DARLINGTON NEW NUCLEAR POWER PLANT PROJECT

JOINT REVIEW PANEL

PROJET DE NOUVELLE CENTRALE NUCLÉAIRE DE DARLINGTON

LA COMMISSION D'EXAMEN CONJOINT

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JOINT REVIEW PANEL

Mr. Alan Graham
Ms. Jocelyne Beaudet
Mr. Ken Pereira
Ms. Debra Myles

Transcription Services By:

International Reporting Inc.
41-5450 Canotek Road
Gloucester, Ontario
K1J 9G2
www.irri.net
1-800-899-0006

ERRATA

Transcript :

Throughout the transcript “whole point” was utilized when it should have been “hold point”.

Throughout the transcript the spelling Mr. Kavlevar was used when it should have read Mr. Kalevar.

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Courtice, Ontario

--- Upon commencing on Wednesday, March 23, 2011 at 8:59 a.m.

CHAIRPERSON GRAHAM: Good morning, ladies and gentleman and welcome to, I guess this is Day 3, and I'll ask my co-manager to open with procedural remarks.

MS. McGEE: Good morning. Mon nom est Kelly McGee. Je suis la co-gestionnaire de la Commission d'examen conjoint du projet de la nouvelle centrale nucléaire de Darlington et j'aimerais aborder certains aspects touchant le déroulement des audiences.

We will have simultaneous translation at this session and throughout the hearing. It's available in French on Channel 2 and English is on Channel 1. So I'll ask you to please keep your pace of speech relatively slow so the translators can keep up.

A written transcript is being created for these proceedings and all of the proceedings and it will reflect the official language used by the speaker. The transcripts and audio recordings will be posted on the Canadian

Environmental Assessment Registry internet site for the project.

I'd also like to note that this session is being video webcasted and that the webcast can be accessed through the website of the Canadian Nuclear Safety Commission.

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

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

If you are scheduled to make a presentation at this session, please check in with a member of the panel Secretariat at the back room. Please also speak with Julie Bouchard of the panel Secretariat staff if you are a registered intervenor and want the permission of the Chair to have a question put to a presenter, or if you are not registered to participate but now wish to make a statement.

Opportunities for either questions to a presenter or a brief statement at the end of a session will be provided, time permitting. When presenting a proposed question to the Chair, please

use the standing microphone over there to my left. All requests to address the Chair must first be discussed with the panel Secretariat.

The panel is committed to a fair and respectful process and will not tolerate interruptions during presentations.

Thank you.

CHAIRPERSON GRAHAM: Thank you very much, Kelly.

Before we start proceedings this morning, just a couple of procedural matters I'd like to deal with.

There were some undertakings and I want to add a couple of new undertakings. The first undertaking Number 1 by OPG, the status of that; are you prepared this morning to answer that or when would you want to deal with that one?

--- STATUS OF UNDERTAKINGS:

MR. SWEETNAM: The undertaking with regards to sustainability, we are prepared to answer that this morning -- first thing this morning.

CHAIRPERSON GRAHAM: Proceed then.

MR. SWEETNAM: With me today is OPG's -- sorry, Albert Sweetnam, for the record.

With me today is our Vice-President of Sustainability, Cara Clairman, and I would ask her to respond to the question of Madame Beaudet.

MS. CLAIRMAN: Good morning. I'm Cara Clairman the Vice-President of Sustainable Development at Ontario Power Generation.

I understand the undertaking -- two-part question, the first part relating to OPG's use of GRI or the Global Reporting Initiative, and then the second part of the question related to a Stratos 2005 report and a perception that our performance had dropped.

So actually I'd like to address the Stratos first, if it's okay with you.

That Stratos report was dated 2005 and just to clarify, that Stratos report was only looking at sustainability reporting, but not on sustainability performance. So it was only focused on how you reported your information, not whether your information was a valid representation of your actual performance. And in terms of the reporting, the reason, at least as far as I could tell from that report, for the drop was that we didn't -- we chose not to report to the GRI, which is the Global

Reporting Initiative so it's somewhat connected to your other question.

Stratos put a heavy weighting on companies that reported to the GRI as well as companies that -- we are focused more on issues that related to GRI which we don't do so that is the reason for that.

We have done subsequent assessments of our sustainability reporting which would suggest that our report is in the top third to top quartile of our peers, and I can provide you with that information if you are interested.

The reason we have chosen not to report to the Global Reporting Initiative is that we determined that our current metrics do not match up well with the Global Reporting Initiative. The Global Reporting Initiative is an initiative that sets out indicators that many companies do use, but the bulk of those companies that use it are multi-national companies and so a lot of the questions and the indicators relate to items that simply are not appropriate to OPG, being an Ontario-based company. And so instead we have chosen indicators that fit our business and we have done benchmarking and also many, many reviews with our stakeholders

and we've elected not to reconfigure our report to align with GRI based on the feedback from our stakeholders that the content is credible and well-organized and that the GRI would not add anything to our report. So that's the reason for that.

In our report we stated in 2009 the reasons why we chose not to report to GRI and that could have led to your question. Previously we had not said why we did not report to GRI, but we decided to include it because we were getting that question, why not.

I think to give you more confidence in terms of our actual performance that all those things relate to just reporting and how you put it in your report. OPG's commitment is to continuous improvement in our environmental performance and that's clearly stated in our environmental policy as well as our code of business conduct. It's an actual legal requirement based on our ISO 14001 environmental management system which applies to all our operating businesses and is also required by some industry associations we participate in such as the Canadian Electricity Association. So we verify that continuous improvement through annual internal

audits as well as a registration audit -- that's an external ISO 14001 audit -- to ensure both our processes and our performance are continuously improving.

We have used other reviews subsequent to that Stratos report that you mentioned. We've done a number of other assessments, most recently, in the last two years, done by the Delphi group, which I would say is a comparable sustainability consultant to Stratos. And they compare us to the top sustainability companies and rank us against those companies in terms -- again, our reporting; not our performance -- and show us to be in the top third.

Finally, we have taken our approach to sustainability and rolled it out across the entire Canadian Electricity Association sectors by being instrumental in the development of a sustainable electricity program for the Canadian Electricity Association.

We developed their policy, we helped them come up with their indicators and we chaired their working group, and we continue as an active participant in that program.

And the point of the sustainable

electricity program is to help develop and report performance indicators on sustainability across the sector so that we'll have apples to apples comparisons and we could be compared against all our peers across Canada. And that's well underway.

We have benchmarked ourselves against numerous other sources and stakeholders, and I'm certainly more than happy to provide you with that if you so choose.

MEMBER BEAUDET: Yes, please. I think it would complete this matter.

MS. CLAIRMAN: Certainly.

THE CHAIRPERSON: Are you finished? Is that the end of your presentation?

MS. CLAIRMAN: Unless you have questions that I can provide you with the documents.

THE CHAIRPERSON: First of all, the information you're going to provide, we'll give that an undertaking and we'll give that as an undertaking number 10 because I have an 8 and 9 that I'm going to add a little later on. So we'll give that as undertaking number 10.

Madam Beaudet, do you have any further questions?

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

THE CHAIRPERSON: Well, thank you very much, OPG, for your presentation and for your undertaking, providing us the information. And we'll look forward to getting the other information.

We will then go to Undertakings 5, 6 and 7, which were from CNSC. And I'm not sure whether you're able to deal with them all this morning right now, but could we start with Undertaking Number 5, Mr. Howden?

MR. HOWDEN: Barclay Howden speaking. Patsy Thompson's going to speak to them.

Thank you.

DR. THOMPSON: Thank you, Mr. Chair.

My understanding of the first undertaking -- and if I have the numbers wrong, please tell me.

Our understanding was the first undertaking was clarification of page 42, the mitigation measures, and our alignment with the licence to prepare site activity where construction of flood protection and erosion control measures

were the topic.

Is this Undertaking Number 5?

THE CHAIRPERSON: That was Number 6, so I would ---

DR. THOMPSON? Okay. So Number 5 is the commitment on site 15 of ---

THE CHAIRPERSON: Acceleration of G-force. The acceleration ---

UNIDENTIFIED SPEAKER: Yes, that was Gerry Frappier.

THE CHAIRPERSON: Mr. Frappier's commitment on the G-force.

DR. THOMPSON: On the U.S. side of the ---

THE CHAIRPERSON: Yes.

DR. THOMPSON: --- of the Lake Ontario?

THE CHAIRPERSON: Yes.

DR. THOMPSON: We're not prepared to give you a date, but we are tracking it.

THE CHAIRPERSON: Okay. So Number 5, then, is stood. Number 6, you can proceed.

DR. THOMPSON: Number 6, the clarification you were seeking.

The licensed activity construct of

flood protection and erosion control measures would be needed on the licence to prepare a site, but OPG would not be moving forward with those activities until a cooling water technology is chosen and they have the approvals from the Ontario Minister of National Resources and the Department of Fisheries and Oceans to do in-lake waterworks.

But once they have these approvals, then they would need to be able to do the activity of flood protection and erosion control measures on the shore. So it's a staged approach with other permits being required first. But that activity is on the CNSC staff's licence recommended to the panel.

But Mr. Howden will speak to that in more detail in the presentation that's coming up.

THE CHAIRPERSON: Thank you, then, if we will get more detail, but there may be several questions from Madam Beaudet.

Okay. That's very good, then. We'll deal with that when the presentation comes up.

Number 7. Are you aware of Undertaking Number 7, the wording?

DR. THOMPSON: My understanding is Number 7 is provision of the CNSC staff results of our independent analysis and the comparison with OPG data, and that was page 145 and 153 of the CNSC staff PMD for reactor-based accidents and out of core and criticality accidents.

THE CHAIRPERSON: That's correct.

DR. THOMPSON: We would be prepared to provide the CNSC staff's report to the panel next Monday, March the 28th, if that's suitable.

THE CHAIRPERSON: That's suitable with the panel. Thank you very much.

DR. THOMPSON: Okay. And I've just been given a sticky note for Undertaking Number 5.

The commitment is to bring the information to you on Friday.

THE CHAIRPERSON: By Friday?

DR. THOMPSON: Yes.

--- REMARKS BY THE CHAIRPERSON:

THE CHAIRPERSON: Thank you very much.

