. What is your opinion of the CANDU export fallout?

CHAIRPERSON GRAHAM: The question is to the Chair, and I'll direct it, okay?

MR. CAMERON: Oh, sorry.

CHAIRPERSON GRAHAM: And I'll

direct that to the group.

MR. MARINACCI: He wanted to know what the potential of exports were?

MR. CAMERON: I can provide a preamble to that, maybe that would be ---

CHAIRPERSON GRAHAM: A very short one because we have seven more on the agenda this afternoon before supper, and I'll allow one question each.

So your short preamble and your question, please.

MR. CAMERON: All right. The short preamble is:

> "The financial salvation promised through CANDU exports has been a fallout."

This is being relayed from an article which I'll provide in a second:

> "An example of this would be that only 3 reactors have been sold since 1996. Only 3 percent of the world's market of nuclear reactors are Canadian reactors."

Also ---

CHAIRPERSON GRAHAM: I think that's enough preamble.

MR. CAMERON: There's a bit more.

CHAIRPERSON GRAHAM: What's the question? Your question?

MR. CAMERON: So what is your opinion of the CANDU export fallout?

MR. MARINACCI: Well, the Canadian -- the Organization of CANDU Industries sees the future prospects of exports of Canadian reactors to be quite substantial.

Your statistics are slightly off. Since 1991, there have been many reactors, three in Korea, four -- two in China, two in Romania.

In terms of future exports, the CANDU is particularly good at building -- burning waste fuels. It has a small -- it's good for smaller grids, so we see that as quite an opportunity for CANDU exports.

CHAIRPERSON GRAHAM: Thank you. Rachelle Sauvé, please?

MS. SAUVÉ: Hello. I'll try to be very brief.

I, like very many people, am incredibly concerned about the uranium fuel cycle

and the fact that a lot of folks who work in the nuclear industry tend to want to piecemeal and just kind of talk about their little part of things.

So I guess this is a question through you, Chair, to all parties sitting today, of whether or not the industry -- whether that's CANDU, OPG or the CNSC -- has any obligation when reporting things like ecological footprint or numbers associated to emissions, to take into factor the ecological footprint of what came before they got that nice little pellet?

Thank you.

CHAIRPERSON GRAHAM: Thank you for your question.

I'm going to refer you -- you're the intervenor today, I'd like you to try and answer that, please?

MR. MARINACCI: Well, I mean, probably CNSC should answer this, but in a sense -- essence -- the total footprint of the entire nuclear industry is taken care of as far as we can see. It's managed.

CHAIRPERSON GRAHAM: I'll take that as a non-answer.

Mr. Howden, would you care to --

or Dr. Thompson.

DR. THOMPSON: Thank you. Patsy Thompson, for the record.

What I would offer is that the CNSC licences, all elements of the uranium fuel cycle including production of power and waste management, but on the Canadian Environmental Assessment perspective, the assessment required under that legislation is the assessment of a specific project, and under CEAA lifecycle, assessments are not done.

CHAIRPERSON GRAHAM: Thank you.

And with that, I'd like to thank the intervenors today for coming and giving us their views and their intervention and, as always, the panel takes every intervention seriously.

We now will go to some oral statements. Remind everyone in the oral statements that they are to be 10 minutes or less and there are no questions from the floor on oral statements.

And the first oral statement that I have is Darlene Buckingham.

Oh, I'm sorry, did I miss a question? Just have a seat, gentlemen. I'm sorry. Our Blackberries don't work as quickly as they

should. So if you'd identify yourself and ask your question, please?

MS. MOUDRAK: Yes. My name is Marina Moudrak. I am member of public and I would like to thank you, Mr. Chairman, for getting me opportunity to ask my question.

The presentation we just heard missed one of the very important issues. Darlington nuclear plant, as many other nuclear plants around the world have software-based shutdown system with a long list of confirmed problems with computer-based system and other problems.

In July 2010, the computer worm named Stuxnet effectively infiltrated the control system of a uranium enrichment plant in Iran, Bahrain -- Bushehr, sorry.

And now we know after experts analyzed the Stuxnet worm that this is the kind of generic attack against control systems that compromise critical data and cause catastrophic malfunction of critical systems, including the software-based shutdown system as Darlington plant nuclear station operates right now.

So my question is, how do you plan

to gain access to a nuclear reactor core under such cyber attack?

CHAIRPERSON GRAHAM: I'm going to answer that. It came to the Chair.

That has been debated, and there's Undertaking Number 54. I don't know whether we've got it yet or not.

And it's regarding exactly the questions you're asking, which the panel has asked for.

And also as far as attacks that -- as I said before, anything to do with security has to be done in camera and we will be doing that at a later date as -- because of the security reasons.

But the Undertaking 54, I think it was. It's completed and it's under which in the -- what's the name of it?

Someone give me the reference number on the ---

MR. NEWLAND: Dave Newland, for the record.

Number 53.

CHAIRPERSON GRAHAM: Fifty-three (53) then. And what's the reference number on the site? Has there been one given yet in filing it?

MR. NEWLAND: It was this morning.

CHAIRPERSON GRAHAM: Oh, just this morning.

That answer will be filed and be on the registry within the next day or so.

MS. MOUDRAK: But ---

CHAIRPERSON GRAHAM: Thank you very much.

MS. MOUDRAK: Yes. But I'm speaking not about the security, speaking of cameras and so on. I'm speaking about the security of the software system.

CHAIRPERSON GRAHAM: That's what we talked about, was the software, and that Undertaking 53 is regarding software and all the related questions that came out of that intervention. That was about three days ago or four days ago.

And as I said, security issues around that will be dealt with separately in an in camera session.

But, yes, your question has been addressed, I believe.

And I would suggest since it was just answered today, probably by tomorrow it will

be on the registry.

MS. MOUDRAK: Okay.

CHAIRPERSON GRAHAM: Thank you very much.

MS. MOUDRAK: Thank you.

CHAIRPERSON GRAHAM: Now, thank you very much, gentlemen, again, for your coming here this afternoon.

And I ask Darlene Buckingham to take the mic for her -- or to come up to make her presentation, please -- or it's not a presentation, it's an oral statement.

Ms. Buckingham?

--- PRESENTATION BY MS. BUCKINGHAM:

MS. BUCKINGHAM: Okay. For the record, my name is Darlene Buckingham.

Mr. Chair, Madame Beaudet, Mr. Pereira and fellow intervenors, I am here today to share my experience with uranium mining and the nuclear industry and to sincerely ask, based on the detrimental impacts of the use of nuclear energy to our environment and thus to our health, that the panel recommend the proposed new build nuclear reactors at Darlington be rejected as environmentally unsafe.

This is difficult for me. Okay.

When I moved to Tory Hill from Pickering in 2006, it was with great anticipation to experience clean air, clean water, to learn how to grow food, and to pursue my artistic career inspired by the beauty of Haliburton County.

In January of 2008, I read an article in the community newspaper about the upcoming drilling and exploration for uranium right around the corner from where I live with the intention of an open-pit uranium mine.

I then spent hundreds of hours researching and learning about uranium and nuclear energy and, sad to say, nuclear accidents, DU weapons and the atomic bomb.

I went to many public meetings and talked to hundreds of people about nuclear energy from cradle to grave and learned that those who are well informed have no desire to power their home by nuclear energy due to the dangers, the costs, and the degradation of our environment.

Nuclear energy all begins with uranium mining -- or mining uranium.

As I’ve learned, uranium is unstable, radioactive, and much more chemically

toxic to organic life once released from the ground it is found in.

When driving around Haliburton County, I had passed uranium tailing ponds and abandoned uranium mines without knowing they were there.

In less than 30 years, historic radioactive waste has become hidden to the public, so the ball has already been dropped with nuclear waste management.

When I first laid eyes on the bright yellow sign leading to the abandoned mines hidden among the trees and read, “Danger Radiation”, I was horrified.

When I walked across the dam that held uranium tailings, I could not believe that we as humans are using a substance that contaminates the environment for hundreds of thousands of years.

I don’t know why I’m so emotional. I didn’t think I’d be so emotional, but anyway ---

CHAIRPERSON GRAHAM: That’s quite all right. Take your time.

MS. BUCKINGHAM: And that we could no longer enjoy these areas without becoming sick and/or dying.

I easily gained access to the tailing pond, and not one radioactive danger sign was to be found.

I also explored the Cardiff Uranium Mine two K's from my home. There were still remnants of the abandoned uranium mine and unsafe 70-foot shaft tower whose wood foundations had rotted and a large metal tank the size of a small house that was removed in 2009 only after public outcry.

So since January of 2008 until present, I have personally written copious letters and had countless conversations with government agencies, including Health Canada, MoE, MNR, Ministry of Northern Development, as well as CNSC, and the local health unit.

I was shocked and dismayed by the lack of knowledge in dealing with the health concerns of the public with regards to radioactive and chemically toxic substances in water, air, and soil.

I was unable to get good information on where to test for uranium and water and radon gas and had to go to fellow community members to find out what to do.

FUME, a community group against uranium mining, organized neighbourhood water sampling using Accutest Labs, and this was how I learned there was high levels of uranium in my well.

I purchased a radon detector from the U.S. There was not a home-use radon detector to be found in Canada.

Without testing, we had no idea we were drinking uranium and breathing in radon gas.

Uranium and the -- uranium are colourless, odourless and tasteless, making them even more dangerous as there are no warnings.

Damage by ionizing radiation to our DNA happens at a quantum level, so we can't see it. But it doesn't mean that damage is not happening, and results in cancers, genetic defects, and sterility.

On January 25th, 2011 on the front page of our community paper, the headline was, "Lung Cancer Rates Higher than Average". The article went on to describe that lung cancer rates were higher even with less people smoking, but more people chewing spit tobacco.

There was no mention of radon gas

as a contributor to the high rates of lung cancer, even though radon gas is the second-leading cause of lung cancer.

On Friday, March 25th, 2011, my neighbour that lived across the street was buried; the cause of death lung cancer. And she did not smoke or chew tobacco.

How is Health Canada and CNSC not addressing this obvious public health issue?

I have copies of letters that environmental -- Environment Haliburton wrote on October 2nd, 2008 to our health unit asking for groundwater studies prior to drilling as well as health impact studies.

Minister Gravelle of Northern Mines said there was no jurisdiction as there was no mine application.

We received no reply from CNSC.

Yet here in 2011, the health unit did a study about lung cancer without looking at radon gas after telling us that they had neither the mandate nor the resources to conduct such a study.

Nuclear waste and health issues are hot potatoes.

To protect ourselves because nobody else is, we did the research. We purchased a five-stage reverse osmosis water filter, we've entered our crawlspace, we regularly do heavy-metal cleanses and then eat foods from a radiation-protection diet. I share this information with everyone I can.

Many people do not have the time to understand the complexities of uranium and nuclear energy and the nuclear energy is not being proactive in providing information about the health impacts of radioactive material. It's us putting the public at unacceptable risk. To continue to say that radioactive isotopes of uranium have no health impacts is ill informed and is why many people are so angry. We know the industry is harming us through experience and the OPG and the CNSC continue to tell us that they are doing no harm. That's not acknowledging real health issues, nor giving credence to any studies that demonstrate correlation between health and radioactive exposures.

Another word I learned about is NIMBY when I began to speak up about the danger of an open-pit uranium mine being located in our

community; not in my backyard. I'm here to say that what is dangerous and bad for my health is dangerous and bad for everybody's health and even more so for our children's and our grandchildren's health. Am I supposed to say that it is dangerous for me to mine for uranium, but it's okay to mine for uranium in Africa or in Australia or that it's okay for many First Nations people to mine uranium in Saskatchewan for our nuclear energy in Ontario? I think not.

The isotopes released by the nuclear industry are not safe for any of us and many are speaking about the dangers of nuclear energy for all of us including everybody who is in the room now. The health of our environment determines our health. We, as human beings, are only as healthy as the water we drink, the air we breathe and the food we eat.

What is going to be the impact to the world after the accident at Fukushima? Iodine 131 has already reached the shores of Lake Huron from Fukushima and we are told it is in safe doses. I question this, as I have learned that environmental and health impacts are minimized.

Let's again return to uranium

mining. After millions of tons of rocks that contain uranium have been blown to bits to extract uranium leaving millions of tons of radioactive and chemically toxic tailings behind, they find their ways into aquifers in the vicinity of the uranium mines and contaminate community wells. I know that 75 percent of the wells tested on Eels Lake that is downstream from the Dyno Uranium Mine are contaminated.

I know of a mother with three children suffering from ill health that through hair analysis show dangerous levels of uranium in their body. Many do not want to speak about this due to denial, stigma and fear of property depreciation.

Uranium found in gravel found its way into people's homes and driveways. Ask the people in Cardiff about the millions of dollars that had to be spent to remediate their homes because radioactive gravel had been used and it was only a partial remediation. The report Radioactive and Toxic Wastes from the Bancroft Uranium Mines: Where are We Going? Who is in Charge? CAIRS Report, Stage 2, prepared by the Canadian Institute for Radiation Safety, May 1st, 1987 was commissioned

and paid for by the Potash Lake Association to deal with all the toxic waste that had been dumped and abandoned by uranium mining in the area as nobody took responsibility. Only due to public pressure was anything done to clean up the mess and it is still a mess. Radioactive isotopes do not go away. Thirty (30) years later it is only because of the work of Environment Halliburton to have the public school test in Cardiff for radon gas at the school is being monitored and has found levels that are dangerous to the health of the children and will continue monitoring.

We also know radioactive metals are finding their way back into consumer products. I wonder what is going to happen as radioactive isotopes of uranium travel around the globe from Japan and if we will be told the truth. Nuclear waste management is riddled with problems and we, the public, are always left to fend for ourselves.

I will now speak to the misinformation given to the public that nuclear energy is clean as it does not release CO2. Since when does the definition of clean mean no greenhouse gas emissions? This is a greenwash (sic), of course, to portray it has Carbon 0 energy

sources. This is, of course, absurd considering the amount of fossil fuel needed when analyzing carbon emissions from cradle to grave.

Saying nuclear energy is clean is misleading the public and not allowing them to make an informed decision. I know I believed this until I did the research myself. A good decision cannot be made based on nuclear PR. What about used fuel bundles that the plan is by the NWMO to dig 2,230 feet through granite rock to store these fuel bundles and this is clean energy producing waste that has to be buried thousands of feet deep into granite to prevent harm? The irony is that uranium is found in granite and after we mine it to use it to boil water, the uranium isotopes remaining are so radioactive and so hot they have to be placed into pools of water for 7 to 10 years and then they have to be put back where it was found in the first place or temporarily in dry-storage caskets that we are told aren’t infallible. The waste has no further useful purpose.

Recycling costs are prohibitive and there is still the problem of waste. And it costs billions of dollars to store and monitor. Yucca Mountain was scrapped after 30 years and

billions of dollars. This could very well happen to the Canadian DGR.

Plan B to store the waste onsite on the shores of Lake Ontario and close to large populations for hundreds of thousands of years knowing that waste management is problematic is unjust to those that live there. New nuclear builds must not go forward until -- okay, I'm summing up.

CHAIRPERSON GRAHAM: No, I mean, you're 12 minutes; allowed 10 so could you sum up, please?

MS. BUCKINGHAM: Okay, I'm summing up now. Yeah, actually it's my last paragraph so that's good.

I asked the panel that based on the dangers to the environment and to human beings, as we are inseparable from our environment, that the new nuclear reactor plans are rejected as environmentally unsafe and that the money is used to research and build a renewable grid for the people of Ontario using a combination of solar, wind, geothermal and hydroelectric that meets high standards of durability using non-toxic materials as well as retrofits and conservation. Many

intervenors had made good cases that base load can be met by using the above. I know this is challenging, but I have confidence if we use our ingenuity and provide funding to youth to research new technologies, we can make it work.

Smaller, community-based grids also make good sense. We do not need more nuclear powered energy to power Ontario. Only 15 percent of the world is powered by nuclear energy and there are no reactors west of Ontario in Canada. These provinces are turning on the lights without nuclear energy so why can't we here in Ontario?

The environment is the whole planet, not just the site of the Darlington nuclear new build and to make a decision based solely on plant-parameter analysis is going to result in an incomplete assessment that is unfair to those harmed by the cradle to grave impact of nuclear energy. The devastation caused to the environment ---

CHAIRPERSON GRAHAM: Will you please -- that's a long paragraph.

MS. BUCKINGHAM: Okay, it's just one more minute.

CHAIRPERSON GRAHAM: In fairness,

I have six more before supper.

MS. BUCKINGHAM: Okay.

CHAIRPERSON GRAHAM: In fairness, if I let everybody go over 10 minutes or 5 minutes, we're not going ---

MS. BUCKINGHAM: Okay, but I'm just ---

CHAIRPERSON GRAHAM: I'll give you 10 seconds.

MS. BUCKINGHAM: Ten (10) seconds.

Okay, the devastation caused to the environment by the nuclear accident in Fukushima and the grief and suffering this has caused to the people of Japan must be a loud and clear message for us to say no to new nuclear reactors. We have a sacred trust and responsibility to take care of our planet and pass this wisdom and knowledge to our children so that they can take care of themselves and the environment and live a long and healthy life.

Allowing more radioactive and chemically toxic isotopes into our environment which is our water, our air and soil is not taking care ---

CHAIRPERSON GRAHAM: Thank you

very much. Thank you very much.

MS. BUCKINGHAM: I just have -- this is positive.

CHAIRPERSON GRAHAM: I know it's positive and look, I really appreciate ---

MS. BUCKINGHAM: In conclusion, let us all move forward together ---

CHAIRPERSON GRAHAM: Look ma'am --

-

MS. BUCKINGHAM: --- in creating a renewable ---

CHAIRPERSON GRAHAM: Kelly?

MS. BUCKINGHAM: Thank you.

CHAIRPERSON GRAHAM: You're welcome. The only problem -- I hate to shut anybody off, but if I let everybody go 15 minutes we have a lot of -- we're trying to get on a schedule and I appreciate that.

I will now go to Mr. Pereira. Do you have any questions, Mr. Pereira?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you for your interesting presentation. We have had similar presentations before.

Thank you very much. No

questions.

CHAIRPERSON GRAHAM: Yes, I just want to mention that there are a list of health studies that you referred and were questioning that are on the record and I suggest you look at number 847 and 848 on the registry that have just been filed with us so that might help you.

Madame Beaudet?

MEMBER BEAUDET: There was another intervenor also that came and talked about her concerns about uranium mining being done on private properties and ---

MS. BUCKINGHAM: I think by my thing I was not concerned about private property. I'm concerned about the world, not private property.

MEMBER BEAUDET: Well, this lady had also invested her lifetime savings ---

MS. BUCKINGHAM: I know her.

MEMBER BEAUDET: Okay.

MS. BUCKINGHAM: Thank you.

MEMBER BEAUDET: And we did ask CNSC to cover this aspect when you have companies coming doing exploration and production. And so if you want to refer to the transcript of that day, I

can get...

MS. BUCKINGHAM: I've been watching this from the very beginning -- that was not my point. So I think that you might have missed the point --

CHAIRPERSON GRAHAM: Your oral statement is on the record and we will review it all and I think Madam Beaudet -- no, Ma'am, I appreciate you listening to the Chair. We take you very seriously and we have your intervention and thank you very much. Madam Beaudet, do you have anything else further?

MEMBER BEAUDET: No, thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you very much. Now, we'll go the next presenter and we've got to stick to ten minutes, please, and it's Ms. Harvey. You have a -- pardon me, it's Dr. Harvey I guess, I'm sorry. Dr. Harvey the floor is yours for a ten-minute oral statement. And I hate to be cutting people off, but we're way behind; I want to treat everyone fairly. Dr. Harvey?

(SHORT PAUSE/COURTE PAUSE)

--- PRESENTATION BY DR. HARVEY:

DR. HARVEY: Okay. Thank you.

For the record, I'm Dr. Linda Harvey. I'm a family physician living in Ontario and I want to thank you for offering me this opportunity to speak. I'll try and keep it to ten minutes. I should be able to do that.

I want to commend the panel first for a very patient and professional job that they've done over the last three weeks. And I want to say that I've been extremely impressed -- I've been following the written transcripts, with the scope and depth of many of the public presentations. You have the benefit up there, of many hours of consultation, quality material. And I hope you take it seriously.

I'm going to discuss some of the medical aspects of this issue. In 1952, Dr. Alice Stewart demonstrated that a single x-ray to the abdomen of a pregnant woman, which would deliver a dose of approximately 0.7 millisieverts, give or take, increased the probability of leukemia in her child by 50 percent. In 2004, the BEIR VII report on the biological effects of ionizing radiation, stated that,

> *"The consensus of the scientific community was that*

no dose of radiation was safe for human tissue."

In 2008, the German KIKK study, the children who developed and excess of leukemia were exposed to emissions delivering in the range of 1.9 times ten to the minus six to 3.2 times ten to the minus four millisieverts per year. This is at five kilometres from the plant. These doses are well under the 100 millisievert limit below which CNSC continues to insist no harm can occur. They are also under the one millisievert per year limit which the CNSC considers an acceptable public exposure.

That which we once thought safe is not. To fail to appreciate this in the face of solid science is to avail oneself of the emotional defence mechanism called denial. This defence mechanism has no place at the helm of the most dangerous industry mankind has yet devised. In this place, you want truth, particularly medical truth and this has been rather systematically dismissed by the nuclear industry. Let me give you a bit of history.

The atomic age began essentially with the top secret Manhattan Project which

culminated in the Hiroshima and Nagasaki bombs. It continued during the Cold War as a hidden and clandestine matter of utmost national security. The effects of radioactivity on human beings were poorly understood, inconvenient and swept under the carpet, sometimes quite deliberately.

In 1959, an agreement was signed allowing the IAEA to prohibit the WHO, World Health Organization, from independently conducting or publicizing research into the effects of radiation on populations. This gag order came just before the initiation of atomic weapons testing at the Nevada test site and incredibly remains in effect today. This is a tribute to the effectiveness of the nuclear lobby and its disregard for human health. It has set back research into radiation and human health by decades.

Nowhere is this more apparent than in the Chernobyl situation. The WHO was prevented from studying the accident and the health effects were trivialized which also had the effect of denying legitimate victims of the accident access to international aid and proper health care. A series of rather vague, sanitized reports were prepared. These stand in sharp contrast, stark

contrast to a compendium of work recently published in the annuals of the New York Academy of Sciences, Volume 1181 in 2009 is the reference. This is a highly credible refereed journal. The work is entitled, *"Chernobyl: Consequences of a Catastrophe for People and the Environment,"* and it contains data from literally thousands of local research initiatives, often published in the Slavic languages and totally ignored by WHO and IAEA.

I would like to insist that every member of the CNSC staff and each commissioner read this in its entirety, all 335 pages. You will then begin to understand the scope of this tragedy.

And for anyone who thinks it can't happen here, I have two free tickets for passage on the next Titanic. You can also review the written submission by Mouvement Vert Mauricie on *"The Positive CVR of CANDU Reactors,"* page 70; scary reading.

Closer to home, in the town of Fort Hope, some 2.6 million cubic metres of radioactive waste from uranium processing, are scattered all through town, around and under buildings, under roads, in parks and ravines. It was known in 1931 that this material was very

hazardous and led to cancers and blood diseases. Mining lab technicians were urged to handle it with extreme caution. And this is a copy of the document that was -- it's on the web. It's a memo that went around the Department of Mines in 1931 on this material.

Okay. There is no excuse other than the convenience of industry, for this contamination in the town of Fort Hope. The townspeople have been repeatedly refused proper health studies. Down the road in the other direction, 12 nuclear reactors are sitting in the densely populated Greater Toronto Area. They continue to operate despite steadily mounting evidence, credible scientific evidence of increases in childhood leukemia and cancer near nuclear reactors and concerns about birth defects, Down's Syndrome and increases in infant mortality.

Where are our regulators upon whom we depend to protect our lives and health? There are no physicians or health care professionals on staff at CNSC that I know of. The medical community at large has been complacent, believing that things were taken care of in this industry. It is now waking up.

You have heard from a number of physicians and physicians' groups at this hearing and from what I've been able to gather, they're pretty firm in their view that nuclear industry presents significant hazards to humanity. Many of them would like to see the whole nuclear industry phased out. There are reasons for this, good ones.

I'm going to speak now a bit on genetics. This seems not to have been covered too much in this hearing and I'm going to fill in a bit. To me, this is the single most important form of damage being done to human tissue. We know that a single Alpha or Beta particular or Gamma ray can damage a gene. This genetic damage can take the form of visible chromosome aberrations or damage to individual parts of the DNA molecule which takes sophisticated laboratory techniques to reveal. Both of these have been demonstrated in humans.

In the germ line, that is the eggs and sperm cell, many of these defects will result in early embryonic death, manifested as infertility or spontaneous abortion. Some will be born with gross physical and mental abnormalities. Other apparently normal babies with internal difficulties will fail to make the transition to life outside

the womb.

Most of these things will have been missed in the Hiroshima populations as data collection did not begin until 1950. They were not missed in the new Chernobyl report. More ominous to me is silent, single gene damage. Since humans have two copies of each gene and one competent gene can often cover for a defective one, the defective one can remain silent. In the situation of ongoing low-level exposure over generations such as we are creating for ourselves and our descendents on this planet, these silent defects accumulate until they start coming together in a single individual. With two matching defective genes at the same locus, the damage will show itself. This can take many generations. By the time we realize what we are doing to ourselves, the damage will be irreversible.

So for all these reasons, I believe we must not build more reactors and we must shut down the ones that are running now, carefully, of course, and stop mining and refining uranium. All of these are putting an intolerable burden on health and the ecosystem. What part of no safe dose don’t you understand? Thank you.

CHAIRPERSON GRAHAM: Thank you very much. Before I go to my colleagues, I just want to say that we have five more before the supper hour, of which three -- two have agreed to come back after supper. Three have said they can't come back and we're going to try and hear them, so we want to go through this as expeditiously as possible. Mr. Pereira?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you for your presentation. And many of the points you have raised have been raised before by -- as you point out, by other medical doctors and other intervenors. And we have looked at a number of arguments, pro and -- pro-health studies that have been done and others that interpret these studies in different ways, so we are looking at all of this information and we thank you for your input.

DR. HARVEY: -- need physicians -- you need trained physicians, oncologists, pediatricians, people with that training on staff. You can do it with no training.

CHAIRPERSON GRAHAM: Thank you --

MEMBER PEREIRA: Thank you.

CHAIRPERSON GRAHAM: -- for your

observation. Mr. Pereira, anything further?

MEMBER PEREIRA: No, nothing further. Thank you.

CHAIRPERSON GRAHAM: Madame Beaudet?

MEMBER BEAUDET: No further questions. Thank you. Thank you for your presentation.

CHAIRPERSON GRAHAM: Thank you very much, Dr. Harvey. Now, we'll go to Mr. Adam Burns. If you could come up just as quickly as possible, please? And I might -- must remind you that I'm going to be strict for a change and 10 minutes is all you're going to be permitted.

--- PRESENTATION BY MR. BURNS:

MR. BURNS: Jumping the gun. My name is Adam Burns and I took the day off work to be here, so I'm not affiliated with any organization. I'm just here of my own accord.

First off, it was very difficult to find out about this public hearing. There was absolutely no internet campaign whatsoever for that. So when you're talking about how many people -- individuals you've seen up here that are under the age of 30 and if you come to the conclusion

that you can count that number on one hand, that might be the reason why, just saying. Thank you.

I'm not here before you as an expert in -- in any relevant field, merely as a global concerned -- a concerned global citizen. I'm staunchly opposed to the new nuclear at Darlington proposal in its current form because of the gaping holes in the accompanying environmental impact statement. These holes include the lack of post-abandonment assessment, as well as a lack of concrete plan for the high level disposal of radiation waste.

At the outset of these hearings, I was presented with a petition drafted by Greenpeace, the -- CELA, the Canadian Environmental Law Association, and Northwatch, who was asking for the suspension of these hearings pending the outcome of the crisis in Japan. As a layperson at the time, I didn't initially see the correlation between the seismologic capacity -- catastrophe that happened there and our own plans for radioactive expansion. As I result, I declined to sign that petition.

Later, it came to my attention that St. Mary’s Cement, owned by Brazilian

conglomerate Votorantim Group, is engaged in the near constant blasting and excavation at ever-deepening levels and would share over a kilometre of borderline with the new nuclear at Darlington site being proposed.

When I found out about that, I was obviously alarmed and then I was alarmed by the prospect of manmade seismologic events taking place at the neighbours, so I did some digging of my own. I found that this section of the environmental impact statement actually addresses some of the potential danger here. I've got the environmental impact statement -- or the relevant section here and it’s actually Internal Reference number 199, EIS guideline section 10.1.1, entitled, “Geology and Geomorphology,” and it addresses the question of karstification.

Karstification, as some of you may know, is a geological term for the process by which bedrock chemically dissolves whenever water is mixed with carbonate rock such as limestone.

CHAIRPERSON GRAHAM: I'm just going to ask you to slow down a little because the translators can't follow you and then that goes on the site too, so just speak a little slower,

please.

MR. BURNS: I'm all amped up, Mr. Graham. Thank you very much for bringing that to my attention.

Yes, so this is a geological term for the process by which bedrock chemically dissolves whenever water is mixed with carbonate rock such as limestone.

The section asked for a more detailed analysis of the issue of karstification at the new nuclear at Darlington site because of “the proximity of the St. Mary’s Quarry immediately to the east of the site and the great depth to which quarrying will occur.”

A fair summary, I believe, of the response in that environmental impact statement would be to say that the bedrock around the blasting areas does not permit much water transmission. It’s actually quite dense, so the potential of the ground under the proposed site completely eroding underneath it as a result of karstification is low. The same response though does state that this corrosion of underlying bedrock issue, this karstification issue, does exist in areas east of the new nuclear for

Darlington site.

In any case, again from my layman’s perspective, as the adjacent quarry digs deeper and the power plant gets larger, so too will the potential for a manmade seismological or radioactive disaster rise. As someone who has attempted to absorb the full breadth of this issue, I'm aware that there are powerful corporate and, therefore, political interests at stake here and that those interests are like as not to be more powerful than the concert of voices presenting their concerns to this esteemed panel.

It is foreseeable that the blasting at the neighbouring St. Mary's Quarry will disturb the complex infrastructure at the new nuclear for Darlington site despite the best efforts of engineers and technicians. Karstification, in my mind, has been adequately addressed, but not the continued seismologic impacts of enduring blasting taking place less than a kilometre away.

There's no post-abandonment plan. There's no way to measure the prolonged impact of nearby blasting on the plant’s structural integrity and there's no intention paid to the inefficiencies

of our current grid documented, in particular, by the Toronto Star in a March 17 article entitled “Power Firms were Paid Millions not to Generate Power.” I have a copy of that article. And basically in that, it’s talking about the constrainment fees that were alluded to earlier in -- in today’s proceedings, saying of the $360 million in CMSC payments, $161 million, 45 percent, was paid for not generating power and $146 million or 40 percent was paid for not importing power; okay?

And, yeah, basically ironing out grid inefficiencies would increase power generation at a negative cost to the public as opposed to the $11 billion that’s slated for -- for nuclear power. That’s -- I mean, again from my layman’s perspective, inevitably going to balloon to $111 billion. I don't know.

There are answers to all these questions. I'm posing a lot of questions. There's answers to these questions, but I'm not satisfied by the level of research put into a proposal that will determine whether this project will mortgage the future of our grandchildren. This is why I humbly submit that this panel must emphatically

reject the current proposal in its current state to add more nuclear fuel to this fire waiting to happen.

On a less formal note, I think that we should take a page out of Germany's notebook, just this once. Let's anticipate Obama's green-coloured jobs movement. Let's assert ourselves as an international environment leader from a country in possession of the most natural resources anywhere. Let's say no to new nuclear at Darlington right here, right now, and work towards a full moratorium on future new project. Let's draw a line in the sand and do something future generations will be proud of because the alternative is a generational mortgage crisis, the likes of which our world has never seen.

Thank you for allowing me the opportunity to speak.

CHAIRPERSON GRAHAM: Thank you very much and thank you for staying within your time. Mr. Pereira -- or, no, Madame Beaudet first.

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman. You did -- you did bring an interesting point and I believe about karstification and I

believe CNSC had some questions on that for OPG when we were reviewing the EIS and I'd like them to comment on that, please.

DR. THOMPSON: Patsy Thompson for the record. Andrew McAllister will comment both on the karstification issue, as well as the -- the issues that were raised in terms of the manmade seismic-induced effects.

MR. McALLISTER: Thank you. Andrew McAllister for the record. With respect to the -- to the karstic features that the -- the intervenor raised, we have noted that the compaction of a specific soil rock and then the induced settlement is -- is -- due to the dewatering depends mainly on two factors, the soil rock property, meaning the porosity or void ratio and the effect of stress acting on it.

The rocks below the new nuclear Darlington plant are mainly limestone. The porosity ratio of limestone is from about 0.6 percent with no karstic features to about 30 percent and higher with karstic features.

In the EIS, in response to the panel, EIS IR number 199, OPG concluded that no karstic features are found in the bedrock

formations in the area of the Darlington nuclear site; therefore, the compaction or subsistence of rock formations due to dewatering, if any, is likely to be very small and not likely to be -- impact the power reactor structures.

I also note that in our recommendation number four to the panel, we do recommend the verification of the predictions of no karstic features on this site.

With respect to the second matter that the intervenor raised with respect to induced seismicity, deep mine-induced seismicity is not uncommon in Canada, such as seismic events induced in metalliferous mines in Sudbury, potash mines i Saskatchewan and coal mines in Western Canada. However, surface mine-induced seismicity is rare internationally and only have records in limited areas. CNSC staff is not aware of any quarry or surface mine-induced seismicity in Canada.

I will add further that in -- again, we have recommended with respect to the adjacent blasting in St. Marys Quarry, the need to monitor the blasting during the Phase IV of that operation, which would be the -- the late operation of that quarry. However, that blasting will happen

in closest proximity, geographically, to the Darlington site.

CHAIRPERSON GRAHAM: Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Mr. Burns, thank you very much for your intervention and your suggestions and -- not an intervention, oral statement I should say, correct myself -- and thank you very much for coming and always pleased to hear the oral statements. Thank you very much.

MR. BURNS: Thank you, folks. Enjoy your meal.

CHAIRPERSON GRAHAM: Good news, we have -- Marina Moudrak has agreed to wait until this evening. So we only have one more before the break, and that is going to be the Greater Oshawa Chamber of Commerce.

And I remind you also of the rules, sir. Identify yourself and welcome.

--- PRESENTATION BY MR. MALCOLMSON:

MR. MALCOLMSON: Thank you. My name is Bob Malcolmson, and I am the General Manager and CEO of the Greater Oshawa Chamber of

Commerce. And I will make sure that you get out of here quickly for your dinner.

CHAIRPERSON GRAHAM: Well, we're back this evening for a whole live slate again, so ---

MR. MALCOLMSON: The Greater Oshawa Chamber of Commerce is one of the largest business associations in Durham Region with over 1,100 entrepreneurs, managers and corporate executives as members of 860 businesses employing close to 40,000 people.

The Greater Oshawa Chamber of Commerce has been on record with the Province of Ontario since December 2005 supporting nuclear new build at the Darlington Nuclear Generation Station, and further supports the Municipality of Clarington's position that Atomic Energy Canada Limited is the preferred supplier of the new nuclear build.

The Chamber feels nuclear industry is vital to both Canada and Ontario. Currently there are over 50 new units in construction around the world, and with something like 400 in planning phases and an estimated 200 nuclear reactors in various stages of development around the world, and

Canadian manufacturing certainly should need its share, as we heard from OCI.

The Ontario -- Ontario and Canada to continue to play a leading role in the global nuclear industry, the key stakeholders in the nuclear manufacturing industry have a responsibility to work with all levels of government in Canada to create a more favourable climate for investment, and that includes OPG. Both levels of government have a responsibility to make a decision without further delay.

In this document, we will highlight three areas of OPG's nuclear performance that are often not recognized, but which directly impact Durham Region businesses and the Province of Ontario, and these three are safety, positive impact on Durham, Ontario and Canadian business community, and contributions to the quality of life in Durham Region, the world environment and Canada's standing as an environmental nation.

Canada's advanced technology and unsurpassed safety record make it the most desirable option in the world to ensure a safe and stable supply of nuclear energy.

In the over 40 years that nuclear

energy has served Canada's needs, no member of the public has ever been harmed as a result of radiation emissions from a nuclear power plant or waste storage facility.

We understand that CNSC continuously monitors and evaluates the Darlington and Pickering stations in at least 14 safety control areas, and that OPG in all these areas has been and exceeded those expectations.

OPG's Pickering Station has been safely generating electricity for 40 years. The employees at Pickering Station A have worked more than 2.6 million hours without a lost-time accident. Employees at Pickering B Station have worked almost 4.5 million hours without lost-time accident. And the Darlington Station has been safely generating electricity for more than 20 years and employees have worked 9.7 million hours with a lost-time accident -- without lost-time accident.

It is further understood that OPG's environmental performance is strong, with emissions far below regulatory limits and a collection of awards and certificates that demonstrate international and local recognition of

OPG's contribution to sustainability.

Community impact. The relationship OPG has with, in this case, the Clarington plant and the rest of Durham Region communities is very strong. OPG works hard to maintain transparent communication with local community residents and key stakeholders through a variety of outreach activities.

The Greater Oshawa Chamber of Commerce has constant contact with OPG through various communication vehicles and attendance at meetings.

OPG is one of the largest employers in Durham Region, with highly educated and skilled job opportunities now and in the future. It is a strong economic driver in Durham Region through its operations, projects and leadership and community building organizations.

OPG's corporate citizenship program in 2010, for example, the Darlington and Pickering together, provided approximately $350,000 to community groups in initiatives in Durham Region focused on environment, youth, culture, business initiatives.

We understand that there was a

concern raised about transportation of potential increased traffic on the roads. The Greater Oshawa Chamber of Commerce does not feel this is a concern. The Region, the municipalities of Oshawa and Clarington and, of course, the Province is working on this as we speak, so this is not something that is going to impact in any way, shape or form we don't think.

Business impact. Canada's and Ontario's nuclear industry has a demonstrated track record of safety, innovation, environmental stewardship. The Canadian innovation design and the manufacture of nuclear reactors has proven to be competitive in world markets.

And, for example, the benefits from the success of the nuclear industry include significant tax revenues to the Ontario and Federal governments. The potential worldwide market is close to $1 trillion, and that would add to the bottom line of the GDP of Canada close to $80 billion and create 500,000 person-years of employment. The value of export manufacturing opportunity alone runs to some hundreds of millions of dollars.

Significant employment across a

range of skills that can be created and sustained. Currently, there's 150 Canadian Ontario companies employing over 12,000 high-tech workers in the nuclear energy sector.

Canadian companies have the opportunity to become leading suppliers throughout the nuclear renaissance. Each reactor sale abroad brings billions of dollars into Ontario and creates thousands of jobs. An estimated pair of CANDU 6 reactors creates 7,000 person years of employment.

The brain gain. Retention of Canadian scientists and engineers and potentially the attraction of hundreds of leading edge international scientists.

Canada would become a world centre of excellence for the development of nuclear technologies.