Okay. Now I'm going to deal with a couple of other issues before we get into today's

main agenda.

The panel has reviewed questions and exchanges between Ms. Lloyd and OPG regarding duration in which passive cooling would be available in the event of loss of power. The panel would like a short explanation, and I think I asked for that myself, for each of the technologies used as the basis for the PPE, just what each one would produce.

We would appreciate that you would, that at the beginning of the presentation this afternoon, be able to give us a more detailed explanation to what Ms. Lloyd's questions were, which was felt that it wasn't clear enough explained yesterday.

So I'm going to give that a number, Undertaking Number 8, and if you can't give it this afternoon, we'll then assign a day to it. But hopefully it can be done this afternoon when we deal with your presentation.

Does OPG have any comment or anything they'd like to say to that, or you agree?

MR. SWEETNAM: Albert Sweetnam, for the record.

We will attempt to address this

this afternoon. If the person is not available, we will do it tomorrow morning.

THE CHAIRPERSON: That's very good. Thank you very much.

And I believe that addresses Ms. Lloyd's concerns.

Now, there's one other undertaking that I would like to take into consideration, and that's to CNSC. And I'm going to give that undertaking number 9.

CNSC was to clarify the recommendations on page 48, second paragraph of CNSC PMD 11-P1.3. And Madam Beaudet, in questioning yesterday, and we'd like some clarification on that recommendation, and if you can't give it now maybe I'll just give you a minute, Mr. Howden, to check that and if maybe you can give us some indication when you might be able to do that.

Ms. Thompson?

DR. THOMPSON: Could we come back this afternoon and we will be able to provide a detailed clarification?

THE CHAIRPERSON: Thank you very much. That's fine.

That is my list of PMDs -- pardon me, of undertakings. And we have added Number 10 as we went along.

We'll now proceed with the agenda for today's session.

Our first presenter is OPG, Ontario Power Generation, and they will be discussing their application to the Canadian Nuclear Safety Commission for a licence to prepare site.

OPG, the floor is yours.

--- PRESENTATION BY MR. SWEETNAM:

MR. SWEETNAM: Thank you, Mr. Chairman.

For the record, my name is Alberta Sweetnam. With me today are Laurie Swami, Director of Licensing and Environment; and Leslie Mitchell, the Manager of Policy and Regulatory Affairs.

Behind me is Dr. Jack Vecchiarelli, Section Manager, Safety Analysis, and the balance of our team of experts.

Today's presentation and discussion focuses on OPG's application for a licence to prepare the site.

OPG submitted its revised

application for a licence to prepare the site in 2009, providing complete information required under the *Nuclear Safety and Control Act*. This was supplemented by the responses to 26 information requests during the JRP public review period.

OPG is requesting permission to prepare the site for a future nuclear facility consisting of up to four reactors with once-through cooling and a combined capacity of up to 4,800 megawatts, consistent with our directive from the province.

We note that for this licence, there is no nuclear facility. There will be no nuclear substances included in this licence. Only conventional construction activities are considered, similar to those for any large project.

In addition to installing the necessary control measures and the environmental management and monitoring systems, the major activity will be clearing and grubbing the area for the future facility and grading down to 78 metres above sea level which is the current grade level for the existing Darlington facility.

OPG also plans to install the shoreline protection for the future facility. This

will require additional federal approvals for the lake in-fill from Fisheries and Oceans and Transport Canada as well as the water locks from then Ontario Ministry of Natural Resources. Once lake in-fill is in place, the licensed activities will expand to include these areas.

To confirm the site suitability for site preparation and subsequent licensing phases, a comprehensive site evaluation study has been conducted in accordance with the CNSC regulatory document RD-346, site evaluation for new nuclear power plants.

The evaluation demonstrates the Darlington site is suitable for any nuclear power plant bounded by the plant parameter envelope, or PPE.

The site evaluation assessed a variety of potential natural hazards. In light of the recent events in Japan, let me assure you that we completed comprehensive seismic meteorological and flood hazard studies to provide input for the design of the new plants consistent with current industry standards and guidelines.

As discussed earlier by our expert, Dr. Robert Youngs, he conducted a state of

the art probabilistic seismic hazard assessment which confirmed that the seismicity in the region is relatively low, that the sites are in a stable continental region and that the sites specific seismic characteristics can be accommodated through conventional design.

The next generation reactor technologies considered for new nuclear at Darlington are very robust and have been designed for considerably larger seismic hazard levels than those specific to the Darlington site.

A thorough flood hazard assessment was completed. Such hazards will be mitigated by standard design.

To determine appropriate bounding or extreme scenarios for weather conditions, 30 years of meteorological data and history was examined to identify the single most severe incident.

This was then extrapolated to identify extreme weather conditions. These extreme site conditions were compared against the proposed reactor designs.

In all cases, the risk to the new nuclear plant and the public was determined to be

acceptably low or it can and will be reduced to an acceptable level through design mitigation.

Furthermore, OPG's Emergency Preparedness Program was evaluated and shown to be compliant with the CNSC expectations allowed in RD-346 with respect to the emergency plan and considerations.

The current Nuclear Emergency Preparedness Program applicable to the Darlington nuclear generation station is robust. It can accommodate the Darlington new nuclear project such that implementation of emergency planning measures is assured for the life of the project.

Emergency planning considerations will be discussed in more detail in our land use presentation later today.

In order to optimize the size layout, a decision on the condensed cooling water option is required at this time. This decision will allow OPG to minimize environmental impacts through an efficient process of site grading, soil management and shoreline protection.

With the once-through cooling option, OPG can minimize lake in-fill and reduced the required excavation by approximately 40 percent

as excavation and grading for cooling towers will not be required.

During the site optimization process, all opportunities will be made to preserve the bank swallow habitat consistent with ensuring safe and stable gradients.

After receiving the licence to prepare the site and permits from the DFO and Transport Canada, OPG will construct the cofferdam and shoreline protection for late in-filling.

Once grading of the site begins, lake in-filling will commence, followed by an earth-moving operation to the soil stockpile.

This slide illustrates an optimized potential layout for site preparation purposes assuming one-through cooling and two metres of lake in-fill. Note that the layout submitted with the licence application is a bounding scenario with 40 hectares of lake in-fill.

The new nuclear at Darlington construction site is 180 hectares. The licensed activities will take place primarily south of the railway corridor which bisects the Darlington property in an east-west direction, an area of approximately 90 hectares.

The proposed power block area is situated on the western portion of the project site. The power block is oriented in a north-south direction to accommodate the 500-metre exclusion zone within the OPG property.

The northern border of the power block is set at 130 metres or greater from the railway corridor for safety considerations.

The topography of the site increases in elevation, both as you move east from the existing waste management facility and as you move north of the existing facilities, from approximately 78 metres above sea level to approximately 100 metres above sea level.

The future facility occupying the power block area is located at 78 metres above sea level. Clean soil from grading for the future nuclear reactor will be stockpiled to the north of the railway corridor as well as providing clean lake in-fill material.

Shoreline protection meeting the requirements of the site evaluation will be installed at the edge of the in-fill. During the site optimization process, all opportunities will be made to preserve the bank swallow habitat. The

exact layout and shape of the shoreline contour with once-through cooling will be finalized through the DFO approval process.

If cooling towers are required, they will be located on the eastern portion of the site and extend into the in-fill area.

Clearing and grubbing for cooling towers would require substantive additional excavation due to the site topography.

OPG has developed an integrated management system to meet the requirements of CSA standard N286.05.

After receiving feedback from CNSC staff, and based on results of our own independent assessment, we revised the management system. The revised system provides not only for management of OPG staff activities but our review and oversight of our contractor to ensure the work is performed to OPG's expectations.

The revised system demonstrates clear alignments with N286 requirements and is consistent with the requirements of ISO-14001.

The management system is now fully integrated; programs are no longer based on organizational units. All work is planned,

performed by competent staff and reviewed appropriately. Performance is assessed and measures taken to correct or improve on ongoing basis.

Many of the implemented procedures required for the OPG staff during the site preparation are now completed and have been provided to CNSC staff as part of their ongoing inspection in this area.

Other required procedures will be developed as arrangements with the contractor responsible for preparing the site become clearer.

All required procedures will be in place prior to the start of the licensed activities in accordance with the proposed licence conditions.

All the safety and environmental protection are not explicit programs under the management system. They are fully integrated into activities and plans reflecting the importance OPG places on performance in these two areas.

Our safety policy requires us not only to meet legislative safety requirements but to move beyond compliance. The expectation applies to our staff and to our contractors.

We expect the contractor

responsible for preparing the site to establish and maintain a health and safety plan appropriate for the activities being undertaken. This plan will also consider the proximity of the adjacent nuclear facilities. OPG is proud of its stewardship record and has committed to ensuring the effects of activities during the site preparation are appropriately mitigated as described, not only in our application, but in the environmental assessment.

OPG is committed to open and transparent –- transparent communications with the community in all aspects of our operations and project execution. The purpose of the public information program is to ensure that those living in the site facility are informed of the key likely effects and how they will be mitigated.

OPG will deliver a public information program in support of Darlington New Nuclear Site preparation that will build on our ongoing public information and community relations program already in place at the site, as well as the public consultation activities undertaken throughout the EA.

Mechanisms will be added to the

existing program to ensure people living in the vicinity are informed of the project activities and to address concerns regarding potential environmental impacts of site preparation activities.

In conclusion, OPG submits the application for a licence to prepare the site. Including the subsequent information requests demonstrates OPG is qualified to carry out the licence activities, and will provide for the protection of the environment, health and safety of workers and members of the public, and the maintenance of national security and measures required to implement international operations to which Canada has agreed to.

OPG has demonstrated through a rigorous seismic, meteorological, and flooding hazard site evaluation process that the site is suitable for another nuclear facility for up to four units or 4,800 megawatts. We have committed to the implementation of the measures proposed in the application and in the EIS, and we will monitor implementation in accordance with our management plan. This includes the commitment to ensure development of the site will be optimized to

minimize effects.

OPG has reviewed the conditions in the proposed licence and licence condition handbook and understands and accepts these. These include the recommendations as accepted in our March 14th, 2011 letter.