Heightened profile for Canada in the research and development area.

Canada's only university which offers undergraduate degree in nuclear engineering is UOIT, and it's located right here in Durham Region at the heart of the nuclear energy sector. Approximately 50 nuclear engineers graduate each year for the last two years, and currently we

understand that most of the ones that are graduating this year have already obtained employment.

OPG is engaged actively with this community, with its suppliers, and is aware of the greater benefits to itself and to the business community that arise from a constructive inclusive relationship.

Around the world we're seeing a nuclear renaissance. Billions of dollars will be spent on hundreds of new plants around the world over the next 10 to 20 years.

Developing powerhouse countries like China and India are looking at new nuclear capacity to help secure the energy they will need to fuel their economic growth. In 2006 the United States implemented an energy policy act encouraging construction of new plants. Many other countries, such as France and the United Kingdom, have also adopted energy programs.

There are many opportunities that nuclear energy can provide to Canada and Ontario. Ontario has a few industries that offer the potential of ongoing, long-term job and wealth creation.

We have attached to our presentation copies of correspondence sent to the Prime Minister of Canada and the Premier of Ontario, as well as a copy of our resolutions supported by the Ontario and Canadian Chamber of Commerce in support of nuclear energy.

As the Chamber stated to the Prime Minister and the Premier that Canada’s technology future is at stake with this Darlington plant.

At the Ontario and Canadian Chamber of Commerce annual meeting in 2009, delegates overwhelmingly agreed with the Greater Oshawa Chamber of Commerce that both levels of government must zero in on the Canadian nuclear manufacturing sector.

The chamber network supported the following resolution: urging the Ontario and Canadian governments to make as a priority a nuclear energy strategy that will continue to provide jobs, investment, and economic strength for the Ontario and Canadian economy in the many -- in the coming decades.

Darlington and Pickering stations that provided a large quantity of base load electricity while maintaining overall electricity

prices at a level that businesses and the general public can afford and allows OPG to continue providing electricity without the production of greenhouse gases arising from fossil fuel consumption.

Greater Oshawa Chamber of Commerce clearly supports nuclear new build at facilities operated by Ontario Power Generation.

OPG shows all the elements of managerial control necessary and a proven safety and environmental performance record.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Malcolmson.

Madam Beaudet?

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: I just have a comment with a question.

OPG did provide a table of transportation improvement projects that was required in order to proceed and not to have any problems.

I don’t know if you were aware of the projects that were proposed because when we had the mayor of -- I think it was the Mayor of

Pickering, we asked him lessons learned, and he said that during construction, it was -- that was the main problem, the traffic.

MR. MALCOLMSON: I'm on.

We understand the region and municipalities, they've recognized that, and they're working towards it now.

And even if this concludes today and this project moves forward, we're at least two years out before there'd be any construction even started here.

And in that meantime -- in the meantime, the Province of Ontario, the Region of Durham, the City of Oshawa, and Clarington are all looking at plans for transportation and for the movement of goods and services in the area.

So they've recognized that they're moving forward. It's not going to be a concern that nobody is thinking about this.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you.

Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman.

You spoke in your presentation mainly about socioeconomic benefits and the benefit to the region in terms of business and build up of the community with new professionals coming in.

But one of the concerns that -- of many intervenors is the health effects in the community. And you say in your presentation no member of the public has been harmed.

What do you base that statement on? Are you aware of health studies and the consequences of --

MR. MALCOLMSON: I'm not aware of any health studies, but the -- this is information I've garnered over the last three to five years.

Exactly where, I can't tell you. I don't have it with me right now.

MEMBER PEREIRA: But in terms of information on hazards to, say, cancers and so on, have you -- are you aware of any changes in your community over the past several years?

MR. MALCOLMSON: I've lived -- I've returned to Oshawa. I left and came back after 30 years. I have heard no concerns to that effect, no.

MEMBER PEREIRA: Thank you, Mr.

Chairman.

CHAIRPERSON GRAHAM: Mr. Malcolmson, thank you very much for your presentation and that of your chamber.

We are now going to declare a supper hour, and we will have to declare one hour, which we will be back at 7:25.

And the first oral presentation will be Natalia Moudrak. I'm pronouncing it wrong, but, anyway, Natalia Moudrak -- Natalia, you're on deck at 7:25.

Thank you very much.

--- Upon recessing at 6:20 p.m.

--- Upon reconvening at 7:20 p.m.

MS. MYLES: Good evening, everyone. My name is Debra Myles. I'm the panel co-manager.

Welcome back to today's second session of the Darlington new nuclear power plant project joint-review panel public hearings.

Secretariat staff are available at the back of the room. Please speak with Julie Bouchard if you're scheduled to present today and haven't spoken to her already or if you -- or if you want permission of the Chair to put a question

to a presenter, and that's for an intervention only, not an oral statement, or if you are not registered to participate but would now like the opportunity to make a statement to the panel.

Opportunities for either questions to a presenter or a brief statement at the end of a session may be provided time permitting.

Please identify yourself each time you speak to make the transcripts as accurate as possible.

And as a courtesy to everyone in the room, please silence your cell phones and other electronic devices.

So we were running a little bit behind this afternoon, so we're going to start this evening's session with an oral statement by Natalia Moudrak followed by the Transition Oakville Steering Committee and Paul -- and then Paul Andre Larose.

And then we'll precede with the schedule as it was outline and available this morning.

Mr. Chair?

CHAIRPERSON GRAHAM: Thank you very much, Debra.

And good evening, everyone.

First of all, I apologize for rushing the last couple of people as they presented because that wasn't my intention as we went through the process in the last three weeks, but we did get a little behind. And support staff sometimes need some time and so on, so that's why I was trying to get at least some of that done.

But we're back for an evening session. Only three to catch up. And the night is long, and we have lots of time. So, Natalia -- Natalia, I'm sorry. I got it. After ten times, I probably will. The floor is yours.

--- PRESENTATION BY MS. MOUDRAK:

MS. MOUDRAK: Okay, it's on.

So my name is Natalia Moudrak. I'm an undergraduate degree -- I have an undergraduate degree in economics, and currently a master student at University of Waterloo.

So thank you for providing this chance to speak in front of you today.

I'll skip straight to my points. There are two main topics that I would like to address in my speech today.

The first one is the questionable

sustainability of the proposed project from economic, social, and environmental perspectives.

The second topic is the lack of transparent and adequate information to the public to stimulate an educated discussion about the project.

I will begin with questionable economic sustainability point.

According to March 25th statements by Mr. Jennings, the Associate Deputy Minister of Energy Supply Transmission and Distribution, the capital cost of the proposed project is estimated at 11 to $15 billion with an additional 2,000 megawatts coming online in 2020, 2022.

The cost to prepare the site was not provided.

Mr. Jennings shared that the license to prepare the site is expected to be obtained by 2012.

I will now expand why these statements are alarming to me.

According to Ms. Swami’s OPG statement on April 4th, the initial cost estimate for Darlington plant in 1977 was $5 billion.

When the station was brought into

service between in 1990 and 1993, the total cost came to $14.3 billion. The escalation of 6.9 billion over the estimate was due for several reasons, including interest charges and the postponement of the project.

The 1979 accident at Three Mile Island and the 1986 accident in Chernobyl had to be factored as lessoned learned into additional regulatory requirements.

We all know that as a result of the Japanese nuclear accident at Fukushima nuclear plant, the Canadian Nuclear Safety Commission is reviewing the safety cases for all of Canada's nuclear facilities.

As said from CNSC website, The CNSC is actively monitoring events in Japan and will work with its international colleagues, including the International Atomic Energy Agency, to identify and take into account any relevant lessons learned for implications on Canadian facilities.

There's an obvious parallel here between the situation that resulted in original cost overruns at Darlington plant being changes to the regulatory requirement for nuclear facilities

after the Three Mile Island and Chernobyl accidents and the recent accident at Fukushima, which may bring further changes to the regulatory environment. Thus, it is questionable if the proposed project will receive further licences to proceed as scheduled.

It was also mentioned in the early comments by the OPG that they OPG has many years to incorporate lessons learned from Fukushima accident in response to public concerns during the licence to construct and operate stages.

What if incorporating lessons learned will be cost prohibitive to proceed with the project? Okay.

CHAIRPERSON GRAHAM: Just slow down for the translators. We'll give you an extra minute or so.

MS. MOUDRAK: Okay. Thank you.

So what if the public at that point will be outraged with the events at Fukushima and will demand not to proceed with the project?

This will mean that whatever money was spent at this point on site preparation was spent in vain; some costs, money wasted. Thus, it is financially risky to approve the licence to

construct the site at this point.

On April 4th, Ms. McClenaghan from CELA stated:

> "There is no formal energy plan yet in existence in Ontario under the Ontario legislation."

This was in reference to Ontario long-term energy plan that assumes 50 percent nuclear power as part of energy supply mix.

This plan is still subject to public input and approval by the Ontario Energy Board. Once again, given the events in Japan, the public may want to decrease the 50 percent nuclear power component of energy supply mix. As we also learned, the OPG has to abide by directions given by the Ministry of Energy and Minister's Directives.

Darlington expansion is the result of Minister's Directive to implement a nuclear component of the long-term energy plan. Since the plan is subject to further public consultation and OEB's approval, could there be another directive issued to the OPG changing the plans for nuclear expansion? Here is also where the lack of

transparency topic comes in the questionable social sustainability of the project.

The Minister's Directive has questionable regard for opinions of Ontarians regarding the power supply mix in the long-term energy plan. As expressed by Mr. Jennings in his March 25th statements, the Ministry of Environment cannot claim a broad support to maintain 12,000 megawatt nuclear generation level.

Upon the release of the long-term energy plan on November 23, 2010, there was a web-based consultation with the public with 40 different stakeholders partaking in discussion. The Ministry also received 375 comments through the environmental registry regarding the supply mix.

I would argue that 375 comments is grossly insufficient for the province to form an opinion on what an average Ontarian thinks on the subject of power supply. However, even based on this tiny sample of Ontario's population, the Minister could not form an opinion whether the participants were largely for or against the proposed mix.

As Mr. Jennings stated, "There was no summary of discussion prepared". On March 25th,

during this Joint Review Panel hearing on the project that is proposed -- as a product of Minister's Directive, the Minister could not say if 50 percent of participants were for the proposed mix or if it was only 5 percent.

Does this imply the decision has already been made and whatever the public has to say does not matter at all? How can we claim social sustainability of the project when the public opinion is so questionably considered?

So a lot has been said on questionable environmental sustainability of the project. Even the Proponents of the project cannot dispute the carbon and land footprint from the extraction and storage of uranium needed to keep the plant running. And there is no guarantee that technologies will be developed to deal with nuclear waste in the future.

I will give you an example of what I, as a young person, that is yet to live my whole life in Ontario, would like to see happen instead.

I have with me and displayed on the screen in front of you, results from Natural Resource Canada Eco-energy Home Retrofit Initiative for Ontario.

Over 340,000 Ontario homes participated in the program, air-sealing and insulating their homes, replacing furnaces and windows, et cetera. It cost the Federal Government $484 million or $1,400 per house. The result, 42.7 gigajoules or 20 percent of energy reduction, with 2.79 tons of greenhouse gas emissions reduced per average house annually.

Overall, the initiative resulted in almost a million tonne reduction of greenhouse gas emissions annually and about 4,147,000 megawatt hours annual energy reduction. Converted to megawatts for a year, it is 473 megawatt reduction.

I looked at the Ontario housing stock statistics. In 2008 they were just over five million structures; single detached, single attached, apartments and mobile stock.

So out of these 5 million, there were 3,600,000 single detached and single attached homes. This means that about 10 percent of Ontario houses participated in the initiative.

Now, I will switch the slide. A quick calculation of energy reduction attainable if 50 percent of homes participated in the initiative, or 1,800,000 houses.

Assuming the same average results per home as demonstrated to date, over 5 million tonnes of annual greenhouse gas emissions reduction is possible, and 21.5 million megawatt hours of energy reduction. In terms of megawatts, this is 2,458 megawatts taken per year off the grid in terms of demand. This is more than 2,000 megawatts that the Darlington new reactors are proposed to generate.

Now, this in my opinion is truly a more sustainable approach to meeting Ontario's demand needs. The return on investment from eco-energy retrofitted initiative is immediate; immediate reduction in energy use, immediate reduction in greenhouse gas emissions.

We do not have to wait till 2020 or 2022 to realize these benefits. There is no risk of higher interest rates and debt associated with the investment. There is no uranium production or long-term nuclear waste.

This option is sustainable because it allows for the same lifestyle only with reduced environmental impact. It also creates jobs, especially in the small business, green trade sector. Well, this is my example of an alternative

to Darlington expansion.

It is bizarre that I'm expected to agree or disagree with Darlington's expansion when I wasn't provided the cost benefit comparison of other options.

I need to know what happens if we invest $11 to $15 billion, or allocate a portion of the sum, into initiatives like eco-energy, into infrastructure required to make power purchasing from Hydro-Quebec possible, into district energy combined heat and power infrastructure and thermal water storage solution suggested by Mr. Marinacci in his earlier presentation.

We need to consider policy advancement suggesting stringent energy requirements for new construction. Further, we need to factor in the manufacturing slowdown in Ontario and its effect on reduced energy demand. The public must be able to download these cost benefit studies from government websites and examine the assumptions behind proposed investment options.

Do not tell us that this is the -- this expansion is the cheapest option. Give us the cost analysis and we shall decide if we agree or

not.

To summarize of what I'm hoping to get out of this process, there's three points.

First, to make summaries of public comments about energy supply mix that Mr. Jennings mentioned will be available in April, easily accessible online.

Second, to understand why 375 comments, plus 40 stakeholders, determining the future of Ontario's energy mix is deemed sufficient.

What measures were taken to maximize public feedback about Ontario's long-term energy plan and these hearings, especially from young people like me, who don't necessarily have a car to travel to Oshawa; who use Google as research medium and Facebook and Twitter as their social medium needs?

Third point, to get an answer on Ms. McClenaghan's question whether or not the Canadian Environmental Assessment Agency requirement to look at alternatives can be bypassed by provincial Minister's Directive. Even if there is a legal loophole that it can, I would argue that I, as a Canadian citizen and Ontario resident,

cannot agree the Darlington expansion is a plausible investment without looking at the detailed cost benefit analysis of the option and other alternatives.

And I had to add a fourth point. To obtain information on the number and details of nuclear accidents due to human error.

That's all. Thank you.

CHAIRPERSON GRAHAM: Well, thank you very much, Natalia.

MS. MOUDRAK: No.

CHAIRPERSON GRAHAM: Thank you very much.

I'll go to my colleagues. Mr. Pereira?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you very much, Mr. Chairman and Natalia.

Thank you very much for your presentation and your analysis of the cost benefits to -- give examples.

Now, there's a couple of points that I'd like to clarify on.

This panel is looking at environmental assessment concerning a proposal to

construct nuclear power reactors, but it's not make a decision on a licence to construct reactors, that will come at a later stage. And that is up to Ontario Power Generation and the Government of Ontario to decide whether they wish to proceed with that and what reactors they wish to select for construction.

And so that decision is sometime in the future. But for now, we're looking at just an environmental assessment, should reactors generating up to 4,800 megawatts be constructed. And in parallel with that, we will be looking at a licence to prepare the site, but nothing more than that.

Of the four points you raised, comments on supply mix and the consultation that Ontario Ministry of Energy accepted as being the basis for their decisions, that is outside the scope of this panel. That's the Ontario Ministry of Energy's business, and how they did that, they have to justify that.

But certainly the point about the requirements of CEAA being met with respect to this exercise, that is something this panel is very concerned about and we're trying to address that.

And, in fact, in our discussions with the Assistant Deputy Minister today we were seeking to get the input that will allow us to confirm that requirements of CEAA have been met. And so that's all I have.

On the question about incidents or accidents caused by human error, that is something that'll be followed up on. Have we got an undertaking on that or -- no. Not necessarily ---

CHAIRPERSON GRAHAM: No, but we were going to follow up on that. Maybe we can follow up in such a way that the information can be provided on some way on the website with -- and can you do that without an undertaking, Madame Co-manager? You can?

So we will undertake to get some information for you. Undertaking to the Secretariat? No, well, we better give it an undertaking number, and that's Number 77.

And was that for just -- that was from IAEA, and that's from all -- yeah, not just in Ontario.

MS. MOUDRAK: That's on 33 nuclear accidents that happened in the last 59 years.

CHAIRPERSON GRAHAM: Okay. Mr. Howden, can you undertake to do that for us?

MR. HOWDEN: Barclay Howden.

Yeah, we will do that. We will report back tomorrow when the information will be ready. We have to talk to our staff who will gather the information, and they probably have to dig deeper to actually get more definitive information on the causes. So we'll try to give you a date by tomorrow, but when it's done it will be on the website.

MS. MOUDRAK: Thank you.

CHAIRPERSON GRAHAM: I might remind you that all documents that we go after once we get the undertakings, they are on the registry, so you'll be able to follow it there.

Madame Beaudet? Oh, I'm sorry, Mr. Pereira?

MEMBER PEREIRA: That's okay.

CHAIRPERSON GRAHAM: Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

I'd like to go back to one of the transparencies presented. We did hear from the

Assistant Deputy Minister of Energy that they had in place a very aggressive efficiency and conservation program. And here you show that there's 10 percent of Ontario housing stock that has taken advantage of this program. Obviously, you must have looked carefully into this.

Was there any indication, because very often when there's a program that comes the first year is always the bulk of it, and then it trickles later. So do you have any comments on that with the figures that you've looked at?

MS. MOUDRAK: Yeah, well, actually the program just ended March 31st, 2011, and as covered in media, there was increased demand towards the end of the program.

MEMBER BEAUDET: Are you aware if they're renewing it or?

MS. MOUDRAK: I'm not aware.

MEMBER BEAUDET: No.

MS. MOUDRAK: That would be a Natural Resource Canada question.

MEMBER BEAUDET: Yeah. Thank you very much.

CHAIRPERSON GRAHAM: Well, thank you very much, Natalia.

MS. MOUDRAK: Yes.

CHAIRPERSON GRAHAM: At last. Anyway, thank you very much for coming.

MS MOUDRAK: Thank you.

CHAIRPERSON GRAHAM: And thank you very much for providing us with that very interesting overview of what your presentation ---

MS. MOUDRAK: Yeah.

CHAIRPERSON GRAHAM: --- your statement, but also of what's happened -- what's been happening with regard to conservation.

MS. MOUDRAK: And may I just make one point in regards to Mr. Pereira's point? No? Pereira. So now we're even.

CHAIRPERSON GRAHAM: No, it's with me you're not even.

MS. MOUDRAK: Oh, yeah.

CHAIRPERSON GRAHAM: I'm the one that's off.

MS. MOUDRAK: Okay. So the comment was I understand this is a licence to prepare a site consideration. I just don't want whatever money will be spent to prepare a site to be money wasted.

This is the point I was trying to

get across. Thank you.

CHAIRPERSON GRAHAM: Thank you very much and safe travels back to McMaster.

MS. MOUDRAK: Waterloo.

CHAIRPERSON GRAHAM: Waterloo, okay, very good. It's still a long ways away. Thank you very much.

MS. MOUDRAK: Thank you.

CHAIRPERSON GRAHAM: The next presenter -- or not presenter, but the next oral presentation is Transition Oakville Steering Committee.

And we have -- who's the presenter? Would you identify yourself, sir, and the floor is yours. And you know the 10 minutes, but if it's -- if you're speaking fast, slow down, we'll give you extra minute or so for the benefit of the translators. Thank you.

--- PRESENTATION FROM BY MR. JANSSON:

MR. JANSSON: Thank you, Mr. Chairman, members of the panel and agency members. Thanks for receiving our statement today.