OPG's acceptance of these recommendations would remove many of the items raised by the CNSC as being below expectations and move them into the CNSC category of satisfactory.

Accordingly, following approval of the EIS, we asked the Commission to issue a licence to prepare the site for the proposed project with once-through cooling.

Thank you. We're now available to respond to your questions.

CHAIRPERSON GRAHAM: Thank you very much. The floor will now open questions -- or, pardon me, the panel will now start asking their questions, and I'll go to Madam Beaudet first.

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman. I'd like to go to your submissions, PMD 11-P1.1, please. The first thing, maybe my number

just for the record, I think we have to make this small correction on page 2, last paragraph, line 3, you refer to the CSA standard and 288.1. It should also be .03 since it's a more revised version. It's a more recent version, which one you used. You can come back with that.

Now, the second thing is on page 3 and 4, you have a list of activities here. I don't know if it's because, you know, when –- I know the communication department, they always try to make it more convivial to ordinary people, but the list of activities for the licence to prepare a site are not the same as in the agreement or in the guidelines. And so I would like to be reassured that –- because the next paragraph, that's why I –- I have this question is that you –- you sort of say that you –- you have an understanding that the licence to prepare a site does not include excavation for reactor foundation, and it's true, it is part of the construction licensing, but I want to make sure that what you've listed above we understand and we are on the same grounds, that it's all the activities in the –- in our agreement.

MR. SWEETNAM: Albert Sweetnam for the record. We –-

MEMBER BEAUDET: Sometimes –- sorry, I'm interrupting you. Sometimes it's simpler to use the same list and it's not here, so I'd like to understand.

MR. SWEETNAM: Okay. Our understanding would be that the list of activities that are listed in the condition –- the licence condition handbook would be the activities that we would be allowed to do under that licence.

MEMBER BEAUDET: Thank you. The next point I'd like to clarify, because you say that the licence does not exclude excavation for reactor foundations, that triggered the question in my mind, and I went back to the documents to try to see that the excavated material in the PPE is approximately 12.4 million cubic metre of soil and rock. I know I asked this question at the technical meeting back in June, but I want to make sure that we understand each other.

Since you can have –- you can start the licence to prepare site activities before the technology is chosen, and I believe that you will know only when the technology is chosen how much rock you still have to excavate during the licence to construct. The excavation in the

licence to prepare a site is about 78 metres above sea level, and then you'll probably, depending on the technology, have to go down another 4 to 14 metres.

It may be a small amount compared to the million cubic metres that you have to do in the first licensing phase, but it –- I think we have clarify, is this further excavation, whatever the amount is, it could be just 3,000 cubic metre, we don't know, and also, as you mentioned for the towers, if you have to do the towers, was that amount included or calculated in the 12.4 million cubic metre?

MR. SWEETNAM: Albert Sweetnam for the record. That amount is included in the overall number that's quoted there as 12 cubic –- million cubic metres.

MEMBER BEAUDET: So that's why you said approximately 12.4, because there could be small variation?

MR. SWEETNAM: That's correct.

MEMBER BEAUDET: Thank you. The other thing I'd like to check refers to CNC PMD. As I mentioned it yesterday, the appendix C, page 51, and that's PMD 11-P1.2. There's a great amount

here of documents that, if I understand well, have not been completed. The licence condition handbooks, if you take page 31 or page 51, 41, so there are lots of XXX. My understanding is those handbooks are not ready yet, and will they be ready, all of them, for when we have to sign for the –- issue the licenced permit to sign –- to construct –- I mean to prepare the site?

MR. SWEETNAM: Albert Sweetnam for –- for the record.

MEMBER BEAUDET: For when we have to sign for the issue the license to permit the site -- to construct -- I mean, to prepare the site?

MR. SWEETNAM: Albert Sweetnam for -- for the record.

Our anticipation is that not all of these documents would be available at the time that the license is awarded. However, we've committed to the CNSC that all of these documents will be available before that license work commences. And I think in the -- in the license, it indicates a time frame that we have to submit these documents before that part of the license work could commence.

MEMBER BEAUDET: And the reason is because the technology is not chosen yet; is that why you can't complete?

MR. SWEETNAM: Albert Sweetnam for the record.

There are a variety of reasons. There's a large volume of intimation that has to be prepared here, that's one reason.

The other reason is when we have a contract on -- on contract, we will be able to modify our processes and procedures to match what they propose so that we have a unified across-the-site procedure. It would be more appropriate at that time to provide that, rather than provide it in absence of a -- the EBC contract.

MEMBER BEAUDET: Thank you. Thank you.

CHAIRPERSON GRAHAM: Mr. Pereira?

MEMBER PEREIRA: Thank you, Mr. Chairman.

I'm going to start off by following up on -- on part of your response, Mr. Sweetnam. You talked about documents that needed to be completed, and I notice from the CNSC staff PMD that there's a license condition on the

management system. Some of the lower tiers of documents are still being worked on. The license condition requires completion of the submissions and implementation of the management system.

Could you outline -- what are the steps that need to be completed to go from completion of documents to implementation of a management system for work in preparing the site?

MR. SWEETNAM: Albert Sweetnam. I'll ask Hemant Mistry to respond to this question.

MR. MISTRY: Good morning. For the record, my name is Hemant Mistry. I am manager of management system oversight for the Darlington new nuclear project.

Our management system documentations are implemented for the processes that we need to do the work internally within DNNP currently.

We have developed our management system and revised it in discussions with the CNSC staff to make an integrated management system, and we have developed all the program documents and submitted them to the CNSC for their review.

We have developed our third-layer tier documents that you're talking about as well.

And the majority of those documents were submitted to the CNSC for their review on March 12 -- 11th of this year, and we are continuing to develop a number of remaining outstanding documents.

As Mr. Sweetnam also mentioned, a number of these documents have to be developed once we have an EPC contractor in place because we want to make sure that we understand and accommodate our processes so that they're aligned, but our -- our intention is that as we are moving forward, we are developing the documentation and reviewing them with the staff at the CNSC.

MEMBER PEREIRA: Thank you for the clarification, but my question went a bit further than that, and the question was, what do you have to do to go from preparation of documents to implementation of the management system to make it an effective tool for management of activities, controlled management of activities?

MR. SWEETNAM: Albert Sweetnam for the record.

After documents are developed, they're, first of all, issued to the management team and to staff for review. After we have reviewed it and incorporated everybody's concerns

and comments, these are discussed with the CNSC. After we have the CNSC buy in to what we are proceeding with, an agreement, then we -- we issue it officially to the team. There's a roll out that's conducted to staff where all management staff are presented the document. There's a discussion period during that roll out, and then they, in turn, role it out to their subordinates, and it's reinforced -- all of the procedures are reinforced over time on a regular basis.

In addition to that, the management organization does internal audits to make sure that the procedures are being followed, and we also have external audits to make sure the management procedures are being followed.

MEMBER PEREIRA: Thank you. I'd like to invite CNSC staff to comment on that response and to indicate whether this lines up with your expectations.

MR. HOWDEN: Barcley Howden speaking. I'm going to provide an introduction then ask our management system specialist Ken Jones to comment.

I think, Mr. Pereira, you went to a very good point, that having the management

system documentation is necessary, but not sufficient to actually have an implemented management system. So I just want to give you a little bit of our strategy and then ask Mr. Jones to comment.

But a couple of important things is they -- the requirement is for them to meet 2 -- N-286-05, which is, what we call, an integrated management system, where it goes away from management system based on organization as opposed -- now it goes towards doing the work that you have to do. So it's independent of organization, but organization is important. The management setup -- they have a management charter, programmatic documents, and high-level process documents.

Now, based on the project management model that OPG has adopted, this leads us to the recommendations that we're going to make to you later.

But I'd like to -- Mr. Jones to now comment on our expectations in going from a documented system to an actual implemented system,

MR. JONES: For the record, Ken Jones, management system specialist for the CNSC.

OPG has been sharing the

management system with us as they have developed it over time. I was very sad to see that we can buy in to their approach. We've got this far where they have produced a series of documents. I'm not saying they're the written word. They now have to demonstrate that those documents are workable and meaningful, that they are tailored to provide the assurance that the -- the activities that they are requesting the license for can be -- can be delivered.

We have, say, reviewed these documents in -- over a period of time. They're the various developments. The latest development group came in on March the 11th. We've had a cursory look at the high-level ones, and we will wait until the conclusion of this hearing to look at the balance of it in more detail when the specialists are freed up to provide that level of detail, and we'll feed our comments back.

Our expectations are that OPG have developed a system, say, that is workable, and our compliance and oversight activities, we'll, in time, take a serious look at that and see that they are doing what they say they do.

MEMBER PEREIRA: So in terms of implementation, you accept the outline provided by

Mr. Sweetnam as being the appropriate way to go from documents to implementation?

MR. HOWDEN: Barcley Howden speaking.

That is correct. One of the things that OPG do -- is doing is it's importing experience in programs from existing facilities that have been proven, so it gives a level of confidence that it can be workable, but the strategy that they have proposed and we've discussed with them in detail is acceptable to us.

MEMEBER PEREIRA: Thank you. I'll go onto my next question. It's more the level of more detail. In section 3 of your PMD, this is OPG-PMD-P1.1, there's a statement that says that OPG will ensure that all project personnel will be competent to safely execute their assigned tasks in accordance with -- into the -- into the 6.5 requirements.

How will this be achieved for personnel employed by contractors working on the site? And I appreciate there will be a number of different contractors coming on site. How -- how will that control be exercised in terms of making sure that personnel are competent to execute their

tasks safely?

MR. SWEETNAM: Albert Sweetnam for the record.

The first step is contractually. In the contract with the EPC firm, there's a requirement for them to have a management system that's approved by OPG.

In addition to that, in this -- they have to develop a safety -- a health and safety plan for the site. In that health and safety plan, there are a variety of issues that are covered.

The site-specific issues, the technical site-specific issues, in addition to the training required for staff before they are allowed on-site; the morning briefings; the meetings with the foremen; the walk-arounds; the walk-around with senior executives.

What we also do as -- when there are multiple contract -- there may be one EPC firm but it could be multiple subcontractors on site. What we do is we have a general meeting of all of the subcontractors on a weekly basis. We actually walk around the site with these subcontractors, with one of them being the inspector. This is done

at a very senior level; the person that's in charge at the site.

We also, on a monthly basis, have one of the executives from each one of these firms attend on-site to address safety issues. We also have the ability -- everybody is trained, everybody is responsible for the other person, so if anybody sees something on site they can elevate this to their supervisor and supervisors have the ability to stop work.

But the crux of the matter is before a contractor can start onsite they have to prove to OPG that their staff have had the requisite training in order to operate on one of our sites to the level that we expect.

MEMBER PEREIRA: In terms of overall responsibility for health and safety onsite, clearly with a licence that rests ultimately with OPG, but is there in place some shared responsibility with contractors? How is that handled?

MR. SWEETNAM: Albert Sweetnam, for the record.

There are two distinct issues here. One is OPG's responsibility on any licence

that would be granted and OPG's overall corporate responsibilities. The other one is how is this viewed under the regulations, i.e. under the law.

So under the law the EPC contractor will be the constructor for the site and would have the overall responsibilities for health and safety, however, under the all-encompassing EPC contract OPG has the responsibility for safety and also in front of the CNSC, OPG has responsibility for safety.

So we would flow-down those responsibilities through the EPC contract to the contractor and the contractor, under the law, will be the constructor; we would be the owner.

MEMBER PEREIRA: Thank you.

Going to Section 4 in your PMD P1.1, there's a statement that the work plans will ensure that onsite workers will not receive doses in excess of the limit for non-nuclear energy workers.

What would be the possible sources of radiation that workers on the site may be exposed to during site preparation work, and what measures will OPG take to make sure that doses do not exceed limits for non-nuclear energy workers?

MR. SWEETNAM: Albert Sweetnam, for the record.

Under the licence to prepare the site, as we said previously, there are no nuclear activities ongoing so there's no exposure to workers.

The possible exposure would be from the adjacent plant and the proximity to the adjacent plant. Any works that are in proximity of that fence-line would be on that specific plan to ensure that the workers were not there for extended periods of time that would expose them to any sort of exposure or dosage.

MEMBER PEREIRA: Thank you.

Would the CNSC like to comment on that?

MR. HOWDEN: Barclay Howden speaking.

We do see the main sources as coming from the plant. Potential other sources are with any site preparation, in case there is industrial gauges being used for density, soil density, but for the most part those are licensed separately and OPG or whoever the contractor doing the work would have to have the licence for that,

and then they have to take measures to protect the public around them.

The people using those gauges are nuclear energy workers.

MEMBER PEREIRA: Thank you.

The next question, PMD P1.1, Section 7, reference is made to requirements for onsite emergency preparedness measures in the event of a nuclear emergency.

How will OPG ensure responsiveness with contractors to nuclear emergencies, given the transient nature of the workforce doing site preparation activities?

MR. SWEETNAM: Albert Sweetnam, for the record.

Before I address -- Rick Bell will address this question on behalf of us. Before I do that, just to add a little bit to the previous question.

I just got a note there that the highest total annual dose to a construction worker is estimated to be in the order of 200 millisieverts per year. This is well below the annual dose for a member of the public, which is 1,000 millisieverts per year.

MEMBER PEREIRA: Could CNSC staff comment on that?

DR. THOMPSON: Perhaps just -- the CNSC dose limit is 1 millisievert or 1,000 microsieverts.

MR. SWEETNAM: Sorry, correction. For my part it should be microsieverts not millisieverts; sorry.

So 200 microsieverts and 1,000 microsieverts per year.

Mr. Bell?

MR. BELL: Rick Bell, for the record, Emergency Preparedness Manager.

Could I have the question repeated again so I can make sure I answer the question fully?

MEMBER PEREIRA: In your PMD, there's a statement that said there will be requirements -- reference is made to requirements for onsite emergency preparedness measures in the event of a nuclear emergency.

How will OPG ensure the responsiveness of contractors to nuclear emergencies, given the transient nature of the workforce on site? So if there were a nuclear

emergency, how would OPG ensure that the contractor -- contracted workers would be aware of what they need to do?

MR. BELL: Prior to commencing any work onsite, the contractor would have to be familiar with the emergency preparedness program that is in place at the current operating station, as the construction or the area where the land is being prepared would also fall under that.

That would have to be in alignment with the current process under the CNEP at Darlington Nuclear Generating Station.

So workers would become familiar with the processes already in place, in terms of emergency response, the notifications of any type of emergency. They would be required to have all this knowledge, similar to the current workers at the existing plants, prior to commencing work on the site. This would be given to them prior to that work.

MEMBER PEREIRA: So would there be drills from time to time to make sure that those onsite, on the worksite, are familiar with what needs to be done and how it needs to be done?

MR. SWEETNAM: Albert Sweetnam,

for the record.

Yes, there will drills.

MEMBER PEREIRA: Thank you.

My next question in the same PMD P1.1, Section 10, and this is with reference to security.

Reference is made to protection against risks from the project activities to the existing nuclear facilities on the site.

What types of risk does OPG intend to address in talking about protection against risk at the existing site -- existing facilities?

MR. SWEETNAM: Albert Sweetnam, for the record.

The risk associated with the construction activities would be similar to the risk that we presently face from the public at large, so that’s no different.

What is different is that on a construction site you have the presence of large pieces of machinery that could potentially be used as battering rams to enter the site.

We will address this situation with the security at the existing site but we would prefer to actually address the details of what we

would do *in camera* versus in an open forum.

Thank you.

CHAIRPERSON GRAHAM: That was one of my questions with regard to workers that will be working on that site.

What type -- and now I'm talking contractors not necessarily OPG workers but contractors. Well, their workforce -- I know they're going to have to submit plans with regard to health and safety and so on, but on the field of security, all workers, will they be checked for background checks with regard to, say, terrorist activities and so on so that it'll be a second line or first line of defence in case what you just mentioned heavy equipment could be used to access the main site?

How do you propose to have -- because there will be a large number of them, to have construction employees screened for security purposes?

MR. SWEETNAM: Albert Sweetnam, for the record.

The requirement would be for all workers to be screened through security to have the appropriate level of security clearance.

OPG does this on a regular basis through the outages that we have at the plants. Some of the outages have an ingress of 2500-3000 additional people than normally are at the site. So we know how to do this. We've done this several times.

And the intention would be to ensure that all of the contractors on site have the required security clearance.

CHAIRPERSON GRAHAM: Another question with regard to cooling towers. I think in your presentation you mentioned that a large amount of excavation or further excavation will be required if the cooling tower technologies were accepted.

Do you have specific amounts of additional excavation required for different types of cooling towers? Do you have that?

It may be in the documents, but I tried to find it. I just didn't see it there.

MR. SWEETNAM: Albert Sweetnam, for the record.

I'll redirect this question to Dr. Aamir.

DR. AAMIR: Aamir, for the

records.

In the EIS, we have looked at the bounding scenarios and the scenarios where with once-through cooling we have said that the excavation would be around 9 million metres cubes compared to one with a cooling tower -- the mechanical draft cooling towers has about 12.4 million metres cubed.

We have not specifically looked at in detail on how much soil would be excavated for each one of the cooling tower technology but they will be within those bounds.

CHAIRPERSON GRAHAM: Are you saying that all of the cooling tower technology is going to be 12.4 million or will certain ones be less than others and so on?

MR. SWEETNAM: Albert Sweetnam, for the record.

As we said, we've utilized a bounding approach so that the 12 million cubic metres is basically the highest bound so the worst-case scenario in terms of the cooling tower layout which would be the hybrid cooling towers. And the lower number, the 9 million cubic metres, reflects the once-through cooling.

CHAIRPERSON GRAHAM: And some of the other technology would be in between the 9 and 12; is that what you're saying?

MR. SWEETNAM: Albert Sweetnam, for the record.

That's correct.

CHAIRPERSON GRAHAM: Okay.

And in your slide number 5, you show the soil stockpile. Is that where all of the excess soils would be deposited onsite? Would they all be onsite or how much other soil quantities would be offsite?

MR. SWEETNAM: Albert Sweetnam, for the record.

I'll ask Dr. Aamir to address this question.

DR. AAMIR: Aamir, for the record.

What we are expecting is that there will be approximately 5.7 million metres cubes of the soil stored onsite between northeast landfill and northwest landfill. There will be a certain amount of soil going into the lake infill depending on the contour depth which is allowed by the EIS. And the rest of the soil will be then transported offshore (sic). Again, it all depends

on the cooling water technology how much it will be.

CHAIRPERSON GRAHAM: Offsite, I believe you mean; do you?

DR. AAMIR: Yes.

CHAIRPERSON GRAHAM: Okay.

Then with the in-fill and with the stockpile of 5.7 on the in-fill, I think we had figures on that. The amount of offsite soil is not that great, several millions; is that all?

DR. AAMIR: So -- Aamir, for the record.

So if you assume 2 metres contour then it's 5.7 for the onsite landfill, 0.7 million metres cubed for the lake in-fill; that gives us around 6.4. And if we go with once-through cooling, that's the bounding scenario then it's approximately 9 -- sorry, 3 million metres cubes which will be transported offsite.

CHAIRPERSON GRAHAM: Okay. Thank you.

I think now I will go to CNSC if they may have some questions also to OPG.

CNSC, do you have some questions?

MR. HOWDEN: Barclay Howden

speaking.

No, we don't have any questions.

CHAIRPERSON GRAHAM: Okay. Thank you.

I understand we have one government participant and that government participant is from Environment Canada and Mr. Sondra Leanardo -- I'm sorry.

MR. LEONARDELLI: It's Sandro Leonardelli, for the record.

CHAIRPERSON GRAHAM: Sandro, okay Sandro, please go ahead.

--- QUESTIONS BY THE INTERVENORS:

MR. LEONARDELLI: The past few days, Environment Canada staff have been listening with great interest to OPG's plans for the bluffs that provide the habitat for the bank swallows.

Much is being made about how if they go to once-through cooling that they'll be able to save the bluffs. But I'm wondering how realistic is it to save the bluffs in light of the slope stability considerations that are a factor at the site? Has there been a detailed study to demonstrate to the CNSC that the bluff preservation is possible while ensuring that the bluffs pose no

threat to the reactor complex?