My name Hart Jansson. I'm a founder and steering committee member of a citizens group in Oakville, Ontario, called Transition

Oakville that has been in operation for over two years.

We are part of a global movement called Transition Towns, which are dedicated to increasing the resilience and sustainability of towns and cities around the world.

In addition to addressing this panel, which is performing a difficult and very important task in the public spotlight, I hope that these comments will also be heard by the provincial government, the Premier, the Minister of Energy and OPA and OPG decision-makers.

Given that the potential harm of nuclear power generation is extreme, I strongly suggest that we must let an informed public make the decision on whether to go ahead with additional nuclear plants.

The Ontario Government's goal to shut down coal-fired plants is laudable and timely. Harm from coal plants to the environment and human health is substantial and incontrovertible. The decision of the Ontario Government to suspend the procurement process for possible new nuclear plants in Ontario is also laudable and timely.

The key point that I want to make

today is that an informed environmental decision on the nuclear power plants can be made only when one considers the complete financial cost, the complete environmental risk, and the complete cost to human life and human health for this and the next 100 generations.

An informed decision based on these financial, environmental and human health factors can only be made when compared to the alternatives available. So let us briefly examine the key decision factors of nuclear power generation that are most relevant to this panel, namely safety and cost.

Nuclear is not safe. Like any other large centralized power generation system, nuclear harms the environment and kills people.

We've heard earlier a highly credible data source that corroborates the statement is the U.S. National Academies of Science. On July 30th, 2005, they released a report on the risks from ionizing radiation. The BEIR 7 or seventh biological effects of ionizing radiation report on health risks from exposure to low levels of ionizing radiation reconfirmed the previous knowledge that there is no safe level of exposure

to radiation; that even very low doses can cause cancer.

Even exposure to background radiation causes some cancers. Any additional exposure causes additional risk. So the supposedly safe one milliSievert per year level would result in more than 1 cancer in every 100 people exposed at this level, which would include 1 fatal cancer in every 175 people so exposed. How can this level be called safe?

I'm not sure whether the CNSC has similar supposedly safe levels of permissible radiation levels. I'd welcome clarification on that.

Regardless whether the supposedly safe values in Canada are similar or not, the levels of radionuclides such as tritium, iodine 131, among others, that are released as a matter of course by every operating nuclear plant and that have been previously discussed during these hearings as safe, according to Canadian regulations, are, in fact, not safe at all. That ends the discussion of the report from the U.S. National Academy of Sciences.

A leak earlier this year at

Pickering released 73,000 litres of water contaminated with radioactive tritium into Lake Ontario. This is one of dozens of leaks into the air and water that have occurred at nuclear plants in Ontario.

The Ontario government has recently put a moratorium on offshore wind farms due to environmental concerns. Surely we have enough commonsense, underscored by recent events in the nuclear industry, to understand that nuclear poses a threat that is far more serious than offshore wind farms and should face a similar moratorium while information about recent events is compiled and safety features and procedures are reassessed.

So let us move on to the cost issue. Nuclear is costly. What is the complete cost of nuclear? A proper cost comparison must include, among many others, construction costs, including likely cost overruns; government subsidies; insurance costs, including those indirect costs borne by the taxpayer. If nuclear were safe, we wouldn't need the current legislation that severely limits the liability of a plant operator or owner in the event of a nuclear

disaster.

Financing costs. We are still paying for reactors built in the ‘80s. The original debt for our old nuclear plants in Ontario, mainly for cost overruns, was $19.4 billion in 1999. After taxpayers have spent 11 years paying a total of $19.6 billion, the bill is still about $15 billion due to interest payments on the debt with no predictable end in sight.

Future decommissioning costs are also a factor. For multiple nuclear plants, these would certainly be in the billions of dollars. So if we go ahead with new nuclear plants, we will still be paying for our 30-year old reactors after we start paying for the next generation, so, for that reason alone, the five and a half to six cent per kilowatt hour figure for nuclear -- nuclear-generated electricity quoted today is misleading in that it does not reflect the complete cost.

More importantly, let's look at future costs. The OPA itself puts the cost for nuclear power generation -- sorry, future nuclear power generation at 15.7 cents per kilowatt hour. In response to a request from Pollution Probe, the OPA recently re-estimated the cost of nuclear

power, assuming a capital cost of approximately $6,000 per kilowatt and a pre-tax cost of capital of 12 percent. According to the OPA, with these two amendments to its analysis, the cost of electricity from a new nuclear plant is forecast to be 15.7 cents per kilowatt hour. Even this cost estimate is based on the OPA's optimistic assumption that new nuclear reactors will have capacity utilization rates of 90 percent in 40 years. In fact, during the last 25 years, the average utilization rate of Ontario's fleet of nuclear reactors has been around 80 percent.

This 15.7 cents per kilowatt hours -- per kilowatt hour compares with anywhere from six cents to 24 cents for combined heat and power depending on who you ask, and the current cost for wind power at about 13 cents per kilowatt hour.

So why would we want to pay more for electricity generated by nuclear than for other sources? Well, in fact, according to a recent poll, we wouldn't. A poll of 1,000 randomly-selected citizens conducted in Ontario by Abacus Data between March 24 and March 28 of this year shows us that only 22 percent of Canadians believe nuclear power is safe and that we should build more

plants. And, in fact, 58 percent of Canadians think nuclear power is unsafe.

Now that we have reviewed some of the key cost and safety factors, I say to OPG and to the Ontario government, a decision to implement a nuclear power plant puts hundreds of thousands of Ontario citizens' lives at risk, so please help the public decide how they want to proceed. We suggest with -- with a combination of more serious energy conservation, as -- as the previous speaker suggested; combined heat and power plants; innovations such as the virtual power plant approach in a smart grid; increased generation from renewables; additional hydro power purchased from Quebec; and perhaps additional gas-fired plants as an interim measure, we could eliminate the need for at least two of the proposed nuclear plants. Get really serious and spend a few more billion dollars now on conservation, better building codes and building practices, more incentives for energy efficiency and -- and more cost-effective retrofits to eliminate the need for at least one of these nuclear plants.

The German government is phasing out nuclear power and so should we. A quote from

Juergen Becker, the German Deputy Minister of the Environment, from Monday of this week -- this is from a Reuters news release and I quote:

> A decision has been taken to shut down eight nuclear plants before the end of this year and they definitely won't be reactivated. And the remaining nine will be shut down by the end of the decade. Japan has shown that the residual risk is too high to justify the continuation of nuclear power. It is better to go for other energy services in a civilized country.

So let an informed public decide if it wants to pay extra for nuclear or if it wants a safer and more innovative approach and forego the life-threatening risks of nuclear to this and the next 100 generations. We say to the Ontario government, let this decision be made via a referendum of all Ontario voters.

Finally, to the esteemed panel, if

we do go ahead with more nuclear plants, then to the extent that you have the capability, please insist on the principle of adopting the best available technology in the world, not necessarily the cheapest or the home-grown version. Do not contribute to a purchase decision based on country of origin. Make the decision based on the safety of Ontario citizens, Ontario's environment and Ontario's future generations. Thank you.

CHAIRPERSON GRAHAM: Thank you very much. Thank you very much, Mr. Jansson. I'll open the floor now to Madame Beaudet.

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you for your presentation. I think it would be interesting to tell us a little bit about your organization because you've brought points about cost and environment and I'd like -- I think it'd be interesting to have a bit more background in how it relates to Transition Towns. Is it an organization against nuclear or you -- what -- what's the objectives?

MR. JANSSON: Very briefly, the objective is to make towns, cities, neighbourhoods more resilient and more sustainable, so resilient

in that we're not dependent on large centralized systems so that we can withstand any type of shock, whether it's an economic shock, a social shock, a natural disaster by relocalizing many activities from food production, processing, manufacturing, energy generation, relocalizing to have more -- a more redundant system on many levels.

And many of society's problems in terms of waste management, social problems are caused by large centralization. If you get more local, a lot of these -- these large-scale problems tend to solve themselves. So we think by localizing and reducing our energy demands in general through an energy descent action plan, so again conservation, we can address a lot of these a lot of these problems.

MEMBER BEAUDET: Thank you.

I'd like to go to OPG. Maybe they do have or do not have the answer.

But, anyway, the quotation of the Assistant Deputy Minister today of five to six cents for the LUEC or the levelized unit energy cost, would that include the debt of Ontario Hydro?

MR. SWEETNAM: Albert Sweetnam.

The LUEC would include the

interest costs during construction. That's how it's normally calculated.

The ongoing debt that was set aside from Ontario Hydro is a different issue and how that's being recovered is an issue that's best spoken to by the Ministry of Finance.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman.

I'd like to go to CNSC staff to comment on the questions about the conclusions of the BEIR 7 report and on the levels of risk from accepted public dose limits.

DR. THOMPSON: Patsy Thompson for the record.

The BEIR 7 report essentially does a detailed review of the available scientific literature from epidemiological studies as well as from studies conducted in a laboratory that are more mechanistic in nature.

And BEIR 7 concludes that the available epidemiological evidence indicates that at doses below 100 millisievert, there is no

evidence of an increased risk when populations exposed to radiation are compared to the general population.

BEIR 7 goes on to say that the experimental evidence indicates that there is data indicating that low doses of radiation -- there's no reason to believe that the linear relationship observed at the higher dose levels would not continue down to lower doses.

There's also evidence for, what's called, hormesis, which is sort of a protective mechanism that -- people call protective mechanisms at low doses and other relationships.

But BEIR 7 essentially says that the current experimental evidence would support the continued use of the linear no threshold relationship below 100 millisievert to zero essentially, which is what the CNSC uses as a basis for the regulations, and that's the basis on which the dose limits have been set based both on the epidemiological evidence of no increase health risk below 100 millisievert and essentially 1 millisievert, which represents a range in the variation of the natural background radiation.

But BEIR 7 puts those nuances in

place and recognizing -- recognized that for radiation protection purposes, the linear no threshold relationship is still the best relationship in terms of representing the available scientific evidence.

MEMBER PEREIRA: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Janson, for coming tonight and expressing your concerns and making the panel aware of what your concerns were and that of your organization. Thank you very much.

The next -- the next oral presentation is from Paul-André Larose.

And, Mr. Larose, would you come forward, please.

MR. LAROSE: We got some glare here.

Mon nom est Paul-André Larose et ma présentation s'intitule "Un pressant besoin pour une vision nationale ainsi que pour un leadership moral".

CHAIRPERSON GRAHAM: Mr. Larose, if you could just wait a moment, I'd like to get the translation earphones, so ---

MR. LAROSE: I -- that's the only sentence I wanted to say in French, sir.

CHAIRPERSON GRAHAM: Oh, en français? Tu parles anglais. O.k. Merci.

MR. LAROSE: Because this is -- I know what bilingualism is.

CHAIRPERSON GRAHAM: No, thank you very much.

---- PRESENTATION BY MR. LAROSE:

MR. LAROSE: Just out of respect for the rest of the audience, I will do my delegation in English.

So as I said, my name is Paul-André Larose, and the title of my delegation is a need for a national vision and ethical leadership.

And, Chair, I would urge you, please, to help me to throttle back if I speak too fast for the translators.

So, members of the Darlington Joint Review Panel and members of the audience, I want to make a brief delegation that will deal with the smart vision for energy production and usage in this country.

I want to consider the issue from a holistic perspective.

As such, I will not address specific technical and economic consideration that have been presented on numerous occasions so far on this -- for this panel.

In other words, I want to address the issue of the forest rather than that of concentrating on individual tree leaves.

I am well aware that the terms of reference of this panel are limited to the Darlington new build.

However, the decisions that are -- that this panel will eventually render cannot be seen in isolation of the larger issue confronting this country.

We have to ask whether it makes sense to contemplate the brute force -- what I call the brute force method of energy production when instead so much could be achieved by addressing the issue of end use, particularly those issues, such as building energy loads that are such power hungry.

You will agree with me that it makes little sense to attempt to justify the expansion of generation capability if we continue to use production in an inefficient and wasteful

way.

There is so much more at stake here than just the issue of better insulation and better furnaces.

Conversely, good energy loads would be -- would and should be related to the electrification of railways, for example, and to the support for eventual electric vehicles.

Moreover, we must take into account the fact that -- and this is the most important in terms of moral leadership. The technology eventually chosen will send a message to the rest of the world.

Indeed, we have an opportunity to fulfill the role of model at the international level. It would be difficult to expect the rest of the world to take a sustainable course of action with respect to energy, for example, if we ourselves opt for solutions that do not reflect this.

In other words, do as I do, not just -- not just as I say.

The -- this certainly -- this certainly would not be a good way to proceed towards world peace.

However critical I may appear in my statement, I must stress that they are not to be construed as being critical of AECL or OPG.

Based on personal experience, I have the highest regards for their capabilities. I only wish that they could follow a more constructive corporate set of objectives.

However, I cannot say the same for other parts of the world where ambition are also to develop some form of nuclear technologies.

This country would send a very bad message, moral message, if it were to contemplate more nuclear power and continue such globally devastating projects such as the tar sand extraction.

So as my introduction here -- I'm sorry that was a prologue here, a long one, but I would like to -- before I get to the essential of what I had to say, I cannot but draw a parallel between what has been going on here and what I've seen in another similar forum. This one a provincial EA for the proposed Durham incinerator.

In light of my very bitter experience with this one that I now refer -- I now refer to the incinerator EA as simply being an EA

for expedited approval, not an environmental assessment.

In terms of contrast, these hearings that I have been present here as well. I've truly been -- day and night experience that put the incinerator ready to process squarely to shame. What a contrast and what a refreshing contrast it was to be here.

As for the Environmental Commissioner in -- I'm not the only one saying that, the environmental commissioner of Ontario indeed indicated in a recent annual report entitled the "Right to Kno", not K-N-O-W, it's K with N-O, the negative N-0.

The Provincial EA process is indeed broken. This gives me little solace in considering the health implication for the provincially approved undertaking.

There are, however, some similarities, such as the issue pertaining to acceptable risk, which I've heard here as well and Non-Lethal Body Burdens. These in view, raise significant moral issues that are generally conveniently ignored by the proponent, along with the importance of abiding with the -- by the

precautionary principle.

In particular, I could not help, but to shake my head in disbelief when I heard delegation in this panel here against the perception elements of certain items such as cooling towers. Yet favouring -- I know from experience in other forms to host an incinerator in the same general area. In other words, what you don't see is not going to hurt you, that seems to be their belief.

I also want to mention that the dichotomy that I've observed at this hearing concerning the synergetic interaction between projects. Much of the discussion here has taken place as if Darlington was the only project being concentrated -- contemplated, but I would like to remind you that there is a few others as well.

So in truth, I am much more concerned by an open system such as an incinerator as by a closed system such as a nuclear power plant when it works well.

This, however, does mean that I approve nuclear energy. Overall, however, I have but the highest praise for the Darlington review process and I have ever reason to believe that the

outcome will be thorough, irrespective of one personal position with respect to nuclear energy, but here I digress.

Let me tell you a few things about myself, so that you know who I am with. I'm not part of the nuclear industry, but I'm very familiar with it. I did my graduate schooling at McMaster University and the -- this is as, you know, a Canadian Research Institution with its own campus research reactor. And it's very -- we have -- we had at the time a very close co-operation with Chalk River Nuclear Labs. I must point out that this was at the time when this country's -- I had a vision.

Research was done with Bertram, B. Brockhouse, a Nobel laureate nationally, I feel, unrecognized pioneered in thermal neutron physics. Something that I again -- as deplore as typical of the Canadian psyche.

Bert Brockhouse was a great scientist, but he doesn't have -- if he was an American, there would be a monument built to him.

Research association with AECL when I got -- when I was doing some research at the AECL in Chalk River, I got to know, albeit in a

very indirect way because I was a graduate student, I got to know people such as W.B. Lewis, which I would call the father of CANDU.

This again reflect -- this was at the time when people in the nuclear industry would describe a future where, thanks to the anticipated, intellectual technological prowess of mankind, “Electrical” -- and I quote, “Electrical energy would be too cheap to measure.” That’s what I was told and I can prove it.

This was typical of the optimism -- endless optimism then prevailing, although we now know -- much better we know only too well that this was rather naïve optimism.

I was later involved with planning and consultation with the Canadian National Railways. Again, I must point out, and you’ll see later on why I mentioned that, I must point out that this was at a time when CN stood for Canadian National, not Canadian Nonsense as it stands now.

I mention this before I go today, essential in my submission, as there are certain aspects in nuclear science that are certainly beneficial. We don’t want to condemn the whole thing with a sweep of a hand here.

Indeed AECL was an undertaking that made possibly much of the nuclear medicine that we now take for granted. It is now unfortunately a shadow of what it used to be. So I get to the essential what I want to say to you here. In the conservation of the Darlington new-build, we seem unfortunately to have put the cart before the horse.

Nuclear energy is being concentrated because of anticipated power needs, but the power consumption side of the equation is seldom being addressed.

Indeed and regrettably, little, if any, thought seemed to be given to -- as to how we could use the currently available power more intelligently and less in a brute-force manner.

In addition, the proposal is focused on using current Darlington site largely because the available infrastructures are there, including power transmission -- power transmission lines.

This fails to recognize the fact that even if this province were to retain the option of nuclear power, possibly such facilities should be built somewhere in more remote areas and

certainly not along the lake -- the shores of Lake Ontario as some delegations have said here in the -- in the previous days.

So the essential aspect of my recommendations are as follows; we have first to look beyond the technical and economic consideration to meet the expected power demands. And we should not adopt the technology that will serve as a pretext for the rest of the world to enter into nuclear proliferation. Thus we have to refuse, and I stress we have refuse to allow nuclear expansion at Darlington.

Point number 2, in addition we have to adopt a truly supportive policy toward substantive innovation, not only in the field of sustainable power production, but also in the field of power use, particularly and distantly related matters, such as building design.

Quite often as it now stands, the building codes, would certainly be more appropriate in tropical countries than in Canada.

It is essential that we adopt a holistic outlook that goes beyond the immediate issue of power generation. I could expand further on this, but I'm sure that you know what I'm

talking about.

About the issue of AECL and OPG, in order to accomplish the innovation that we're referring to here, I would consider a renewed AECL. There is no reason why AECL should not work on innovation, righted on limiting itself exclusively on nuclear power.

In order to clearly stress the refocus mission, AECL could very well become BECL, that is Benign Energy of Canada Limited. This could be a unique opportunity to be created using the large pool of resources in technical, available at AECL.

As a country, we would be foolish not to use such an opportunity. I for one do not want to see a continued repeat of shameful past episodes where we clearly demonstrated our national propensity to shoot ourselves in the foot, think of Avro.

In light of the above, and in this context, OPG could very well become a major provider of benign energy as the need for electricity production will certainly remain, but it need not be nuclear generated.

Additional matter for your

consideration, the -- the issues of adopting a smarter approach to energy usage, I would like to add the following; I know there is certain interesting facts during these hearings in particular --

CHAIRPERSON GRAHAM: Mr. Larose, if you could -- you're about 14 minutes -- I'm allowing you because you're so interesting --

MR. LAROSE: Oh?

CHAIRPERSON GRAHAM: -- but if you could get -- we would appreciate the --

MR. LAROSE: I have half a page, sir. Could you bear with me, please?

CHAIRPERSON GRAHAM: No problem, go ahead for that.

MR. LAROSE: Okay. Thank you, sir. I will just list a few examples in order to elicit how conditioned we are to even attempting to think outside of the box.

For example, much of the discussion was made about the issue of transportation of irradiate material and possibly nuclear waste, previous discussion previous days. Yet I have not heard a single intervention about the unique opportunity to use the mainline railway

that runs right through OPG property.