CHAIRPERSON GRAHAM: OPG?

MR. SWEETNAM: Albert Sweetnam, for the record.

I'll ask John Peters to respond to this question.

MR. PETERS: John Peters, for the record.

The question pertains to the stability of the excavated site as it is proposed using a once-through lake water cooling scenario. In the LTPS, we illustrate what the excavated area would look like in the drawing that is in our presentation.

And as we've indicated, there are going to be protective measures put in place to allow the slopes to be stable to safely operate the plant to make sure there is no slumping or change to those slopes.

In the EIS, we noted that there -- because of the amount of cutting and slope-stability work, there will be opportunities to consider ways to create bank swallow habitat as we have identified a number of lenses of silt and soil that are going to be cut and exposed inland from

the current shoreline.

So what we have committed to in the EIS is to examine ways that we can create what we consider to be artificial bank swallow habitat which is a kind of habitat that you see appearing in gravel pits on an annual basis.

As they excavate these large pits, they expose new surfaces and the bank swallows use them routinely as a normal part of their behaviour. We will seek ways to create a stable platform for them to continue to behave as they have for generations on the site.

Based on our experience, based on our knowledge of the way the site slumps and is managed on an ongoing basis, naturally, we will create a situation for that to be possible on our site.

MR. LEONARDELLI: If I may? The question has to do -- well, Environment Canada will be presenting this afternoon and we'll be speaking to the bank swallow issue. And we'll entertain any questions regarding that.

But in terms of the natural habitat, which is the natural bluffs, the question pertains to that in the sense that is it realistic

that they can preserve these bluffs while not creating a hazard for the reactor complex? I'm sure that that weighs on CNSC's mind while trying to ensure safety for the complex.

So I'm not sure what studies have been done or when they would be done to demonstrate that it is possible to preserve bluffs while maintaining the reactor safety.

It's one of the environmental trade-offs for the various cooling options. And I guess the question pertains to how realistic is it to be able to preserve the bluff?

MR. SWEETNAM: Albert Sweetnam, for the record.

I'll ask Dr. Aamir to address this part of the question.

DR. AAMIR: Aamir, for the record.

The question, the way I understand it, is basically asking for whether there are any new solutions to save the bank swallows habitat. Yes, the new solutions are available, but again, it all depends on the site layout, the cooling water technology, the reactor technology chosen.

And if all the things line up, yes, there will be new solutions available to save

the bank swallow habitat.

MR. LEONARDELLI: Okay. Thanks.

CHAIRPERSON GRAHAM: Just a question on the bank swallow habitat. You're saying that the new -- the mitigating measures, the new areas would be from existing soils, you wouldn't be building new habitat.

It would be, like, as you said, like gravel pits and so on, you're not going to be compacting layers of sand and so on in another area for the swallows to nest, are you?

MR. SWEETNAM: Albert Sweetnam, for the record.

Can you give us a moment to confer?

(SHORT PAUSE)

CHAIRPERSON GRAHAM: Yes, Mr. Sweetnam?

MR. SWEETNAM: Albert Sweetnam, for the record.

John Peters will address this question.

MR. PETERS: John Peters, for the record.

The point that I think we need to

come to is that the excavated material that we're speaking about for once-through lake water cooling only removes about 50 percent of the bluff area that we have studied in detail.

Fifty (50) percent will remain, plus or minus, in its natural condition based on the limit -- more limited excavated area.

That is an area where the focus of the bank swallow colony is located. All our diagrams in the EIS illustrate that the concentration of bank swallows is on the far east-end of the bluff and that is the area we are intending to avoid disturbing as a result of this lesser excavation.

That would leave us with 50 percent of the bluff intact, roughly, plus or minus. And that leaves us with somewhere between 80 and 90 percent of the bank swallows burrows that we currently have studied on the site intact.

CHAIRPERSON GRAHAM: Okay. Thank you.

MR. HOWDEN: Mr. Graham, Barclay Howden ---

CHAIRPERSON GRAHAM: Yes, I'm sorry.

MR. HOWDEN: --- would it be possible for Dr. Thompson to make a comment on this?

CHAIRPERSON GRAHAM: Certainly.

DR. THOMPSON: Thank you.

Essentially what we wanted to raise was the fact that through the Environmental Impact Statement retention of -- partial retention of the bluff wasn't considered because the bounding approach was used.

So the worst-case scenario was considered. And from a geotechnical perspective, in terms of the steepness of the slopes from staff's perspective, if the project would move forward with consideration of partial retention of the bluffs, there would need to be additional geotechnical work to ensure stability in relation to the safety -- nuclear safety of the site.

CHAIRPERSON GRAHAM: Thank you.

That clarifies my question.

Madame Beaudet?

MEMBER BEAUDET: Also when you level the ground -- I mean the bluff will sort of stick out because you -- do you have to level the ground so low, go up to 78-metre above sea level?

Because in some areas, it's up to 110 above sea level; so you're lowering a great deal, putting flat -- you know -- the area that you want to construct. And this was one thing that when we looked at the big drawings, we realized that in some area it's, at the moment, 110 metres above sea level.

So do you really have to go down to 78?

MR. SWEETNAM: Albert Sweetnam, for the record.

I'll ask Dr. Aamir to address this question.

DR. AAMIR: For the power block, yes, we have to go down to 78 metres above sea level.

For the rest, if there is once-through cooling then no, it can stay as it is, specially the eastern portion.

If we go with an alternate once-through cooling technology, like any cooling towers, then those I guess will need to be excavated as well.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: Thank you.

Moving on, we have one intervenor, Lake Ontario Waterkeepers. And do you have a question? Please use the microphone and direct your questions through the Chair.

MR. MATTSON: Yes, thank you, Mr. Chairman.

To the Ontario Power Generation, in terms of the licensing application; in our preliminary motion, we talked about the August 17th letter in 2010 regarding tritium emissions from the addition of the Candu 6 reactor and concerns that it may exceed the environmental impact statement's bounding scenario. We filed that with you.

My question is to OPG. To what -- what consideration was given by the company to the May 2009 report by the Ontario Drinking Water Council that the tritium emission levels for drinking water should be lowered from 7,000 becquerels per litre to 20 and that monitoring take place at the discharge pipe from the nuclear power plant and not from the actual drinking water plants and that their notification be reduced from 4,000 becquerels per litre when they notify the public of a release to the actual 20 becquerels per litre?

Thank you.

MS. SWAMI: Laurie Swami, for the record.

We have looked at the tritium in drinking water, Ontario Drinking Water Advisory Committee's recommendations.

We understand the recommendations on the 20 becquerels per litre to be an area for intake supplies so that it would apply to the actual drinking water objectives. It doesn't apply to the direct discharge from our facilities. It is based on an annual average.

We also note that that has not been issued yet by the Ontario government.

CHAIRPERSON GRAHAM: But I think the question was, if it is, what you're saying is it will be at the intake?

MS. SWAMI: Laurie Swami.

It's an Ontario drinking water objective so it applies to actual drinking water, not at point of discharge.

CHAIRPERSON GRAHAM: Without getting into debate, I'll allow your question directly to the chair, please.

MR. MATTSON: Thank you, Mr. Chairman.

Maybe OPG could provide that report to the panel so you can see for yourself the recommendations. And you'll note Recommendation 6 directly speaks to the nuclear power facilities on Ontario reporting at their discharge and no longer at the drinking water pipe.

The report should have been provided, it hasn't been and I just think it's important, particularly if you're going to make a decision about the environmental impacts and how to mitigate tritium for the Candu 6 particularly.

CHAIRPERSON GRAHAM: I believe CNSC already has that report or I think that's -- maybe it was at a licensing hearing for something else. But Dr. Thompson, would you like to comment?

DR. THOMPSON: Patsy Thompson, for the record.

We can make the report available to the panel. It has been presented to the Commission on various proceedings.

In terms of the project under consideration by the panel, the expectation is that at the time of licensing the facility would meet the existing drinking water standards and if the standard is lowered from 7,000, OPG would be

expected to comply with the provincial standard.

Having said that, the environmental impact statement analyses for the EC-6 reactor design indicates that the total public dose, including tritium, the PPE that includes the EC-6 is 5.32 microsieverts per year. And a small fraction of that, a very small dose is from drinking water.

The modeling shows that the drinking water supply plants around Darlington would be at less than 20 becquerels per litre.

CHAIRPERSON GRAHAM: Thank you.

We'll give that undertaking number -- pardon me, I'll let -- Madame Beaudet first.

MEMBER BEAUDET: I don't know if it's just me that has the confusion here. But it seems that -- and correct me if I'm wrong -- that the lowering of the standards is not at the discharge pipe but it's at the intake pipe of municipal water; is that correct?

DR. THOMPSON: Patsy Thompson, for the record.

The Ontario Drinking Water Advisory Council made recommendations to the Ontario government to lower the drinking water

standard to 20 becquerels per litre and made a number of recommendations in terms of protecting the sources of drinking water in terms of weekly reporting, measuring at the discharge to ensure that if there are increases, for example, in the discharge that there would be ample notification before the tritium gets to the drinking water.

So there's a number of recommendations. And Mr. Mattson was right in terms of the recommendations for monitoring at the discharge level with a trigger for reporting to municipalities.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: So we will proceed to getting the report and that'll be Undertaking Number 12.

CHAIRPERSON GRAHAM: Two things to deal with; we have another undertaking but before I do that, I will call on Northwatch for their question.

MS. LLOYD: Thank you, Mr. Chair.

Brennain Lloyd from Northwatch.

My question isn't exclusive to the licence to prepare the site but it is raised again by the description in Section 1.3 of the PMD OPG

prepared for this discussion.

And it's about the plant parameter envelope, and in this description I continue to struggle with this notion of a plant parameter envelope.

And in this description, OPG says that -- explains that the PPE was developed from information supplied by the vendors.

And my question to OPG is how is that information provided by the vendors verified, peer reviewed, tested by some independent expertise?

CHAIRPERSON GRAHAM: Thank you.

OPG would like to respond, please?

MR. SWEETNAM: Albert Sweetnam, for the record.

The vendors are under consideration are all international companies that have operated in the nuclear field for many, many years.