This illustrates how conditioned our society has become to equate transportation with roads. By the way the same could be said for Port Hope, that I heard this afternoon.

Similarly I've seen no discussion of the adverse potential impact on the national economy if it was ever at Darlington a nuclear incident. I say here, à la Bhopal in India. As you probably know, carbon had a very serious leak. Thousands of people died; about 2,000 people died.

So and this case that would require invoking the exclusion zone, so it's the other way around. Normally we talk about an accident on the railway could affect the plant, but here I'm saying the plant -- an accident on the plant could affect the exclusion zone, which would effectively cut down the 401 and shut down the railway, both the CN and the CP.

So needless to say, adding additional units at Darlington will increase the probability of this ever happening.

Such an instance would result in a closure of the highway, as I said before, and both the CN and the CP Rail corridor, which are -- for

which there are no alternative, thanks to our collective, again, short-sidedness as demonstrated this time by the fact that we have abandoned -- CN and CP have both abandoned their rail line that went through the Ottawa Valley route. Needless to say, such closure would be devastating for the economic consequences at the national level and it hasn't been clarified. So, Chair, I appreciate the extra time and I had just a summary of my two recommendations and I will not repeat in order to save time. Thank you, sir.

CHAIRPERSON GRAHAM: Well, thank you very much. Your presentation was very interesting and thank you for the remarks with regard to the panel and I'll go to Mr. Pereira.

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you for your presentation and your vision for looking at energy generation along with use, in a holistic approach. And this is the first time someone has talked about that as being the way to go forward and we'll take that, consider that further. Thank you very much.

CHAIRPERSON GRAHAM: Madam Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman. We did invest -- well, I'm going to say inquire about different universities and technological schools coming here, about research being done and basic research that is needed so it's interesting that you bring this as well under a different light.

And I'd like to hear from you where what you feel you say that ACL should go on and do research, only basic research. I'd like to hear from you how you react to the funds over the years that diminished for basic research in energy?

MR. LAROSE: How many hours do I have to answer this question? Okay. I'll try to keep it very brief, Madam Beaudet. First of all, I just would like to make a clarification about what you said at first, what I'm addressing about here is not exactly the same thing that you would learn in engineering school, nuclear power production; so that's another story.

As a scientist myself, I've got a Ph.D. in physics, but I always had a very strong social vision and so it's not something that you just relate just from the business of studying cross-sections of certain materials with respect to

neutrons, whatever. So you have to look at the bigger picture.

With respect to the second part of your question, this is something that is extremely dear and shocking to me I must say to you, is that the fact is, as I entitled my presentation, is that we have no vision in this country. We are looking for return on investment for the next quarter, the bottom line focus. Research is something that requires -- it's a long-term vision. You know, you cannot guarantee -- if somebody had been confronted with Canadian situation when they developed the laser and the transistor, it would have never happened. You have to leave these scientists go in the lab and, you know, sure -- and I'm telling these people that I know of, they're not going there just to fill in the minimum of time because people that work in the lab that are absorbed by ideas, they will put lots and lots of hours. So it's not something they're checking the clock to get home.

So -- and I can -- I have many experiences I could relate to you to that, but the point is that we have to nurture -- this is what I tried to say here. We have to nurture. If we are

in a society where we expect for the immediate, you know, we can't make it. I can do analogy with you. We're like in a super tanker. You know in super tanker, a big heavy vessel, 300,000 ton, you stop the engine, the super tanker still keeps coming on.

Now, if you think that is going to be happening and, you know, over and over and -- all the time, then there's a problem there. It initially looks good, but eventually it comes to a stop and this is what is happening in this country because we're starving basic research. And as you know, the result of our progression and so on and so forth, eventually comes back to basic research which eventually trickles down.

Look how many years it took for having laptop computers if you compare it to the days -- you know, the early days of the transistor and so on. But Bell Lab, for example, in those days, you know, you invest, you know, this is the cost of doing business. You do this and you've got some scientists and out of this there's a lot of good research that comes out and sometimes it's negative. There's no commercial outlet, but such is the price of business.

MEMBER BEAUDET: Thank you. Thank

you, Mr. Chair.

CHAIRPERSON GRAHAM: Well, thank you very much for enlightening -- a very enlightening oral presentation. And we appreciate your coming and expressing your views. Safe travels back home.

MR. LAROSE: Back home is in Oshawa, sir. I don't have too far to go. Thank you kindly, sir.

CHAIRPERSON GRAHAM: Bon voyage for a very short distance. Now, we will start our evening agenda and the first presentation is from Jeff Brackett and that is PMD 11-P1.187. Mr. Brackett, the floor is yours and we have your presentation.

(SHORT PAUSE/COURTE PAUSE)

--- PRESENTATION BY MR. BRACKETT:

MR. BRACKETT: Thank you, Mr. Graham. My name is Jeff Brackett and in addition to my written submission, I'm thankful for this opportunity to speak with you tonight.

The government of Ontario has decided to build new nuclear reactors at Darlington. It doesn't know who will supply the reactors or what the design of those reactors will

be. It only knows it wants nuclear reactors. It wants approval for site preparation prior to selecting a reactor. There cannot be a thorough environmental assessment on a reactor design because they will choose the design after the environmental assessment is over. The government of Ontario has decided that new nuclear reactors will be built at Darlington. It's exerting a political influence here and it's playing its role.

Now, we have an environmental assessment that does not recognize the legal requirements -- the legal requirement to review alternatives to the project. It only browses Ontario Power Generation's proposed catalogue of reactor designs. We have an EA into new nuclear reactors without a reactor to assess. We have a government that wants approval without having to explain here and now just how they will solve the central problem of what to do about high-level radioactive waste.

We have an EA that looks at accident scenarios, but only if they are as OPG calls it, credible. The Japanese experience involves the uncontrolled accidental release of significant amounts of radiation to say the least.

OPG seems to believe that uncontrolled accidental releases of significant amounts of radiation is not credible at one of their stations and that's just not credible.

For the record, I'm opposed to the province's decision to build new nuclear reactors at Darlington and although it feels honestly quite futile, I've taken time off work to come over tonight and tell you so. As background, I will say that in the late 70s -- excuse me while I read. My wife and I came out from Toronto and we bought a home in Oshawa where we raised two kids and we were blissfully unaware of the Darlington nuclear station at that time.

As teenagers the two of us had lived near the Pickering nuclear station and we trusted that nuclear power was safe and clean. Right now, at this very minute, there's a billboard near the front of the Darlington property that proclaims that nuclear energy equals clean air. I guess it's true that if they tell you a lie enough times, people will believe it; we did.

In the 1980s I learned that nuclear power was not clean. I went to Welcome, I went to Port Granby and I saw for myself how waste

from these radioactive dump -- toxic dump sites was flowing offsite across farmers' fields and directly into Lake Ontario. I went to Eldorado Nuclear and saw the radioactive waste barrels sitting at the Port Hope Harbour. I read blind faith about what happened to Port Hope. I didn't want any of that ignorance about radiation risks to threaten my children so I went to the Darlington Information Centre and read Ontario Hydro's early environmental impact information for the original project. I saw how vested interests could amass scientific data and documents to fill a room and still miss the truth. I learned about nuclear spin and that data can deceive. I learned that as part of normal routine operations, Ontario's nuclear stations release radiation to the environment, venting to the atmosphere and flushing it to the Great Lakes. Excuse me.

At the Darlington Information Centre I learned that even large releases of radiation could be made to look insignificant if the information was framed just so. If an accidental release of tritium exceeded the short-term release limit, any competent Ontario Hydro spokesperson could present the spill to the media

as an insignificant portion of the monthly release limit. And if that monthly limit was exceeded, they could compare the release to the annual release limit to smooth things over and make it seem even more insignificant. To this day when OPG accidentally loses radiation to the environment, they employ the wiggle words, words like trace amounts or negligible amounts. How about giving the public some credit and openly reporting what was released and the quantity of that release so we can make our own value judgments as to your industry's significance to our lives.

In Oshawa our home was -- or sorry, 10.2 kilometres from Darlington. The primary planning zone for emergencies at Darlington was 10 kilometres. My children went to school inside the emergency planning zone, but because we lived a block outside the zone, we received absolutely no information on nuclear emergency planning, and there was no plan during an emergency to inform us of where our children might have been evacuated to.

With the plans so inadequate, and Darlington coming on line, and knowing that routine releases would increase our exposure to tritium, we

built the -- the 7th Generation Monument at the front gate of Darlington and we left town. I've heard at these hearings some discussion of traumatic effects that this project might bring. I'm sure mine was not the only family uprooted in some manner by Darlington.

It's disgraceful that these proceedings claim to consider the full lifecycle of the reactors up to abandonment of the site. As I was told at OPG's open house meetings on the project, the issue of spent fuel bundles and what to do with them is beyond the scope of this EA. OPG is washing their hands of it. They expect you to set this issue aside. They expect some future EA and a different Joint Review Panel to deal with this, but hasn't that EA already happened? Weren't there ten years of study and no solution found? We are more than two generations into the nuclear age. By the time new reactors at Darlington reach their anticipated expiry date, two more generations will have passed.

Literally, my grandchildren's grandchildren may be back here in 50 years faced with closing Darlington B or opening Darlington C and urging a Joint Review Panel to finally deal

with the spent fuel. It's grossly immoral. The province of Ontario and OPG will seek approval for site preparation, yet discard this nuclear waste issue onto the shoulders of future generations.

I think OPG and the province like to discard and disregard nuclear waste. Look what they've done with tritium, a waste bi-product. They've turned it into a commodity, selling this waste into the marketplace and washing their hands of the whole affair.

As I mentioned, in 1990, as Darlington fired up their reactors, we decided to put some distance between us and the routine emissions. We now live 38.4 kilometres from Darlington, and were in what we hoped would be a tritium free zone, but OPG's tritium has followed us. Tritium from Ontario's nuclear stations ends up being sold by OPG to glow-in-the-dark sign manufacturers like Shield Source Incorporated. They're located at the Peterborough Airport, and their process is very leaky, rivalling and OPG might say exceeding the experience at a full-blown nuclear station.

I heard concerns expressed at this hearing about how site preparation might disturb

contaminated soil on the Darlington site. In response the CNSC said that the worst contamination of soil found at Darlington is about 500 becquerels per litre. We know a becquerel equals one radioactive disintegration per second.

Soil on the lawn at the Shield Source Incorporated facility at the Peterborough Airport has been measured at 1.5 million becquerels per litre. I could have brought you a shovel full, but I thought better of it. I thought of bringing you an apple, perhaps an apple from the tree across the road from the Peterborough Airport. They have been measured to contain up to 5,540 becquerels per litre of tritium.

Water samples 16 kilometres from the airport have been found to average 65 becquerels per litre, and tap water at the Peterborough Airport shows tritium contamination averaging 50 becquerels per litre. I thought I'd bring you all a bottle.

One reason we love where we live, in Millbrook, is the abundance of clear, clean water. I admit, I was somewhat shocked 20 years ago when we moved there, to see my son's new friend, a ten-year-old boy, lean down and drink

from a local stream. There's a natural trust about water there, where we're so close to the source. Of course, there's natural radiation in the environment. Some would say that life evolved in a radioactive soup. But since the beginning of time tritium in fresh water has been balanced at one Becquerel per litre.

OPG's nuclear operations have and will continue to cause dramatic increases in tritium levels in our streams and vegetation. Shield Source is shooting OPG's tritium up their stack like there's no tomorrow. The current guideline for tritium in drinking water, as you know, is 7,000 becquerels per litre. So you will tell me that these tritium levels are safe.

You used to tell me that tritium was safe at a concentration of 40,000 becquerels per litre. The toxicity of tritium has recently been re-evaluated by the Ontario Drinking Water Advisory Council, and they've recommended a new guideline of just 20 becquerels per litre averaged over 52 weeks. It appears that OPG supports this recommended guideline.

Tell me this: If tritium hasn't changed since the beginning of time, why do your

guidelines keep tightening to recognize that tritium is more and more dangerous than previously thought, and allowing less and less tritium in our drinking water.

I believe it’s the height of arrogance for us to mess with the earth’s balance. Mother Nature has already set the standard for tritium in drinking water. The standard has been one becquerel per litre since the beginning of time.

Dramatically elevated levels of tritium in my area are the direct result of de facto decisions made by the province and OPG as to how they will deal with radioactive waste. They have decided to put off their responsibility the same way they expect this EA and this Joint Review Panel to put off that responsibility.

Now, let me tell you, I’m reluctant to be here. I almost just didn’t bother coming. I don't want to spend my life banging my head against the political wall and the political will that is unwavering in its support for nuclear power. When I told friends at work what I was up to tonight, someone asked if I was some kind of an expert, and you all know that I’m not, but I don’t

need to be an expert to have an understanding of the issues that affect my life.

Years ago some friends and I founded a citizen's group, Durham Nuclear Awareness, and our goal was to raise public awareness of nuclear issues. That wasn't an easy task here in what could be argued as the nuclear capital of the world. We were often written off as a special interest group.

You know, it seems to me that OPG has counted the 1,000 swallow nests that will be destroyed during cite preparation. And they seem to be okay with the genetic intrusions that tritium will impose on Darlington's birds for generations to come. It's insignificant.

You know, that if there is one special interest group that we need to consider here, it is those who have not yet arrived, those that can't speak for themselves. As Rosalie Bertell said,

> "The purpose of the environmental movement is to save the seed. Everything that's ever going to live in this world, whether it's a

tree or a plant or a fish or a baby, all into the future time is present right now in the seed. And if we damage that seed there's no place else to get it. It is our most precious possession and we have got to think in terms of the seed because it is the future.

Now, there's one very important -- very special -- special interest group that all of us here represent, and the special members to me are my grandson, an eight-year-old boy, my five-year-old granddaughter, and a little girl that'll make her debut this summer. It's heartbreaking that our government doesn't concern itself with the ethics of nuclear power and the effect that it will have on those to come.

In closing, we must have a reactor designed to assess. We must have full consideration of the need for the project and the alternatives to the project. We must account for an accident scenario resulting in uncontrolled accidental releases of radiation, because it's

credible. We must finally take responsibility for nuclear waste prior to approving the reactors.

It's heart-warming or encouraging to know that Germany has just decided that it will close its nuclear plants by the end of the decade. And I'm urging you to reject OPG's proposal to build a new nuclear station, site preparation -- saying that it's only site preparation, that's just not good enough. When they get approval to prepare that site, everything breaks loose and they go full steam ahead and spend as money as they can, like they did the first time around, so that it's harder and harder and turn back and stop that nuclear steamroller.

And before I close, I'd like to maybe ask a question, because I heard the BEIR 7 report brought up tonight, and I don't know much about the BEIR 7 report, but apparently the no linear threshold means there is no threshold or no level below which there is no associated risk at doses of 100 millisieverts or less, statistical limitations make it difficult to evaluate cancer risk in humans. The committee concluded that the risk would continue at smaller doses without a threshold, that small dose equals small risk, not

no risk.

And, Dr. Thompson, when you were speaking earlier, I thought I gathered that you said from the 100 millisieverts down to zero millisieverts.

There was a line of risk. Doesn't that still mean that the only place there's no risk is one there's zero or no exposure, that all exposure increases risk?

That's my question.

CHAIRPERSON GRAHAM: Mr. Brackett, thank you very much.

I wanted to assure you of one thing, that we're glad you did come tonight.

MR. BRACKETT: Thank you, sir.

CHAIRPERSON GRAHAM: We're glad, as a panel, that you did come and give your presentation. We've read your intervention that you sent in prior to coming, and we've listened to your comments tonight, and we are glad you came.

MR. BRACKETT: Thank you.

CHAIRPERSON GRAHAM: So don't feel that it was a wasted trip. It wasn't.

I will go to my colleagues. And, Mr. Pereira, I guess you're first on my list here.

--- QUESTIONS FROM THE PANEL:

MEMBER PEREIRA: Thank you, Mr. Chairman.

Thank you for your review of your concerns.

Among the points you raised, one was the question about no vendor and no design being selected and how that -- how that was an impediment to an environmental assessment being conducted.

The way this proposal has been brought to us is we have been -- we have a proposal before us which describes a plant parameter envelope that takes the maximum values from a number of reactor designs, and the environment then -- environmental assessment is conducted for that envelope of parameters.

And what that means is that when Ontario Power Generation or -- and the province eventually selects a particular technology, they will have to demonstrate that whatever they choose fits within that envelope for the -- for the environmental assessment to be valid.

So that’s sort of a bounding strategy.

The question of review of

alternatives, that's something that this panel has been concerned about, and it was something that can be discussed this morning when the Assistant Deputy Minister of Energy was here, so we're looking for a more fulsome discussion of alternatives to the project.

So that is -- that is something we're working on.

I was pleased to hear that you were involved at one time with the Durham Nuclear Awareness Group. Is that correct?

MR. BRACKETT: Yes.

MEMBER PEREIRA: We heard from a previous presenter that that group eventually went on to form a health concerns community -- committee and that they have done studies on health.

I don't know if you still -- were still a member of the group when that was done.

MR. BRACKETT: Many of us have gone on to different areas, yes.

MEMBER PEREIRA: But they did do -- conduct a study of health.

MR. BRACKETT: Yeah. In the 19 -- in, I think, around 1990, I was a member of the Durham Region Darlington Pre-Baseline Health Study

Committee that made recommendations to the Minister of Health in Ontario.

But to my mind, that was not effective. The health study -- what would you say? The health studies investigations in the region are dominated by the industry, and it's very difficult to have non -- if you are sceptical or if you are investigative of what nuclear power might do to the health of the community, you better have some way to prove it because it's just -- it's difficult.

We had Dr. Bertell at our meetings, and she was basically ignored.

We were ridiculed by the -- by the medial officer of health at the time for being concerned about nuclear power, that we should have been spending our time concerned about the hazards of cigarette smoking, but he just didn't seem to get it. And I don't think anybody there gets it yet, to tell you the truth.

MEMBER PEREIRA: Thank you.

And I don't know whether we -- Dr. Thompson, could you clarify the question about the BEIR 7 report and also the tritium studies that have been done?

DR. THOMPSON: Patsy Thompson for

the record.

The BEIR 7 report does recommend that the linear no threshold relationship continue to be used for radiation protection for regulatory purposes, and that's what the CSNC has done, and it's the basis for the requirement for doses to be kept as low as reasonably achievable.

In the context of the Darlington new build project, the projected highest dose to a member of the public living close to the station is an infant, and the dose is projected to be 5 microsieverts per year, which represents, using the linear no threshold relationship, an increased risk of 0.3 in one million people. So it's a very low risk.

And a dose of 5 microsieverts would not be measurable between individuals living in the area.

The CNSC did a number of reports and literature reviews and research to address the issue of tritium in the environment and tritium in health.

And there are, if my memory serves me right, seven -- six or seven reports on the CSNC website that range in topics from uranium --

tritium behaviour in the environment, the review of the health effects of tritium, as well as tritium in drinking water, and other subjects.

MEMBER PEREIRA: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you, Mr. Pereira.

Madam Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

I'd like to get back on the figures you've given us about the level of radiation in -- near the Peterborough airport.

And I'd like to ask CNSC if you're aware of those figures.

DR. THOMPSON: Patsy Thompson for the record.

Yes. Shield Source Incorporated is a tritium light manufacturer. It has a CNSC license. It's licensed as a class 1 nuclear facility.

And the releases of tritium from both Shield Source and SRBT, that is a similar facility in Pembroke, have been the subject of regulatory actions following the levels of tritium

that were measured in the environment and the improvements that were needed to -- controls in facilities.

MEMBER BEAUDET: Can I ask the intervenor -- and you live near that area now?

MR. BRACKETT: Jeff Bracket for the record.

I live in Millbrook, a short distance from the Peterborough airport.