As part of the process, the procurement process that went on, and that terminated in June 2009 or was suspended in June 2009, part of that process was a full audit of the quality systems at these organizations.

These audits all indicated full conformancy with nuclear standards, full conformancy with ISO requirements.

So we have full confidence that the material that will be provided by these organizations would be accurate. And the information that they are putting out in the public is accurate, based on the systems they have in place, audited by ourselves as an independent agency.

CHAIRPERSON GRAHAM: Ms. Lloyd?

MS. LLOYD: I want to sure I understand; the audit was done by OPG. Who audited the vendors? And was the audit of their general operations or was it a review -- a peer review of the information they provided which was then the basis for the plan parameter envelope?

CHAIRPERSON GRAHAM: Mr. Sweetnam?

MR. SWEETNAM: Albert Sweetnam, for the record.

I will ask Hemant Mistry who was actually involved in the audits to give a little more detail on how the audits were conducted.

MR. MISTRY: Hemant Mistry, for the record.

The audits that we conducted were the audits of the management systems of the various vendors. We went out and we looked at how they manage the quality of their work, their procedures and the overall management systems that they have in place.

And we were satisfied that they have adequate provisions and adequate management systems for the type of work that they were undertaking.

CHAIRPERSON GRAHAM: Okay. Thank you.

We'll now proceed to another undertaking which came out of questions by my colleague, Madame Beaudet, with regard to CSA standards whether it's N288.1 or N288.1.08. And I'm going to give that Undertaking Number 11 and ask OPG to note that and give us a time when they're able to provide that information.

CHAIRPERSON GRAHAM: Is that satisfactory, Mr. Sweetnam?

MR. SWEETNAM: Albert Sweetnam, for the record.

Undertaking is duly noted, we will answer this afternoon.

CHAIRPERSON GRAHAM: Thank you very much.

Next on the agenda is going to CNSC. But before we do that I think because -- I don't want to interrupt it once they get going, maybe we will take a 10-minute -- instead of 15 -- 10-minute break and come back at 10:35.

--- Upon recessing at 10:25 a.m.

--- Upon resuming at 10:37 a.m.

CHAIRPERSON GRAHAM: Everyone please take their seats so we can start again.

Thank you very much.

We just took the 10 minutes and we'll try and get back on schedule.

The next presentation is the Canadian Nuclear Safety Commission. And Mr. Howden and his team are ready to make a representation.

Mr. Howden, you're –- the floor is yours. And this is –- by the way, this is for the licence to prepare a site application.

--- PRESENTATION BY MR. HOWDEN:

MR. HOWDEN: That is correct. Thank you. Good morning, Mr. Chair, Members of the Joint Review Panel. My name is Barcley Howden. I'm the Director General of the Directive of

Regulatory Improvement and Major Projects Management at the Canadian Nuclear Safety Commission. With me today on my left are Dr. David Newland, Director of the New Major Facilities Licensing Division, and on my right, Mr. Ross Richardson, Project Officer within the same division.

In addition, members of CNSC staff's technical review team are present and available to answer any questions.

The purpose of today's presentation is to present the result of CNSC staff's review and assessment of the application for a licence to prepare a site submitted by Ontario Power Generation or OPG for the future construction and operation of a new nuclear power plant at the Darlington nuclear site.

As documented in CMD 11-P1.2, CNSC staff conclude that OPG has provided sufficient information in the licence application together with the information request responses for the issuance of a licence to prepare a site. CNSC staff recommends certain conditions be included in the proposed licence to provide further confidence that OPG will make adequate provision for the

protection of workers, members of the public, and the environment while carrying out site preparation activities.

Overall, CNSC staff recommend that the Joint Review Panel accept CNSC staff's conclusions and issue the proposed licence to prepare a site subject to a decision on the environmental assessment allowing the project to proceed.

We will start today's presentation with pertinent background information followed by an overview of OPG's licence to prepare a site application and CNSC staff's assessment. The proposed licence and licence conditions handbook will then be discussed, followed by a brief discussion on regulatory compliance. We will conclude today's presentation with CNSC staff's overall conclusions and recommendations.

I will now turn the presentation over to Dr. Newland who will provide background information to –- relevant to CNSC staff's review and assessment of OPG's licence application.

--- PRESENTATION BY DR. NEWLAND:

DR. NEWLAND: Thank you, Mr. Howden. This slide presents CNSC's licensing

process for new nuclear power plants. As shown in yellow, a nuclear power plant requires five separate CNSC licences over its life cycle.

Public involvement is ongoing throughout the licensing process as members of the public are invited to participate in public hearings for each licensing phase. Should a licence be granted, CNSC regulatory oversight continues throughout the licence period through rigorous compliance, audits, inspections, and enforcement actions to ensure safety requirements are being met.

This morning’s presentation will discuss the results of CNSC staff’s review and assessment of an application for a licence to prepare a site, which is the first in a series of CNSC licences required for a nuclear power plant over its life cycle.

At this stage in the licensing process, an applicant is expected to provide detailed evaluations to demonstrate that the proposed site is suitable for a nuclear power plant and that the site preparation activities will be conducted in a manner that protects the health and safety of persons and the environment.

A determination of a specific reactor design is not required at the –- this licensing phase; however, high level plant design information from a range of reactor designs under consideration for the site is taken into account.

I would like to re-emphasize in this slide, given some of the discussions that occurred yesterday, first, the opportunity throughout the licensing process for public participation. It is not a one-shot deal. Further, I would like to stress the importance of compliance activities through legally binding licence conditions and regular inspections by staff and annual reporting.

This slide presents the regulations under the Nuclear Safety and Control Act, which are applicable in the context of a licence to prepare a site for a nuclear power plant. As shown the regulatory requirements for a licence to prepare a site are contained in the General Nuclear and Safety Control Regulations, the Class 1 Nuclear Facility Regulations, and the Nuclear Security Regulations. A mapping of applicable CNSC regulations to CND sections is provided in addendum E of CMD 11-P1.2.

CNSC staff's assessment of OPG's proposed measures to ensure compliance with the Nuclear Security Regulations is provided in a separate security protected commission member document and will not be discussed in the presentation due to its prescribed nature.

It should be noted that an issuance of a licence to prepare a site from the CNSC does not eliminate the need for OPG to obtain additional regulatory approvals during the –- the site preparation phase as appropriate. For example, in water –- in waterworks on the site shoreline or inland will require an authorization from the Department of Fisheries and Oceans Canada. Also, approval from Transport Canada will be required for any works to be built under or through navigable waters that may interfere with navigation.

Additional federal, provincial, and municipal permits or authorizations will be required during the site preparation phase. It is OPG's responsibility to obtain the necessary regulatory permits or authorizations from other regulatory agencies, which exist outside the context of the Nuclear Safety and Control Act.

That said, CNSC staff are committed to work with other regulatory agencies to harmonize regulatory oversight.

As shown on this slide, the CNSC's technical expectations with respect to the evaluation of site suitability for new nuclear power plants are contained in regulatory document RD346, Site Evaluation for New Nuclear Power plants. RD346 represents the CNSC's adoption, and in some case –- cases, adaptation of the principles of International Atomic Energy Agency Safety Requirements documented in standard NSR3 site evaluation for nuclear installations and its associated safety guides.

The scope of RD346 goes beyond NSR3 in several aspects, such as the protection of the environment, security of the site, and protection of prescribed information and equipment, aspects which are not addressed in the IAEA standard.

As documented in RD-346, the aspects considered in the evaluation of proposed sites for new nuclear power plants include the potential effects of natural external events, such as seismic tornadoes and flooding, the potential

effects of human induced external events, the characteristics of the site and its environment that could influence the dispersion of radioactivity –- radioactive material to persons and the environment, and the population density, population distribution, and other characteristics in the region in so far that they may affect the implementation of emergency measures.

This concludes our background discussion. I will now turn the presentation over to Mr. Ross Richardson who will provide an overview of OPG's licence to prepare a site application, as well as CNSC staff's assessment.

--- PRESENTATION BY MR. RICHARDSON:

MR. RICHARDSON: Thank you. In September 2006, OPG submitted a preliminary licence to prepare site application to the SNSC requesting approval to prepare additional land available at the Darlington nuclear site for a new nuclear power plant. On September 30th, 2009, OPG submitted an updated application for a licence to prepare a site to the Darlington Joint Review Panel along with a new nuclear at Darlington environmental impact statement.

OPG's updated application for a

licence to prepare a site seeks approval to ––- prepare site to the Darlington Joint Review Panel along with the new nuclear at Darlington Environmental Impact Statement.

OPG's updated application for a licence to prepare site seeks approval to prepare the Darlington nuclear site for a new nuclear power plant of up to four units with a maximum combined output of 4,800 megawatts electric. OPG has requested a licence duration of 10 years.

As shown on this slide, the Darlington nuclear site is home to the Darlington nuclear generating station, a four-unit nuclear power plant and the Darlington waste management facility, a used fuel dry storage facility. Both of these facilities are licensed by the CNSC.

The overall Darlington nuclear site comprises a parcel of land of approximately 485 hectares. Canadian National Railway's main line bisects the site in an approximate east to west direction.

As shown in yellow, the portion of the site proposed for development is primarily the easterly one-third of the overall Darlington nuclear site. The proposed new nuclear power plant

site is to be located south of the rail line.

The physical activities requested by OPG to be encompassed by the licence to prepare site include those that are necessary to facilitate the subsequent construction and operation of a new nuclear power plant.

These activities include the construction of access control measures, clearing and grubbing of vegetation, excavation and grading of the site, installation of services and utilities, including domestic water, fire water, sewage, electrical, communications and natural gas to service the future nuclear power plant, construction of administrative and support facilities inside the future protected area, construction of environmental monitoring and mitigation systems and the construction of flood protection and erosion control measures.

Each of these activities is discussed in further detail in Section 1.2 of OPG's licence application.

It should be noted that for the construction of flood protection and erosion control measures OPG acknowledges that additional regulatory approvals will be required.

Enclosed with OPG's licence application were a number of supporting documents including a suite of site evaluation reports which assess the suitability of the Darlington nuclear site for a new nuclear power plant.

OPG's site evaluation studies conclude that the Darlington nuclear site is suitable for a new nuclear power plant and that engineering solutions can be implemented to mitigate risks associated with site-related hazards.