Fortunately I believe that most of the winds go slightly the other way, but I've followed it closely, and it's just astounding to me how much tritium is in the environment in that area.

MEMBER BEAUDET: Thank you for your testimony.

MR. BRACKETT: Thank you.

MEMBER BEAUDET: I have no further questions.

CHAIRPERSON GRAHAM: Well, thank you very much for coming tonight, and we do appreciate your sincereness in giving us your -- both your written brief and your presentation tonight and safe travels back to your home. Thank you very much.

Next on the agenda is Amanda Lickers. I want to welcome Amanda here tonight on her -- oh, I'm sorry. I'm sorry.

Mr. Bracket, I made a mistake. I was so -- such a hurry to get Amanda up -- I need you back. I was thinking that we were still in the oral presentations.

You are a submission, so I now go to a line of questioning along with -- from the floor.

But before I do that, I go to OPG.

Do you have any questions to Mr. Bracket?

MR. SWEETNAM: Albert Sweetnam.

No questions. Thank you.

CHAIRPERSON GRAHAM: CNSC?

DR. THOMPSON: Patsy Thompson.

No questions. Thank you.

CHAIRPERSON GRAHAM: Government participants, which I don't think there are any. We've called for them before tonight -- or this afternoon.

And we go from the floor, and I have Brennain Lloyd.

You're the -- you have some -- a

question for the -- for the intervenor?

--- QUESTIONS BY THE PUBLIC:

MS. LLOYD: Yeah, thank you.

And good evening, Mr. Graham.

Brennain Lloyd from Northwatch.

My question, I think, is actually for panel council.

We've had many discussions of the BEIR 7 report over the last two-and-a-half almost three weeks, and I heard CNSC, I think, represent the BEIR 7 findings two different ways this evening.

And it occurred to me as I was going through the transcripts that I think what's required is for the panel to have the BEIR 7 report themselves.

When I read the BEIR 7 report, I hear no threshold. Even under 100 millisieverts, there is an associated risk.

And my question, I think, for -- and we hear it represented differently by CNSC.

And my question for panel council is how can we provide that? I know earlier in the proceedings there has been discussion about copyright concerns.

Northwatch is prepared to purchase the report and provide it. I want to know from panel counsel, how can we have that entered into the public record given that it's National Academy of Sciences? I did check this afternoon and there are copyright restrictions, so how should we handle that? I do think it's essential reading for the panel.

CHAIRPERSON GRAHAM: Just give us a moment, please?

MS. LLOYD: Sure.

(SHORT PAUSE)

CHAIRPERSON GRAHAM: I'm going to go to CNSC.

Undertaking Number 30, was there a summary of that report in what you provided us on March 31, Dr. Thompson, Undertaking 30?

DR. THOMPSON: Patsy Thompson, for the record.

No, we presented essentially the findings of the main health studies that have been used to develop the linear no-threshold relationship, as well as the studies that have been done in Canada.

MS. LLOYD: And if I may, Mr.

Graham, my review of Undertaking 30 was, in part, what prompted me to review the copyright restrictions on the BEIR 7 report because I do think it’s going to be helpful reading for you.

CHAIRPERSON GRAHAM: What I'll do is the panel members will discuss amongst each other to see if it’s -- if we need it, and if we do we'll issue an undertaking tomorrow morning.

MS. LLOYD: Thank you.

CHAIRPERSON GRAHAM: And we'll get legal counsel on how we get -- if it’s needed, how you get around copyright and so on.

So I take your question and we'll report back tomorrow morning.

MS. LLOYD: Very good. Thank you, Mr. Graham.

CHAIRPERSON GRAHAM: Thank you.

Any other questioners? If not -- Mr. Brackett, thank you very much, and I apologize for -- oh, just one moment. There's someone -- oh, another -- Mr. Haskill is up -- is waiting there too. We have a problem in getting who wants to report. There's a delay in the messages coming up.

So, Mr. Haskill, the floor is yours.

MR. HASKILL: Thank you, Mr. Graham. It was my fault. I didn't get there in time. I didn't realize that you were going to shut it off so quickly.

My question is to you, sir, and I would like you to direct it to medical Dr. Patsy Thompson, please.

We raise horses in the Province of Ontario. I feed them apples and I heard some words from him that I'm worried about. They drink water and I assume it’s got tritium in it.

When these horses are tested by the provincial government after we win a race, hopefully, are my horses going to show positive for tritium and I get a $20,000 fine and a 3-year suspension? Is this going to happen to me with tritium in the water and the apples?

CHAIRPERSON GRAHAM: I will -- I'm not sure whether when they do tests at horse races -- because I used own race horses myself -- that they test for tritium, but I'll ask Dr. Thompson to address that.

DR. THOMPSON: Patsy Thompson, for the record.

I have no answer to that question.

I have no idea what water is being consumed and what apples are being eaten.

CHAIRPERSON GRAHAM: We're not aware of testing for tritium. I think what the -- there are drug tests, as you know, but I don't think it's for tritium, but I'll ---

MR. HASKILL: My understanding, sir, is that they are now starting to test for tritium because it's becoming a problem in the Province of Ontario.

So where can I get the answer? Just direct me to the right place and I'll go look for that sucker.

CHAIRPERSON GRAHAM: I'll report back to you tomorrow what -- if there's any way of finding out. I'm not sure whether CNSC has the abilities, but we will mention it tomorrow morning.

MR. HASKILL: Thank you.

CHAIRPERSON GRAHAM: Thank you.

MR. HASKILL: That's a reason I can come tomorrow.

CHAIRPERSON GRAHAM: Thank you, Mr. Bracket. I appreciate your coming and thank you very much.

Now, Amanda Lickers, you have the

floor. You were on earlier this week and couldn't make it and we rescheduled for tonight.

Ms. Lickers' presentation submission is PMD 11-P1.229, and the floor is yours, and welcome.

--- PRESENTATION BY MS. LICKERS:

MS. LICKERS: Hello. I'm just going to drink some water. Hopefully there's no Tritium in it. Okay. Well ---

CHAIRPERSON GRAHAM: As I said before, take your time and feel relaxed to be able to give your presentation.

MS. LICKERS: Okay. So my name is Amanda, Amanda Lickers. I'm a current student at Trent University. I'm a Bachelor of Science, Environmental Chemistry.

I'm going to touch on a number of issues which demonstrate the financial risks as well as the health risks that Canadians will face if this project is approved, as well as critique the current ideological paradigm that the nuclear industry is operating within as a green technology.

Firstly, I want to present a brief radiation oncology which examines the classical paradigm of radiobiology that is based on the

concept that all radiation effects on living matter are due to the direct action of radiation and describe the cellular and genetic issues that low-dose ionizing radiation incurs.

The studies that I'm looking at -- there's two that I have taken primarily from. One was published by the University of New Mexico in 2002, “Targeted and Non-Targeted Effects of Low-Dose Ionizing Radiation on Delayed Genomic Instability in Human Cells”.

And the other was actually published in June of 2010. It’s from the Journal of Mutation Research and Fundamental and Molecular Mechanisms of Mutagenesis and it’s titled, “Non-Targeted Effects as a Paradigm-Breaking Evidence.”

And these studies are conducted based on epidemiological data as well as in-lab, so it was primarily on chimeras, which are kind of a weird thing. They're actually animal-human hybrids, like embryonic, and then they like zap it with radiation, so it’s kind of weird, but okay.

So there are several adverse physiological and carcinogenic and mutagenic reactions that are in response to long-term, low-dose exposure. I'm going to start with low-dose,

radiation-induced, the bystander effect.

So the bystander effect is the effect on non-irradiated neighbouring cells who either are in contact or received soluble signals from cells that were irradiated. And by soluble signals, it's through cell communication mechanisms.

This occurs at extremely low doses, some of which are comparable to background radiation, where not all cells in an area that has been irradiated were actually directly irradiated.

The bystander effect gives rise to non-linear cell responses such as damage to cell metabolisms, cell killings, point mutations and carcinogenic effects and damage to chromosomes and do not occur in isolated locations relative to the point of irradiation. This increases the likelihood of developing free radicals, damaging cell health, and has a great deal of implications to the scientific understanding of radiation poisoning as it implies a new paradigm to the concept of accepted levels of exposure as the bystander effect produces adverse responses in cells which have not been directly irradiated. So it's pretty serious.

The second is radiation-induced genomic instability and this is an increase in genomic alterations of the progeny of irradiated cells. It includes chromosomal rearrangements; aneuploidy; abnormal number of chromosomes; delayed mutagenesis; genetic information is not transferred in a stable way with different mutation spectra; gene amplification; production of multiple copies of a particular gene or genes to amplify the phenotype, and it makes it more difficult to treat cancers and has evolutionary implications. It also results in chromosomal instability and cell death.

And so by this -- like the implication of this is that it’s actually -- when a cell reproduces the progeny of that cell, like it’s -- and the next -- first generation are also affected by the low dose of irradiation. So like -- like we see here, like chromosome instability or they're producing like the wrong -- like a multiple gene.

And these are things that you usually wouldn't see like in a healthy cell, and are very, very uncommon and very, very problematic as well. Like they lead towards -- they increase the likelihood of developing harmful cancers.

And there's another effect called the “death noosing effect”, which is displaying of radiation-induced chromosomal instability which is toxic to unirradiated parental cells and can be seen many generations after the irradiation has occurred.

So long-term, low-dose radiation exposure not only affects the cell that is directly irradiated, but also cells that were not directly irradiated in a non-linear form.

So because cells communicate with each other to perform tasks, like another cell in a different area could start to develop, like, you know, it could be -- there could be a problem with the helix or there could be issues with its ability to reproduce itself or to repair itself.

And also, these issues are seen in future generations of a cell. So as time passes and the cells divide and they reproduce these same issues occur.

So like long-term low dose exposure isn’t really negligible in that way and these are like -- these are very recent studies, this is actually after the BEIR-7.

So that’s something that I hope

the CNSC would look into as well.

And then the last point here is trans-generational responses which refers again to the reproduction of cells.

So this is a mutation induction. Mutation induction itself is the fundamental event which underlines long-term genetic risk for humans and that's like when -- because like this has -- if we're talking about, like cells whose DNA is changing that could effect our total organism as individuals, it means that we could become carriers for more mutations, like down the line.

So this could have effects not only in our cellular progeny but also in our genetic progeny, like our actual children and future generations.

So here's a quote actually from the Aberbach article which is the one that was published by the Mutation Research Journal, non-targeted effects as appeared on breaking evidence.

> "In recent years evidence has been obtained for the induction of persistent elevated levels of mutation rates in the progeny of

irradiated cells. Not only the genetic risk could be greater than previously thought but also mutations and associated genomic instability could well increase radiation-induced carcinogenesis."

Academics have observed low dose ionizing radiation as a contributing factor towards genomic instability, leading to trans-generational carcinogenesis since as early as 2000.

Non-exposed ---

CHAIRPERSON GRAHAM: Ms. Lickers, if you could just slow down.

MS. LICKERS: Sorry.

CHAIRPERSON GRAHAM: The translation booth is having a little problem.

Just take it a little slower please.

MS. LICKERS: Yes. Sorry, guys.

So non-exposed first generation offspring of irradiated cells show single and double strand breaks, endogenous DNA damage, replication stress, and parental irradiated cells

can induce distant bystander effect where epigenetic alterations in the offspring occur.

Overall, future generations of cells inherit genomic damages, impedances on cell structure, ability to repair and cause alterations to DNA strands.

This type of relationship between radiation and genetic memory has severe implications, not only for cell progeny but also the progeny of us, of the organism.

These findings contradict the classical paradigm of radiation biology that says all radiation effects on cells, tissues and organism are due to direct action of radiation on DNA and show our need to further research the relationships between cell responses and radiation exposure.

Showing that real time non-radiated cells and first generation non-radiated cells experience substantial structural and health compromise is a pivotal move towards a better understanding of the risks of nuclear power.

The issues that Japan is now facing illuminate the question, how much radiation is safe.

Recent developments in radiation oncology, as I've described above, have brought into the light the seriousness of that question as the risks of low dose become apparent.

However, the issues of nuclear power do not revolve simply around toxic radionuclides that will pollute us but there is a serious lack of accountability in the nuclear industry for the entirety of the fuel cycle.

An investment in new nuclear technology at this time is simply an investment in debt. The projected estimate by Ontario Clean Air Alliance to date is roughly $24 billion, although OPG has proved to be able to successfully complete million dollar projects on time and under budget, that case is yet to be seen for billion dollar projects.

Furthermore, this estimate does not include transportation costs or waste disposal or management costs or the cost of decommissioning a reactor.

In leaked documents to CTV AECL admitted to the risk and likelihood of large cost overruns in their operation -- sorry -- in their bid for the project.

As projects like this not only has enormous financial incurrences as a start up operation it has yet to be seen how the market will treat labour cost and what the projected financial commitment for site maintenance will become.

In the nuclear industry Proponents must recognize that there is a time lag in the technology and more often than not, reactors are somewhat dated even by their opening day.

This type of financial commitment on behalf of Canadian citizens is difficult to justify, especially with the strong opposition we have seen in these panel proceedings.

The CNSC has a duty to adhere to that, to the interest of its community, to recognise the arguments of fellow citizens and make decisions based on public consultation.

It is clear now that the public does not want to see new builds in Darlington. The old builds faced resistance and as do the new ones, we do not seek a legacy of debt and you must act with agency to represent that interest on our behalf.

It is because the risks of nuclear are not just in potential exposure to radionuclides

but this investment must not be considered an investment in renewable energy for one simple reason, mining.

Unfortunately, the industry has failed to acknowledge the dependence on uranium as a raw material in order to guarantee the continuation of nuclear energy.

Land use and mining practices carry heavy pollution burdens on communities, impinge on Aboriginal sovereignty and irreparably degrade our environment. In this way nuclear and coal must be equated.

But the story of the fuel cycle unfolds further; the issue of waste is currently a volatile and bleak obstacle to overcome and it is one that must be considered in this environmental assessment process.

There are no modern technologies which neutralize the radioactivity of the waste and our only solution today is to close our eyes and ears and bury it in the ground.

Perhaps Members of the Panel have heard of the Onkalo Tunnel. Finland is on track to become the first country with a permanent waste repository for spent fuel rods, which by the way I

heard that Onkalo is actually being shut down because of the Fukushima Daiichi and there's major protests in Finland which have actually discouraged this project.

Onkalo is -- and they had already begun production and the final product was supposed to be five kilometres long and 500 metres deep. Finland's secret in solid granite bedrock.

The project had an estimated cost of 3 billion Euros and will take an estimate 15 years to build with a projected lifespan into 2100.

The issues Finland has begun to face are not only practical but theoretical. It is clear Onkalo will need maintenance throughout its lifespan but 100,000 years is a timescale no human civilization has attempted to operate within previously.

The western coast of Finland where this industrial crypt is located is projected to undergo an ice age in 60,000 years. Humanity as we know it today has only been around roughly 100,000 years.

Who will watch over Onkalo when we are gone? What if the earth changes the shape of her face? What if we are still around, will we

enter Onkalo, will we try to see what our ancestors have buried there? How can we tell them it is not safe? Will our grandchildren remember to tell a story of Onkalo?

There is no way to be sure. There is no way of knowing. The risk of human intrusion is high. Our civilization today excavates the ruins of past cultures, enters their pyramids and Temples, tries to uncover their secrets. What if they cannot take chemical samples or measure radiation?

What if the spent fuel becomes a valuable commodity, do we leave signs? Can they read our signs? It is impossible to know.

Onkalo will only house a tiny percent of the world’s nuclear waste. How many graves must we build?

The issue of nuclear waste is paramount. In my opinion, more pressing than the reliability of current technology.

A means of production without adequate means of waste disposal is a poorly planned project that undoubtedly will leave humanity in a difficult and scary place.

We have a responsibility to future

generations to find solutions for the waste we currently have and there should be no more waste made until that time.

It is foolish to undergo a project that will only add volumes of urgency to this unsolved equation.

I urge the panel not to forget the fuel cycle, not to forget the legacy of waste we leave when we choose nuclear power.

The people of Ontario are at a crossroads where we can begin cultivating a new standard of energy sources by pursuing legitimate alternatives that are truly renewable, that do not produce toxic waste, that will not poison our bodies and our generations, that will not render our land uninhabitable through mining or in the event of an accident, that do not leak poison into our water, that do not require us to dissect the earth and leave her cadaver lifeless.

That's all I have.

CHAIRPERSON GRAHAM: Thank you very much for your presentation.

We'll go now to my colleagues for their questions, and Madam Beaudet.

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman.

I've been -- you brought important points and interesting points. I'd like to ask CNSC what you were mentioning that CNSC should look at these studies, the recent studies and I'd like to ask CNSC -- and I think you did mention it, but maybe you can cover this item again, how you keep up to date with recent studies.

DR. THOMPSON: Patsy Thompson, for the record.

The CNSC is aware of the literature that Ms. Lickers is referring to. There is extensive research going on in terms of both delayed and non-targetted effects.

These studies are done extensively in cell cultures and they do in fact challenge the classical understanding of how radiation will increase the risk of cancer and cancer development and promotion.

This has been essentially a topic of both extensive research and also extensive consideration by the international community. And I believe the -- there's a UNSCEAR report on delayed and non-targetted effects and I can't

remember if it's 2008 or 2006, but it's something that the CNSC is paying attention to.

And in our view as well as the view of the scientists and international community is that undertaking of delayed and non-targetted effects is important in terms of understanding the mechanisms by which radiation causes cellular damage and mechanisms by which cellular damage is repaired or not repaired.

When we -- the dose limits that have been set are set based on epidemiological studies, studies that have looked at people who have developed cancer in relation to high exposures of radiation.

And what happens in the cells of people exposed to radiation may be a combination of delayed non-targetted effects that are both positive in terms of several mechanisms that react to cellular stress as well as negative effects such as those that Ms. Lickers has referred to.

But in all cases, this happens at the cellular level and the response in terms of cancer incidence, will be captured in the studies that have led to the development of -- are radiation risk factors because we do look at cancer

incidence in populations exposed where all these mechanisms are happening. So they are captured in the risk factors.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Thank you.

I have no questions or comments. Thank you.

CHAIRPERSON GRAHAM: Now, we go to the floor, OPG do you have any questions to the intervenor?

MR. SWEETNAM: Albert Sweetnam.

No questions. Thank you.

CHAIRPERSON GRAHAM: CNSC, do you have any questions or comments or clarifications?

DR. THOMPSON: Patsy Thompson.

No question, but perhaps to add one more sentence, is that even though there's been a UNSCEAR report on the subject, we do continue to review it and we actually had someone do a report on this not very long ago.

CHAIRPERSON GRAHAM: Thank you.

From the floor, do we have anyone? Julie's shaking her head, so we don't. So you -- I

will let you have the last word.

MS. LICKERS: Okay. Can I ask -- I guess I don't know who this would -- you tell me who this question is for, okay.

CHAIRPERSON GRAHAM: Ask me the question and then I'll decide.

MS. LICKERS: In the environmental assessment I understand it's like outside of the scope, but I mean, I think that first of all, I'd like to know if would be possible to amend the process to include a comprehensive strategy for waste management. And second of all, does OPG consider waste disposal their responsibility and what kind of strategies do they have, if any?

CHAIRPERSON GRAHAM: First of all, I'm just getting some legal advice here.

MS. LICKERS: Okay.

CHAIRPERSON GRAHAM: We cannot amend, as such, but I'm going to let OPG respond as to their responsibility because they are going to be responsible for waste forever.

MS. LICKERS: Yeah, and then --

CHAIRPERSON GRAHAM: And that's why I'll ask Mr. Sweetnam ---

MS. LICKERS: Okay.

CHAIRPERSON GRAHAM: --- to answer that question.