Given that a specific reactor technology had not been selected at the time of the licence application submittal, OPG provided bounding reactor design parameter values describing the plant site interface from a range of reactor designs under consideration for the site.

The complete set of bounding plant parameter values is referred to as the plant parameter envelope, or PPE, as described in the use of plant parameter envelope report. Values from the PPE were used by OPG, where applicable, to support the evaluations of site suitability.

We will now focus our attention to CNSC staff's review and assessment of OPG's licence

application.

CNSC staff assessed the licence application against the applicable regulatory requirements under the *Nuclear Safety and Control Act* and associated Regulations, as well as the expectations of CNSC regulatory document RD-346, site evaluation for new nuclear power plants.

During the course of CNSC staff's review and assessment of the licence application, a number of requests for additional information were provided to the Darlington Joint Review Panel for the purpose of enabling CNSC staff to obtain all relevant information needed to support CNSC staff's regulatory findings.

A total of 26 LTPS, or Licence to Prepare Site, IRs were raised and responded to by OPG. As documented in CMD 11-P1.2, CNSC staff's assessment of the licence to prepare site application was grouped into two road review areas as: (1) assessment of the site evaluation studies, and (2) assessment of the relevant safety and control areas.

Each area is further discussed in the following slides.

CNSC staff's assessment of OPG

site evaluation studies was grouped into a number of review areas as shown on this slide including plant parameter envelope, or PPE, approach, the characteristics of the site, the evaluation of natural external events such as seismic, meteorological and flooding hazards, the evaluation of human-induced non-malevolent external events, the radiological dose consequences for normal operations and accident conditions, the population and emergency planning considerations and proposed exclusion zone determination.

CNSC staff's conclusions pertaining to the site evaluation studies are presented on this slide.

Overall, CNSC staff conclude that OPG has provided sufficient information in the application, together with information request responses to meet RD-346 expectations.

The consideration of external events and site-specific characteristics as inputs to the design and safety analysis of a new nuclear power plant will be reviewed and assessed as part of an application for a licence to construct.

In addition, as part of an application for a licence to construct, OPG must

demonstrate and takes full responsibility that the design characteristics of the reactor design selected for construction fall within the plant parameter envelope.

Now, it should be noted that the site evaluation studies performed to date were conducted for the purposes of verifying the suitability of the Darlington nuclear site to host a new nuclear power plant.

As acknowledged by OPG, additional site investigation work will be required for the purposes of design and safety analysis during the site preparation phase.

CNSC staff acknowledges the seriousness of the event that occurred in Japan on March 11th of this year and the resulting impact on some of Japan's nuclear power plants. CNSC staff wishes to emphasize that it is satisfied that the Darlington site has been adequately characterized from the perspective of natural hazards such as seismicity and flooding.

CNSC staff remain of the opinion that the Darlington nuclear site is suitable for new build.

In addition to the evaluations of

site suitability, OPG's licence to prepare site application contained additional information as required by the General Nuclear Safety and Control Regulations and the Class 1 Nuclear Facilities Regulations.

CNSC staff's assessment of this information has been grouped into the most appropriate safety and control area, or SCA. Numerous SCAs are not within the scope of this assessment as they are not applicable in the context of a licence to prepare site.

Those SCAs not addressed in this assessment will be addressed as appropriate in subsequent licensing phases.

This slide presents each of the SCAs, the relevance to this assessment, risk ranking and CNSC staff rating levels. For each relevant SCA, CNSC staff found the information provided in the application, together with information request responses, as satisfactory.

Each relevant SCA is discussed further in the following slides.

As presented in CMD 11-P1.2, OPG's management system documents focus on the oversight of the yet to be selected contractor referred to as

the "engineering procurement and construction", or EPC, company. It is the EPC company who will perform site preparation activities, while OPG will oversee the EPC company activities to ensure all requirements are met.

OPG will retain the ultimate responsibility as licensee under the *Nuclear Safety and Control Act*.

It should be noted that OPG has indicated that they may elect to contract an EPC company to perform site preparation activities in advance of a decision on the particular reactor technology that will be procured.

In support of the application for a licence to prepare site, OPG provided their Darlington new nuclear project management system charter.

As a result of information request No. 3 and the subsequent CNSC comments received, OPG revised their management system charter and submitted an additional seven program level documents for CNSC staff review.

CNSC staff found a notable improvement from the initial document submitted and concluded that the proposed management system is

sufficient for the issuance of a licence to prepare site.

CNSC staff recommend that the proposed license to prepare site include a licence condition requiring OPG to have the implementing documents required for site preparation to be accepted by the CNSC prior to the commencement of the licensed activities. A list of documents to be submitted is provided in the applicable section of the proposed license conditions handbook.

CNSC staff also recommend that the proposed license to prepare site include a license condition requiring OPG to implement and maintain its management system in accordance with the requirements of CSA standard N-286-05, management system requirements for nuclear power plants.

With respect to human performance, CNSC staff conclude that sufficient information was provided in the application for the issuance of a license to prepare site. Under the proposed license, a personnel training plan will require CNSC review and acceptance prior to the commencement of the licensed activities.

CNSC staff recommend that the proposed license to prepare site include a license

condition requiring OPG to implement and maintain safety and control measures for personnel qualifications and competencies while carrying out the site preparation activities.

With respect to operating performance, CNSC staff conclude that sufficient information was provided in the application together with information request responses for the issuance of a license to prepare site.

Given that a specific reactor technology has not been selected, the proposed license to prepare site permits excavation and grading of a site to a finished elevation of approximately 78 metres above sea level, which is the anticipated final ground surface grade. This would permit levelling of the -- levelling of the site, such as the final ground surface grade would be equivalent to that of the neighbouring Darlington nuclear generating station.

For the record, CNSC staff would like to correct a misprint that appears on page 78 of CND 11-P1.2, section 4.34, bullet 3, where the term “bedrock” incorrectly appears and should be replaced with the term “grade.”

For the license to prepare --

UNKNOWN SPEAKER: Just wait. Repeat it again.

MR. RICHARDSON: Would you like --

UNKNOWN SPEAKER: Can you give us the page, please?

MR. RICHARDSON: Sure. Page 78, section 4.34.

CHAIRPERSON GRAHAM: Co-managers also noted that for the record and thank you.

I believe it's the spelling. You had "a" instead of "g," is it?

MR. RICHARDSON: It's just -- the terminology should be -- we have -- we have the term "bedrock."

CHAIRPERSON GRAHAM: Oh, bedrock.

MR. RICHARDSON: And it should be -- should be grade.

CHAIRPERSON: Grade instead of bedrock.

MR. RICHARDSON: The term "bedrock" should be replaced with grade.

CHAIRPERSON GRAHAM: So noted. Proceed.

MR. RICHARDSON: Thank you. For the license to prepare site, CNSC staff recommend

the following license conditions regarding the conduct of the licensed activity:

One, a license condition requiring OPG to implement and maintain safety and control measures for the conduct of site preparation activities.

Two, a license condition requiring OPG to report adverse events that include those required by the Nuclear Safety and Control Act and regulations.

And, three, a license condition requiring OPG to submit an annual report on the licensed activities.

With respect to conventional health and safety, CNSC staff conclude that sufficient information was provided in the application for the issuance of the license to prepare site.

Under the proposed license, an Occupational Health and Safety plan will require CNSC review and acceptance prior to the commencement of the licensed activities.

CNSC staff recommend that the proposed license to prepare site include a license condition requiring OPG to implement and maintain

safety and control measures for Occupational Health and Safety while carrying out the licensed activities.

Similar to the existing OPG nuclear facilities, OPG is to make the appropriate arrangements to incorporate by reference the provincial legislation respecting Occupational Health and Safety such that The Occupational Health and Safety Act of Ontario will apply to the project.

With respect to environmental protection, CNSC staff conclude that sufficient information was provided in the application together with information request responses for the issuance of the license.

Under the license -- under the proposed license, pardon me, an environmental management and protection plan will require CNSC review and acceptance prior to the commencement of the licensed activities.

CNSC staff recommend that the proposed license to prepare site include a license condition requiring OPG to implement and maintain -- to implement and maintain measures for environmental protection in accordance with CNSC

regulatory standard S296, environmental protection policies, programs, and procedures at class one nuclear facilities and uranium mines and mills.

When incorporating a license, CNSC regulatory standard S296 requires licensees to establish, implement, and maintain an environmental management system that satisfies the requirements set by ISO-14001, environmental management systems requirements with guidance for use.

With respect to emergency management and fire protection, again, CNSC staff conclude that sufficient information was provided in the application for the issuance of the license. Under the proposed license to prepare site, detailed plans for emergency response and evacuation and fire prevention and response will require CNSC acceptance prior to the commencement of the licensed activities.

CNSC staff recommend that the proposed license to prepare site include a license condition requiring OPG to implement and maintain safety and control measures for emergency preparedness and fire protection while carrying out licensed activities.

With respect to waste management,

staff conclude that sufficient information was provided in the application for the issuance of the license. It should be noted that the activities encompassed under the proposed license will not involve the handling of radioactive materials and will not generate any radioactive waste.

Hazardous waste that may be generated as a result of site preparation activities will be limited to those found in standard construction projects.

CNSC staff recommend that the proposed license to prepare site include a license condition requiring OPG to implement and maintain safety and control measures for waste management while carrying out the licensed activities.

With respect to preliminary decommissioning planning and financial guarantees, staff conclude that OPG has provided sufficient information in the application together with information request responses for the issuance of a license to prepare a site.

As documented in CND-11-P1.2, OPG enclosed a preliminary decommissioning plan with the license application based on the assumption that full site preparation works, including

excavation of the power block, would be included within the scope of the license to prepare site.

Given that excavation of the power block is not permitted under the proposed license, OPG proposed that the original preliminary decommissioning plan, included with the application, be superseded with a revised proposal. Under the revised proposal, no site decommissioning work would be required.

Should the project be cancelled during the course of site preparation activities under the proposed license, OPG would not decommission the site, but would use the site to support the existing licensed facilities.

Given that no decommissioning work would be required under the proposed license, OPG has proposed a financial guarantee of zero dollars.