MR. SWEETNAM: Albert Sweetnam, for the record.

Yes, OPG is responsible for the waste generated by our stations, both the low and intermediate wastes and the fuel wastes. And yes, we do have strategies. These strategies are laid out in the documentation that's been presented to the panel.

It's been available for public review and the strategies are around either storing the waste at site, as we're presently doing in terms of the fuel wastes. And for the low and intermediate wastes, either storing at site or transferring it to another waste facility, that's licensed by the CNSC.

CHAIRPERSON GRAHAM: Thank you very much.

And as I say, we cannot amend because the terms were already set.

MS. LICKERS: M'hm. But I guess my question really is, is there a process to make sure that EAs are more accountable for the full scope of a project in the future, like, maybe not

-- obviously it's too late for this one, but --

CHAIRPERSON GRAHAM: No, we're -- we're looking at the full scope of waste. Waste is included in our -- in our Terms of Reference.

MS. LICKERS: Okay.

CHAIRPERSON GRAHAM: Thank you very much for coming. We appreciate that; appreciate your intervention and safe travels back to your university and good luck in your studies.

MS. LICKERS: Thank you.

CHAIRPERSON GRAHAM: Now, that is the last of the submissions for the evening.

We have a number of oral statements and I'm wondering -- let me -- do we want a break right now or -- we'll do Mr. Cameron. We'll do your oral statement with, I believe, you have a presentation under PMD 11-P1.247 with regard to a slide deck and we'll accept that with your oral statement. And you're going to do it up there and somebody is going to do your slide deck down here. Thank you very much and welcome.

--- PRESENTATION BY MR. CAMERON:

MR. CAMERON: Thank you. Yes. I am Ian Cameron. I am a Trent student. I'm in my second year of mathematics and I am with Save PTBO

which stands for Peterborough.

Next slide, Dave.

All right, I am studying the impacts of uranium excavation with connections to Darlington. A quick summarization of my point is that the negative impacts of uranium excavation are perpetuated by the functioning and expansion of the Darlington power plant.

Excavation in this sense can be defined as the process in which uranium is removed from its natural habitat and the process in which it's prepared for fuel rod use.

The next slide.

So a definition of uranium mining is provided by a Proponent of nuclear power, the World Nuclear Association, and they say this exactly:

> "The environmental aspects of uranium mines are the same as those of other metalliferous mine operations."

With this quote in mind, I was going to draw from examples from other mine operations such as gold and iron that had gone sour with regards to expropriation, oppression and

disregard.

However, I was able to find examples of these occurrences all within the Canadian uranium mining industry. So the first example will be expropriation.

So in Elliot Lake, a more past example -- I will move to a more contemporary example instead of trying from the past. The production of waste would have one barrel of usable uranium material would -- would equal tons of solid waste dumped into the surrounding environment of the Elliot Lake Mine. By the year 2000, 300 million tons of radioactive waste was dumped in natural habitats. This entailed a contamination of vegetation, even the roads leading to and from the mine had caused some extinction of species.

Moving on, still on expropriation. The radiation-affected tailings, have caused massive damage to the environment, to the community. And still today in 2010, there is still radiation being detected in -- it's still diluted in the water.

Moving on to the oppression of Indigenous populations. A specific case which was part of Elliott Lake was the Serpent River

Reservation. In this scenario, there was knowledge of the infected water being distributed to the populations, so a filtration plant was given -- was produced to remove most, if not all, the toxins from the water for the non-Aboriginal population.

However, the plant refused to filter the water for the Aboriginal population. Their rationale being that it is a federal matter, not a provincial, so that is a pretty, blatant racist act right there by the -- I guess that would have been the industry responsible for filtration, I guess.

Port Radium was the first uranium mine, which was used to supply uranium for weapons, but that’s not of concern of this meeting, but regardless, the waste dumped into the lake was with inhabitants across the lake. There was no precautions taken in that case.

So these are all past examples, which hopefully have been learned upon and the protocol has been manipulated for the betterment of human life and the environment.

However, an example, which dates back just five years ago has violated all the concerns I’ve just addressed with Cigar Lake in

2006, a flood caused radon infected water to leak into a populous drinking supply.

The mine is owned by Cameco, and I'll get more into Cigar Lake in a few slides, but -- oh, that's okay. Thanks, Dave. So, yes, Cigar Lake, I guess, I'll just dive into that.

So October 24th, 2006, the flood occurred, water was leaked into the drinking supply. I did a bit of research as to how affected it was. Fish had some radiation. Water -- there was some motivation to talk with the local populations, however, I could only find a pamphlet discussing the good things, not so much the negative occurrences.

And in regarding the mine of Cigar Lake, it has collapsed three times now. The fourth venture is beginning in 2013. Workers are being exposed to radiation, however, from reports it's below levels of concern. I guess my response to that would be workers have always been below -- uranium miners have always been below levels of concern and uranium miners have always had the highest rates of lung cancer and death among miners.

So keep in mind, Darlington

requires uranium to function. It only perpetrates -- perpetuates this system of oppression.

The next slide, so getting into a more contemporary issue again. This is the point in which uranium is not being mined anymore, but being processed for use in the nuclear power plant.

Peterborough, a city within the Kawarthas. General Electric, Attaché makes -- a maker of electrical appliances operates in downtown Peterborough. As of now, they only process natural uranium, they don’t process low and rich uranium, but they were proposing to -- to process low and rich uranium for nuclear reactors such as Darlington.

And this -- this process would have occurred within the downtown community seeing as how the GE Factory is in a pretty residential area.

You can go to the next slide, Dave. Yeah, and I’ll show you a map in a few seconds, but the activist resistance did -- did -- was not in support of this, this action and GE, General Electric, is no longer allowed to manufacture low and rich uranium within the area,

but this map will show you how severe the situation was. Next slide.

Yes, so in the middle of the map, we have the factory. Each circle represents 100 meters in radius, so the second circle represents 100 meters away from the facility.

The first square is the public school, that is Prince of Wales Public Schools, junior kindergarten to grade 8, population of 650 students plus the faculty. They are 100 meters away from natural uranium exposure. Thankfully not low and rich.

The next square is the -- at 300 meters -- 250 away is the residential home, Royal Gardens. Population approximately 150. There is the YMCA at 350 meters away. They get over 500 people a day in and out of the building. Then in the top left corner you have the hospital of the Peterborough area clocking at 450 meters away from the uranium.

The next slide ---

CHAIRPERSON GRAHAM: Mr. Cameron, if I could suggest, time is running out. Maybe get to your solutions. That’s what I think we would be -- where Peterborough -- the Peterborough situation

was explained by at least one other intervenor before, so the panel has heard that.

So if you get to the solutions, it might be helpful because we don't want to see you use all your time just on the first part.

MR. CAMERON: Okay. We can skip this, if it's already been read, but solutions. Solutions is something I want to elaborate on, so all right, let me get my presentation back in order here.

All right, so I propose solutions merely because it's apparent that the power plants only perpetuate a pretty impressive mining system to the environment and peoples living in those areas and the workers, so solutions to lower the impacts of mining due to the power plants, construction and expansion are provided, so the next slide.

So if we look at the first -- the first part, increased energy demand equals a need for energy supplement, which would incur -- increase in the nuclear industry, which would be a bad thing. A bad being described as the oppression, which I described within the mining industry, so it's obvious that the root of the problem is due to an increase in energy demand.

Excellent. Thank you. So the root of the problem is high consumption rates of energy. Lack of education concerning resource crisis. These are expropriation and community destruction.

Lack of investments in renewable energy. I would like to invest -- to elaborate on this point. I couldn't find a solid number that would represent the amount of money spent on nuclear power, but it’s definitely in the billions each year. Whereas I can only find minuscule numbers spent on renewable energy.

I calculated an average of 2.4 billion dollars each year spent on nuclear and about 0.14 billion dollars spent on renewable.

The argument that nuclear provides jobs can be trumped by the fact that if more money was pumped into renewable jobs would be provided by renewable technology.

The next slide, so invest in renewable technologies, I already covered.

There seems to be a lack of education regarding very consumptuous consumer item such as large automobiles, excessive amounts of laundry machines, so on and so forth.

And there seems to be a lack of education through public service announcements and as previously concerned, nuclear education within high schools and alternative resources in the education institutes. These solutions we've all heard before. Really acting upon them is what needs to be done.

Before I get to my last viewpoints, some stuff that -- some items that were not on the PowerPoint I have encountered, and I will describe now.

Some items not on the PowerPoint, one of which is -- I encountered this idea in the GE procedure that was -- they would often talk around issues.

For instance, they said they had taken into account the indigenous communities and the uranium, but after interviewing the indigenous communities it was found that they're incredibly unsatisfied and unaware of GE's plans to implement uranium in their community.

This also applies to what's happening now, in which I see many cases of an issue being brought up and merely the professional or the academic in that area who will merely say,

this has been looked into but the results won't be provided or the actual numbers won't be there, or merely they'll walk around the issue. That's why I wish to propose that ---

CHAIRPERSON GRAHAM: Mr. Cameron.

MR. CAMERON: Yes?

CHAIRPERSON GRAHAM: You're five minutes over already. Could you sum up, please?

MR. CAMERON: Wrap it up? Yeah.

My conclusion was that I guess talking around issues should be disallowed and confrontation is preferred.

So learn from the past, Chernobyl. Learn from today, Japan. And then learn from us.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much for your presentation, especially your slide deck which is very informative.

Now, I'll go to my colleagues, panel members. Mr. Pereira?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you very much for your presentation, and a major part of the rationale for you -- the issues that you raise is

health and hazards in uranium mining.

We've had presentations from other intervenors on the subject, concerns being raised, and we've had reports presented by CNSC staff on health studies with modern uranium miners.

And what we saw from those studies is that the modern uranium mining is very well regulated and they're -- the modern miner cohort studies have shown there was no significant change in cancer risk.

But I'll go to CNSC staff to confirm whether my understanding of what was reported to us before is correct.

CNSC staff?

DR. THOMPSON: Patsy Thompson, for the record.

The studies that have been done on what are referred to as the Eldorado Uranium Miners Cohort, have shown an increased risk in lung cancer.

And essentially workers involved were involved in uranium mining from the '30s, '40s, to about the late '60s. And there was an increased risk in lung cancer, essentially because of the high radon exposure -- radon decay product

exposures.

From the mid-‘70s onwards, there were a lot of radiation protection methods implemented in mining, such that the doses of radon decay products that the workers were exposed to, were significantly reduced and the Joint Review Panels in the mid-‘90s had recommended a cohort study of modern uranium miners.

And the CNSC, in collaboration with federal and provincial partners, did a feasibility study of modern miners up to the expected end of life of the mines that were being approved in the mid-90s.

And that study showed that the doses were so low that the probability of detecting an increased risk in lung cancer from mining was statistically too low to be able to study, and that the increase in the lung cancer incidents would be related to residential radon, so radon in homes, and smoking, and not through radon exposures in the workplace.

MEMBER PEREIRA: That would have been for miners in an era starting about when?

DR. THOMPSON: Patsy Thompson, for the record.

I could provide the details tomorrow. It included the miners who would be employed for -- for example, McArther River, McLean, the modern mines -- but I can't remember the start date. But I can provide that detail tomorrow.

MEMBER PEREIRA: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Do you want that an undertaking? No, it’s okay. You’ll just provide that.

Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

Thank you for bringing your concerns forward to us. I was looking at the list of solutions you were proposing and I think “learn from the past, learn from today and learn from us” is interesting. You did a new generation coming up, but I was wondering what you mean on putting boycotts on washing machines?

Wouldn’t you say that it would be better to improve the efficiency of the appliances than to put a boycott? I just wanted to clarify that.

MR. CAMERON: Yeah, improve the efficiency would be an alternative way to reduce the massive impact our laundry has on the environment, yes.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you, Madame Beaudet.

Thank you, Mr. Cameron for your presentation. We have five more -- for your statement, I should say, and your presentation. We have five more statements, but in fairness to everyone, we're going to take a break until 12 minutes to 10.

MR. CAMERON: I have a response to the -- just what the CNSC said.

CHAIRPERSON GRAHAM: I -- look, time -- some people that are sitting here, we're going to be here till midnight, so if you don't mind, thank you very much for your presentation.

--- Upon recessing at 9:33 p.m./L'audience est suspendue à 21h33

--- Upon resuming at 9:47 p.m./L'audience est reprise à 21h47

CHAIRPERSON GRAHAM: Thank you

everyone for that short break.

Now, we'll go to the next oral statement, which is Mr. Grant Orchard.

Mr. Orchard? Perhaps just pull it up a little closer to you, the microphone. Thank you very much.

--- PRESENTATION BY MR. ORCHARD:

MR. ORCHARD: Mr. Chair, Madam Co-chair, Panel Members and members of the public. My name is Grant Orchard. I live in Toronto and worked much of my life as a journeyman heavy duty mechanic in my native province of Saskatchewan where I followed the nuclear issue for many years.

I've also been active Canadian sovereignty, labour and justice issues, and in the political arena where I co-managed the Federal leadership campaigns of my brother, David Orchard.

This evening, I wish to explain why I oppose new nuclear reactor construction, refurbishment or expansion of the industry and to support what I believe are workable alternatives to nuclear power generation in Ontario.

Problems with nuclear power. We need only to look to Japan, Chernobyl, Three Mile Island to witness the profound and far-reaching

political, environmental, economic, health and moral ramifications of nuclear power generation gone wrong, and to show us that despite arguments to the contrary by so-called experts in the fields, accidents do and will happen in this industry.

One could argue that operating nuclear reactors within such a densely populated area is the golden horseshoe of Ontario, with millions more living across our border, is inviting trouble of catastrophic proportion if an accident were to occur here.

Power generation drives the nuclear cycle that begins with mining and ends in a deadly military application of depleted uranium.

During time spent campaigning in Northern Saskatchewan in 2008, I heard many stories from the local residents who worked in or lived near the uranium mines in the Athabasca basin that supplies some 30 percent of the world’s uranium, stories of wildlife drinking from and swimming in unprotected uranium mine tailings ponds, waste bills that go unreported by the industry, and fishermen who see and catch grossly mutated fish in their nets.

One commercial fisherman told me,

I sell the fish, but I'd never eat it myself, a stark admission from a member of a community largely dependent on local fish for their diet.

Big trucks pound daily over the rough northern roads of that province delivering tonnes of radioactive yellowcake from processing plant to railway terminal.

Yellowcake, as you know, is a concentrate powder produced from the initial stage of processing the ore into uranium fuel for nuclear reactors.

A story from a town on one such truck route was that of a northern resident who discovered a pile of yellowcake on the road and carried a sample of it into the local town office.

The yellowcake had fallen from a truck, and when the province was notified, a grader was dispatched to push the material off the road and into the ditch where it would leach into the intricately connected river and lake systems of Northern Saskatchewan.

A serious problem with atomic power that remains unresolved is what to do with the tonnes of highly radioactive waste that nuclear reactors produced.

The proposal currently being pursued by Atomic Energy of Canada Limited, AECL, is to bury the waste deep underground in solid rock formations.

The Province of Manitoba spent many years experimenting with deep rock disposal at the Whiteshell Facility at Pinawa. It concluded that no matter how solid the rock, water moves through it.

The cocktail of waste generated by nuclear reactors is lethal for up to a million years. Any container will leak long before that time, and the buried waste will be released irretrievably into the environment leaving a deadly legacy for eternity for -- to future generations on the planet.

Virtually every state in the US has said they do not want it.

For two decades, the Yucca Mountain site in Nevada has been the sole focus of US government plans to store nuclear waste deep in solid rock caverns.

Over 13 billion has been spent on this site, but opposition grew steadily across the State, and the project was killed.

There are now over 100 reactors across the US looking for a place to get rid of their nuclear waste.

If a disposal site is constructed in Canada, nuclear power stations across North America will be anxious to send us their waste. I don't believe this is a future most of us want for ours or any other province.

The US military has used hundreds of tonnes of depleted uranium, DU, emissions in the bombing or Iraq, Yugoslavia, Afghanistan, and now in Libya.

Upon impact, DU hardened missiles often burst into flames and vaporise. A tiny speck of DU inhaled can be an agonizing death sentence as the escalating cancer rates of the countries so targeted are showing.

The subject of use of DN weaponry has been virtually taboo, but there's no way that we can pretend that our uranium is not responsible for massive suffering which will go on for generations to come in other countries.

This is an ethical and moral question facing us as a province and nation.

Options -- there are other options

available for producing power. Other Canadian provinces have a surplus of power they are seeking to sell.

Incredible as it may seem, Canada does not have an east, west electricity grid connecting our provinces.

Prime Minister John Diefenbaker proposed some 50 years ago that we link our country east and west so that the provinces requiring electricity would have access to those with power to sell.

Instead, most of the provincial electrical utilities have tied themselves more tightly to the US states to the south and to their neighbouring provinces.

During the 2003 blackout in Ontario, for example, Quebec had surplus electricity it was seeking to sell south, but the link did not exist for Ontario to get that power, and we ended up buying expensive and dirty US coal-fired electricity.

Ontario could take the lead in advocating a national east, west grid that would give all Canadians a sense of energy security.

With simple high voltage lines to

Manitoba and Quebec, provinces that produce much more power than they use, Ontario could purchase this extra power when needed from already existing hydro facilities without the high costs of nuclear generation.

This is one clear and obvious solution which has received very little discussion.

Former Ontario Energy Minister Dwight Duncan advocated in 2004 for an east, west power grid to supply Ontario's market. He announced an agreement between Ontario and Quebec to build transmission lines for delivery of an additional 1,250 megawatts of power here and that talks were ongoing with Manitoba for the same.

In media reports, Mr. Duncan says, and I quote, "I really think Canadians need to focus on the need for an east, west grid and that we need to begin to really talk about energy self-sufficiency and energy security. I hope that Canadians will have turned their attention to this and understand that we have a remarkable opportunity. My hope is that governments can come together and find ways that all of us can benefit."

I ask the province what the status is of that initiative to supply power from Quebec

and Manitoba is -- to Ontario is.

China, which has stopped construction of nuclear power plants following the Japan crisis, has undertaken the construction of a national power grid. And it's an undertaking that's driving up the price of copper and aluminum in the world.

Even the impoverished country of Bangladesh has a national grid to provide power and stability to its regions.

And there's other options.

A second option for power generation involves looking at alternative sources of energy.

Germany, it's mentioned tonight, for example, after a great deal of study and debate is phasing out its nuclear reactors by 2020 and is developing wind and solar generation.

Ontario has a good deal more wind and solar resources than most jurisdictions in the world, including Germany, and must do more to develop them.

Both wind and solar energy are sustainable indefinitely and don't carry with them the large risks and problems of nuclear energy.

In conclusion, we must ask why so many other jurisdictions have said no to nuclear power.

BC, Alberta have said no to the development of the nuclear industry.

Manitoba, from its study of deep rock waste disposal at its Whiteshell facility, legislated a nuclear waste ban in that province in 1987.

In April of 2009, the Saskatchewan government undertook a public consultation process chaired by long-time civil servant Dan Perrins to gauge public opinion on its plans to establish nuclear power generation in that province.

The Perrins Report submitted to the government in the fall of 2009 reflected wide-scale public concern and opposition to the plan in its recommendations that resulted in the Saskatchewan government's decision to suspend plans for nuclear power in that province.

Why in a province where reliable, safe, and stable alternatives to nuclear power exist does the Ontario government continue to support the nuclear option?

Access to a stable supply of power

from our neighbouring provinces combined with clean alternative sources and a sensible plan to reduce consumption could replace nuclear power generation in this province.

I believe that for the sake of our future and the future of generations to come that we must ratchet down and phase out nuclear power and that these public hearings offer an opportunity for our government to rethink and to redirect the future course of power generation in Ontario.

And I urge you, Mr. Chairman, to take a long sober look at the risks, dangers, and the economic costs involved in this industry and to ensure that we continue no further down on this path.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Orchard.

I'll go now to questions from my panel colleagues.

Madam Beaudet?

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you. Thank you, Mr. Chairman.

I don't know if you were here this

afternoon when the Assistant Deputy Minister was here, and we did ask him about how far, let's say, the trans-provincial grade -- grid was moving on.

So if you were not here, I think it would be interesting for you to look at the transcript of today.

On another point that -- you've raised the moral question. We did get quite a few number of submissions, written ones as well, raising the ethical or the moral issue.

And I wonder if you could elaborate a bit more on your comment.

MR. ORCHARD: If you're talking about the use in weapons, the use of our uranium in weapons, or the --

MEMBER BEAUDET: Weapons, but mainly the nuclear energy.

MR. ORCHARD: Well, the -- the ethical and moral, like, you know, I would quote Dr. Caldicott and others who said that the nuclear industry and the accidents when they happen are like -- you know, it's -- it's like a nuclear weapon without the -- a nuclear war without the -- on the people without the weapons.

And this -- you know, other people

are more expert than I have been talking about the problems of radiation and the legacy. But the waste is a big problem, what we're leaving to our children.

How do we deal with this waste?

The best thing right now is to leave it on site but we're in an industry that we don't have -- it's been brought up before. We don't have answers to the problems of waste disposal and yet we're -- I guess if we think we can bury it in the ground and then it's out of sight, out of mind, we can escalate the nuclear industry but that's not a suitable solution to burial.

And then our uranium is going into these -- you know, the plutonium into the nuclear weapons industry and that's leaving a legacy.

In Yugoslavia, there's different -- different quotes but, you know, some experts are saying their cancer rates have gone up 20 percent in that country since it was bombed by NATO with these DU missile tip missiles. They're very hard but they disperse into a vapour, a powder that's left all over the countryside in these countries that are being bombed.

So that's definitely an answer. What are we doing to the people in the world with this industry? And surely there's a safer way to generate electricity that doesn't leave this kind of legacy.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman.

Many of the points that you brought up and brought up by other intervenors and with the Assistant Deputy Minister this afternoon, we explored what Ontario had done in examining alternatives -- alternative generation options, wind, solar, gas and combined heat and power options.

And he outlined the province's strategy in moving forward with those alternative options with conservation and with nuclear as being part of the mix. And certainly of the issues that he talked about was the challenge of access to hydro power from Quebec, from Manitoba and as far away as Newfoundland.

So he talked about how those could

fit into the equation given certain constraints.

So I think you'll be very interested, as Madame Beaudet has suggested, to listen to that transcript part or read that part of the transcript. It is about an hour and a half long and we touched on many issues. So you'll find it quite enlightening as to why Ontario is going in the direction that it is.

But certainly the issues you bring up about waste and about the health impacts of use of uranium have been raised by many intervenors.

Thank you for your intervention.

MR. ORCHARD: Just briefly, what did the Minister say? Are they moving forward on transmission or is it ---

MEMBER PEREIRA: They are looking at a number of options and have figures that they've obtained on what it would cost and the connectivity challenges because there are some great distances involved.

But you will be able to see the full details of what he said in the transcript from this afternoon.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Orchard, for coming and sharing your

concerns in your oral statement.

The next oral statement is Olga Kremko.

Ms. Kremko, would you come forward and give us your presentation, please?

--- PRESENTATION BY MS. KREMKO:

MS. KREMKO: Mr. Graham and members of the panel, thank you for giving me the opportunity to make a statement concerning the two to four additional reactors that Ontario Power Generation are proposing to build at Darlington nuclear station.

Building more nuclear reactors at the cost of $35 billion in Ontario will stop the funding and political support, as well as research for green energy and electricity.

CHAIRPERSON GRAHAM: Move the mic over to you a little closer.

(SHORT PAUSE/COURTE PAUSE)

MS. KREMKO: Okay. I'll start with building.

Building more nuclear reactors at the cost of $35 billion in Ontario will stop the funding and political support, as well as research for green energy and electricity.

We can become more energy efficient. Our baseline needs can be met by an integrated combination of wind, water, geothermal, biomass and solar, et cetera.

When the wind turbines are not turning or even -- or the sun isn't shining, we can import more power from Quebec or even as far as from Labrador.

Over the past few years, we have been exporters of electricity. Recently, we could not stop the nuclear reactors and damage them. So we had to pay the United States to take our electricity.

Investing in nuclear energy because it is cleaner is a myth. In addition, nuclear is the slowest and most expensive solution for climate change.

The high costs, long construction time, high environmental and health risks, and problems resulting from management, it does nothing for climate change.

There are no direct emissions of carbon dioxide during electricity generated from nuclear power. However, the nuclear fuel releases carbon dioxide during uranium mining, fuel

enrichment and plant construction.

Therefore, a mixture of energy efficiency and renewable energy offers a quicker, more realistic and sustainable approach to reducing carbon dioxide emissions.

Many of Ontario's most senior energy bureaucrats are still stuck in the 1950s concerning nuclear power, though there have been improvements in the green energy efficiency in the past few years.

Since the two biggest electric power companies in Ontario, OPG and Bruce Power, are nuclear power companies, the Power Workers Union protects their members' jobs. Cement and steel and nickel companies stand to gain.

Debt payments guaranteed by Ontario taxpayers, insurance companies and pension funds make money using -- big money using loans.

Energy nuclear project in Ontario has been huge; capital costs overruns that are past on to Ontario electricity consumers or taxpayers, especially subsidies.

We are still paying the stranded debt for past nuclear mistakes, $150 per year for a decade. Renewable companies, et cetera, are not

allowed to pass their capital costs overrules to electricity consumers or taxpayers.

Ontario is considering the new nuclear plants such as Atomic Energy of Canada Limited advanced CANDU reactors, as well as other new ones that have not been operated anywhere.

Scientifically, if they have not been tried anywhere, then they are useless. For example, Finland AREVA, billions of dollars over budget and completion is three years late, with federal and provincial Ontario and consumers huge deficits. Including personal bankruptcies, we, as consumers, can no longer afford nuclear plants.

Nuclear plants release millions of radioactive curies annually called “incidents”, leak and release millions of gallons of cooling water contaminated with radioactive tritium.

I mean we've talked about it like previously.

In Lake Ontario and Lake Huron, and Lake Ontario especially is very polluted and needs to be protected and nuclear plants threaten the health and we're all getting up all -- of all in -- you know, in their environment as well as in other nations.

Women living close to nuclear plants develop breast cancers -- okay, more than they do in other populations, isotopes, plutonium 239. They can be even passed to, you know, onto generations. And low-level radiation and cancer mortality through the Petco effect by Dr. Sternglass, a long-term exposure of extremely low radiation, one half millionth of a rad is -- can pass radiation, you know, from generation to generation.

And also security threats and potential weapons of mass destruction are targets for terrorists. Insurance industry do not insure nuclear isotope, plutonium, do not insure nuclear plants. And isotope plutonium 239 was used by India to make nuclear weapons in 1974. In other words like anybody can use our nuclear plants to make -- to make nuclear weapons.

Depleted uranium -- uranium enrichment process used on weapons and in this recent wars of Yugoslavia and Iraq, 200 million tons of uranium tailings in Ontario -- in Saskatchewan lie all over the place and they produce radium, radon gas polonium and others. And it’s difficult to store and expensive -- and

expensive because we have no experience of storing -- like any of the radiation. And it takes as much capital cost to shut down and dispose of a nuclear plant as it is to build one.

Therefore the choice must be made now, either we stick with more nuclear energy for the next 60 years or make a complete transition to green energy. And that's about it.

CHAIRPERSON GRAHAM: Thank you very much. You were right on your 10 minutes. Thank you very much for your presentation.

Mr. Pereira, do you have questions for Ms. Kremko?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you very much for your presentation. You made some very good points, which have appeared in a number of other presentations by other intervenors, talking about the preference for going to green alternatives and raising some of the challenges that we face with nuclear, the question of waste, cost overruns, the issues of leaks and tritium in the lake, cancer, terrorists, threats, nuclear liability. These are all matters that have been raised by many others so you've picked up on some

important points raised by many other intervenors.

As we mentioned earlier, we had the deputy minister -- the assistance deputy minister of Energy for Ontario here this afternoon and he talked about the reasons for choosing different options, a mix of nuclear and these other options and building up the green options and conservation, a strategy which involves going forward with nuclear, but with the others being mixed in to meet the needs for the next -- next few decades.

So I don't have any questions about your presentation because we have covered these matters before and we've asked questions previously. So thank you very much for your presentation. It certainly covered all of the issues that many others have brought up before.

CHAIRPERSON GRAHAM: Thank you, Mr. Pereira.

Madam Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

I just wanted to touch on one point that you've mentioned, that the civil servants still live or encapsulated themselves in

the 1950s. And I'd like you to comment maybe more on that and what do you feel that should be done in order to -- I presume you want them to look more at renewable energies?

MS. KREMKO: Well, definitely. There used to -- like I was saying, even though the green energy has gone quite a bit forward, and we can still even go more forward with it, if we -- if you use other science, like -- other -- find other scientific methods to do it. But these people they're just stuck in there and that's what usually happens with a lot of people, especially when they get older, you know, because there's so many in the 1950s. And most of the people that are in government, have been there for, you know, for quite a long time. And then you have the unions that make money on it too, on nuclear science.

MEMBER BEAUDET: Thank you. Thank you, Mr. Chairman.

CHAIRPERSON GRAHAM: Thank you, Madam Beaudet, and thank you, Ms. Kremko for your oral statement and all the information you've given us.

As Mr. Pereira has said, a lot of those topics have been debated over the last three

weeks and discussed and asked and we appreciate you sharing your concerns with us also in your statement.

Thank you very much.

MS. KREMKO: Okay. Thank you.

CHAIRPERSON GRAHAM: The next oral statement is from Sohail Ateeq and my indication is that he is not here so we'll take him off the record.

And the next one is Mr. Dale Stewart. And I'm getting a head shake also that Mr. Stewart is not here so he'll be removed from the record.

And the next one is Mr. Jim Harris. Mr. Harris, welcome tonight and the floor is yours, sir. And the only thing I ask is for the benefit of the translators don't talk too fast.

--- PRESENTATION BY MR. HARRIS:

MR. HARRIS: All right. Chair Graham, Madam Beaudet and Mr. Pereira, I want to take a slightly different tact. I want to look at the economics of the decision. And the impacts of Chernobyl are still being felt by the government of Belarus. It's estimated that about 235 billion has been spent since the catastrophe so far. And in

fact, 22 percent of the budget in 1991 was dedicated to it, to addressing the symptoms, mitigating the problem. And even to this day, five to seven percent of that government's budget is dedicated towards it.

Similarly, the Fukushima crisis is estimated to cost $12 billion and take at least three years of cleanup. That was reported in the last couple of days by Bloomberg. So here in Ontario, the liability of the nuclear industry is limited to $75 million. So on a $235 billion problem, say at Chernobyl, it is the public who'd pick up the bag, the taxpayer, Canadian and Ontarian taxpayer for the remainder, the same in the case of Japan.

So it's particularly telling that no insurance company will insure this. No re-insurance company will insure this. No private corporation will privatize -- will take on the liabilities. So the fact that no business on this planet will take on the economic risk should tell us something about the form of power generation itself. And we haven't even got to the issue of the disposal of the nuclear waste which is highly toxic for more than a quarter million years.

So looking at the economics, there are huge, massive subsidies to the industry. The risk subsidy is one we've just talked about here in Ontario, limiting the liability to $75 million. But there are the direct subsidies of course to AECL which run in about $20 billion since '52. There's the cost overruns of Darlington, three or four billion dollars last time and then there is the stranded debt of course, which we heard about from an earlier intervenor tonight, still at almost 15 billion dollars after our paying nearly 20 over 11 years.

The other economic thing we really need to look at is the alternatives. And McKinsey & Company, the pre-eminent management consulting firm worldwide, many would argue, has pointed out that investing in energy efficiency can give an internal rate of return of 17 percent over the next 13 years if we invest two trillion dollars globally.

It's important to note that this isn't some environmental group telling us this, this is a hardcore business group saying that this is fantastic economic return.

Wal-Mart is spending 500 million

dollars every year with four-year paybacks or less. We have -- and that assumes $50 oil by the way, so it's highly profitable. They didn't stop their sustainability spending during the recession because it's driving bottom-line benefit.

By contrast here in Ontario, our nuclear has never had a payback. We're still in debt. In California by focusing on energy efficiency, they use half the electricity per capita of any other people in the U.S., half the electricity by focusing on standards.

Are you aware for instance, that in North America, half the corporate PCs are on 24/365, half the escalators are on 24/365?

Conservation, I don't like the word conservation because it implies having to do without. You know, it took GM going bankrupt before they decided to turn the escalators off on evenings and weekends.

Why did it take bankruptcy to create common sense in that corporation, so when we compare Canada to the G20, we are the most energy intensive economy of any one we benchmark against. In fact, we require more energy per dollar of GDP than any other.

We are the most energy inefficient economy globally with the exception of the United Arab Emirates, Kuwait and Iceland, all three awash in energy, so the other thing that's very important when looking at economics, I always like to quote that famous economist, Wayne Gretzky who says, "I never go where the puck is, I go to where it's going to be", so I think the question tonight for us to ask is, where the puck is energy going in the future?

And if we actually look at it, Steven Chu, the Secretary of Energy for Obama, in the last week said that solar is going to be on grid parity by 2020 he believes.

So if we embark on this and make a ten-year construction commitment to build the nuclear plants that are being proposed, by that time nuclear will be far more expensive than solar because solar is on a declining cost curve, much like Moore's Law.

The price is declining 18 percent every doubling of capacity, so we're going to see a lock-in on a decision that will cause a huge economic liability for future generations, so we need to look at that.

But the final thing and the one that's most telling is when Linda Keen was fired by the current government, she had had a disagreement that the Chalk River Facility was not properly up to standards because it did not have a suitable, seismically protected backup power supply to ensure coolant to the reactor's core.

Does that sound familiar to anyone here? And she went to the wall on this issue and was fired at ten p.m. at night before appearing before a House Committee the next morning.

And so what this tells me is that the Safety Watchdog that is charged with protecting our interest against all others is meddled with on a political level.

It's like imagine the fire inspector went into a bar and the bar had chained off the exit doors and had no sprinkler system. And so the inspector said you have to as a requirement of your license to operate, address these issues, but the bar owner went to the local municipal politician and said, this regulator is interfering with my business. It's going to cost me money. It's really unreasonable and pressure was brought to bear on the regulator and the regulator, the

fire marshal was eventually fired.

That is exactly the same situation. And it creates a great deal of distrust for me in the body or the political meddling in the body that is supposed to protect our interests.

So for these reasons, for the economic impact of nuclear being far more expensive than any other form because other jurisdictions are not longer investing in it because we have no costing on what it's going to take to keep highly toxic radioactive waste away from all life forms for a quarter of a million years.

For all of these reasons, we can't invest in nuclear. It's far too expensive and we're far oversupplied as we are now. And the solutions are really quite simple.

CHAIRPERSON GRAHAM: Well, thank you very much, Mr. Harris, for those comments, remarks and views. Madam Beaudet, do you have some questions?

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman. Thank you for your presentation. We did discuss on a few occasions during the last three weeks financial guarantee that the proponent has to

put up for the commissioning costs.

Also, there is some bank deposits, which I recall it, for paying for waste disposal. And so you did bring different figures as to how much nuclear energy costs.

What I can have -- noticed is that the -- the debt of previous nuclear installations have a very, deep, bitter grain in Ontario because all Ontarians have to pay for that debt, but we did get some figures to compare different costs, level of costs for different power generation sectors, like wind, solar, et cetera. The Assistant Deputy Minister was giving those figures this afternoon.

And in your presentation I wonder if when you say that nuclear is more expensive, which part of the industry do you consider that is costing too much?

MR. HARRIS: Well, I -- all of it. All of it is costing too much. I just picked on four levels of subsidies. The liability subsidy is one form of subsidy. The direct subsidies to AECL are another form of subsidy.

The public taking up the stranded debt is another form of subsidy. The public bearing all cost overruns is another form of

subsidy.

I mean, there are many others that I haven't even gotten into, such as export loan guarantees for foreign countries buying CANDU reactors, that's another public subsidy.

The subsidies run into billions of dollars around this and so when -- you know, it's like saying the capital cost on buying a car is free, right? It's written off by the public and the operating cost of buying gas is what it costs to run the car. Well, no, it isn't, it's all the capital costs in getting the car really that should be averaged over the electricity production.

And then we've heard tonight that, you know, the reactors were promised to operate at 90-percent uptime and it wasn't anywhere near that, so the whole economic case is hammered every which way you look at.

But around the conservation, the energy efficiency initiatives, you should never ask a barber if you need a haircut. And similarly, you can't go to a nuclear power corporation and get it to engage in energy efficiency uptake. They're fundamentally different skill sets.

It's like asking somebody who is

300 pounds in weight to run a marathon tomorrow, it just can't be done. And so the efficiencies that, for instance, have been wrought of the economy in California are profound but they have had a consistent program. And you can have Art Rosenfeld who is the éminence grise of energy efficiency in California with the California Energy Commission come up and talk to you and he will show you example after example of ways to profoundly reduce energy use in the state at no cost to the state.

Simply for instance by saying you can't sell a television in this state, a big-screen flat-panel TV unless it's this energy efficient, and the industry will squawk about it, but do you know what, that level of -- you know, there are already 100 models available that meet that standard. And because we're buying flat-panel TVs this is something that's important.

So it's really simple things that can be done that have a profound impact. There are four billion electronic devices sold every year with power supplies. And the power supplies are the cheapest ones there are.

Do you know in the average house in Ontario the devices that are off are consuming

more power than the devices that are on. Because -- you know that little light is flashing, and the inefficient power supply in your microwave -- your microwave consumes more power in the 23 hours and 55 minutes that it's off than the five minutes you use it, because we have no standards on stand-by power for power supplies in our devices.

In fact, the load in California was equal to half a power plant. Half one of the plants you're considering could be eliminated with a simple stand-by power regulation that costs nothing to either consumers, to industry or to the state, the province.

MEMBER BEAUDET: Thank you.

Thank you, Mr. Chairman.

MR. HARRIS: Un plaisir.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Thank you for your interesting presentation and the insights you provide into what was achieved and some jurisdictions that look for energy efficiency.

Just on the matter of the $75 million liability, I think the government has realized for many years that that particular aspect had to be addressed, as you probably know.

Legislation to change that has died on the Order Paper three times for various reasons.

So certainly as far as we're concerned on this panel, this is an issue that is certainly front and centre among the various considerations that we are to address. It's not the main one but it is an important one.

Thank you very much.

MR. HARRIS: Even if it goes to $600 million liability, that is nothing approaching $235 billion for Chernobyl or 12 billion for Fukushima in Japan.

So it is not even, at 600 million, scratching the surface of the liability that we as taxpayers would bear and that is a huge -- and I would argue -- unacceptable subsidy to the industry.

CHAIRPERSON GRAHAM: You've given us a lot of thought. You've given us a good expression which we appreciate and above all, you've given us a lot of your knowledge which is very helpful to the panel and I thank you very much for coming tonight and sharing that presentation with us.

Thank you very much. Safe

travels.

Now, my understanding is that's the agenda for the day. So I guess what we'll do now is adjourn for the day and the Chair will resume at nine tomorrow morning.

So nine tomorrow morning for day 17 or 18, whatever it is.

Thank you very much.

--- Upon adjourning at 10:33 p.m./

L'audience est ajournée à 22h33

C E R T I F I C A T I O N

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