CNSC staff accept OPG’s revised proposal.

As license conditions for preliminary decommissioning planning and financial guarantees are standard across nuclear power plant licenses, CNSC staff recommend that the proposed license to prepare site include a license condition requiring OPG to maintain a preliminary

decommissioning plan for site preparation in accordance with the requirements of CSA standard N-294-09, decommissioning facilities containing nuclear substances, and that OPG be required to update the preliminary decommissioning plan every five years.

CNSC staff also recommend that the proposed license to prepare site include a license condition requiring OPG to maintain a financial guarantee to adequately fund the preliminary decommissioning plan.

As shown on this slide, CNSC staff recommend two additional license conditions for the proposed license to prepare site.

The first is a license condition requiring OPG to implement and maintain an environmental assessment follow-up program.

As discussed during our presentation provided on the environmental impact statement, an environmental assessment follow-up program is necessary to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures.

OPG will develop the final scope of the environmental assessment follow-up program

through a consultative process involving its own technical staff, the CNSC and other stakeholders.

Under the proposed licence the environmental assessment follow-up program will require CNSC acceptance prior to the commencement of the licensed activities. Following acceptance OPG will be responsible for ensuring the elements as described in the follow-up program are implemented.

CNSC staff will provide oversight for the implementation of the follow-up program to ensure it meets its objectives and scope.

Finally, given that a reactor design had not been selected at the time of the licence to prepare site application submittal, CNSC staff recommend a licensed condition requiring OPG to submit the proposed quality assurance program for the design of the nuclear facility upon the selection of a reactor technology.

We will now turn our attention to the proposed licence and accompanying licence conditions handbook, which were enclosed in part two of CMD11-P1.2.

First, the proposed licence includes all recommendations outlined in the CMD

and as discussed in this presentation.

Second, under the proposed licence excavation is limited to approximately 78 metres above sea level, which is the anticipated final ground level surface grade. As previously mentioned, this would permit levelling of the site, such as the final ground surface grade would be equivalent to that of the neighbouring Darlington Nuclear Generating Station.

Third, the proposed licence includes a condition requiring OPG to have the implementing documents required for site preparation accepted by the CNSC prior to the commencement of the licensed activities.

And fourth, the proposed licence includes delegation of authority from the Commission to CNSC staff where applicable. Under the proposed licence CNSC staff recommend the delegation of authority by the Commission apply to the encumbrance of the following CNSC staff positions: The Director of the new Major Facility Licensing Division, the Director-General of the Directorate of Regulatory Improvement and New Major Projects Management and the Executive Vice-President and Chief Regulatory Operations Officer

of the Regulatory Operations branch.

CNSC staff has also prepared a licence conditions handbook to accompany the proposed licence, a copy of which was provided in part two of CMD11-P1.2. The objective of the licence conditions handbook is to provide compliance and verification criteria in order to meet the conditions listed in the licence.

To support this objective the licence conditions handbook contains the following information; a description of each section of the licence, background information and compliance verification criteria for each licence condition, reference to licensee documentation with version control, and reference to applicable CSA standards or CNSC regulatory documents with version control.

The licence conditions handbook is intended for use by both OPG and CNSC staff and should be read in conjunction with the licence.

The licence conditions handbook is an evergreen document that will be updated during the course of the licensed activities and includes a change control process to ensure that preparation and use of the document is properly controlled. All reference documents are clearly identified and

maintained and procedures for modifying the documents are clear.

With respect to regulatory compliance, should the licence to prepare site be issued, CNSC staff resident inspectors will be on site to independently verify that OPG is conducting the licence activities in accordance with the *Nuclear Safety and Control Act*, associated regulations, and the licence to prepare site.

In addition, the OPG commitments made in the licence application and in the environmental impact statement will be entered into a CNSC commitment management system and monitored to completion.

I will now turn the presentation over to Mr. Howden.

--- PRESENTATION BY MR. HOWDEN:

MR. HOWDEN: Thank you.

In summary, CNSC staff conclude that OPG has provided sufficient information in the application, together with information request responses, to satisfy the expectation set forth in RD346 and the applicable regulatory requirements under the *Nuclear Safety and Control Act* and associated regulations for the issuance of a

licence to prepare site.

CNSC staff acknowledges the seriousness of the event that occurred in Japan on March the 11th of this year and the resulting impact on some of Japan's nuclear power plants.

CNSC staff is satisfied that the Darlington site has been adequately characterized from the perspective of natural hazards such as seismicity and flooding, and CNSC staff remains of the opinion that the Darlington site is suitable for new nuclear build.

The consideration of external events and site-specific characteristics as inputs design and safety analysis of the new nuclear power plant will be reviewed and assessed as part of an application for a licence to construct. The CNSC will not recommend a licence for any reactor design unless it is confident that the design adequately protects against external events such as seismic, meteorological and flooding hazards.

In addition, as part of an application for a licence to construct OPG must demonstrate and takes full responsibility that the design characteristics of the reactor design selected for construction will fall within the

plant parameter envelope.

With respect to paragraphs 24(4)(a) and (b) of the *Nuclear Safety and Control Act* CNSC staff have concluded the following: The Applicant is qualified to carry on the activity authorized by the licence and the Applicant will, in carrying out the activity, make adequate provision for the protection of the environment, health and safety of persons, and the maintenance of national security, and measures required to implement international obligations to which Canada has agreed.

An environmental assessment under the *Canadian Environmental Assessment Act* is in progress and must be completed prior to a licensing decision. No licence may be issued unless a decision on the environmental assessment has been made allowing the project to proceed.

Overall, CNSC staff recommend that the Commission accepts CNSC staff's conclusions, and pursuant to Section 24 of the *Nuclear Safety and Control Act*, CNSC staff recommend that the Commission approve the issuance of the power reactor site preparation licence subject to a decision on the environmental assessment allowing

the project to proceed.

This concludes our presentation and staff is available to respond to questions.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Howden and your team.

We'll start of with questions from panel members.

Mr. Pereira, you have the first questioning.

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Thank you, Mr. Chairman.

My first question relates to exclusion zones -- the exclusion zone, rather. This is dealt with in Section 3.8.3 in PMD11-P1.2.

The PMD states that historically the exclusion zone for all nuclear power plants in Canada has been defined as 914 metres, which translates to 3,000 feet, from the reactor building.

For the reactors at the new nuclear development at Darlington, OPG has based its assessment on exclusion zones on the requirements in RD337 and RD346, and it has concluded that a distance of 500 metres would

satisfy regulatory requirements.

It appears from the panel member document, however, that this distance has not been justified to the satisfaction of CNSC staff.

What are the issues that remain to be resolved?

MR. HOWDEN: Thank you. Barclay Howden speaking.

With regard to exclusion zone to be established, I just want to outline that there's five factors that we consider; one is land usage needs, in terms of how much land the project itself will require.

The second is the performance during normal and accident conditions, which includes anticipated doses at the boundary of the exclusion zone.

Emergency preparedness considerations on site and off site; environmental factors such as wind strength, direction; those types of things.

And finally security and robustness; one is how secure is the plant against threats from the outside and what is the robustness of the design?

Our view of the exclusion zone right now is that it has been described to us and we're of the opinion that the description is satisfactory for the moment.

However, it's really up to the Proponent at the licence to construct to demonstrate that the 500 metres, as they proposed, is appropriate. And this would be going through very much the documents that you had described, Mr. Pereira. But very importantly, what are the potential accidents and with this exclusion zone, is the plant able to meet the safety goals as outlined in RD-337?

We will know those in -- those will be demonstrated or are to be demonstrated during the licence to construct where the detail design is outlined and the safety analysis is done. So it's not that we are saying it's deficient today. It needs to be demonstrated for sure at the licence to construct.

MEMBER PEREIRA: I appreciate your explanation of considerations, but looking at the illustration provided in some of the documents submitted to the panel, the 500-metre zone; one side of that boundary runs very close to OPG's site

property boundary.

So if a -- based on the analysis of accidents and so on, we need a larger or wider exclusion zone. There's a real risk that one might be going beyond the site boundary. Would that be a limiting consideration, the site boundary?

MR. HOWDEN: Barclay Howden speaking.

In our view, no. They have to meet the requirements at the exclusion zone which means that they have enough land set aside and that they have the legal authority to exercise control over the land.

So there could be options where they would have to seek legal control over a larger parcel of land or they would have to require more mitigation measures within the plant to be able to meet the requirements of the exclusion -- to meet the 500 metres.

Again, it goes back to RD-337, the safety goals they have to respect. So they're either going to have to expand it and have the appropriate control or put in measures such that they can meet the regulatory requirements of 500 metres.

MEMBER PEREIRA: Well, if they seek to obtain legal control over more property then that would be property outside the scope of the environmental assessment because our environmental assessment applies to the current site boundaries. So that might be a bit of a tricky issue.

So has that been considered in -- when you outline that option of acquiring additional property that it might fall outside the scope of the current licence to boundary and also in the case of what we are deliberating on, an environmental assessment which is a one-shot deal?

MR. NEWLAND: Dave Newland, for the record.

Maybe I can provide a little context. Historically, 914 metres, 3,000 feet was set at a time when there were certain types of technology. This is back in the 1970s. It was appropriate for that time.

Since then there have been technologies proposed, sites proposed that have used reduced sizes of exclusion zones and -- including 500 metres.

The reactor technologies as

proposed have far more robust, tighter containments that are able to contain any significant release from a core during an accident such that we would not expect, for those kinds of technologies, to not meet the 500 metres.

That said, the applicant will be obliged to do the analysis and show that that is the case and if they don’t meet that 500 metres, they will be obligated to provide -- to include extra design provisions such that they do.

MEMBER PEREIRA: So -- but you did -- Mr. Howden did say that one option might be to acquire control of a property outside the present site boundary and that -- there may be legal considerations that need to be fed into that.

MR. HOWDEN: Barclay Howden speaking.

From a process perspective, every application or every amendment that is brought before the Commission has to undergo an EA determination which then you compare against the EA that was -- had been previously done to determine whether what is being proposed falls within the EA.

So in that case, there could be a case where it could trigger potentially another EA

because it doesn’t meet the environmental assessment that you are assessing today.

However, I think from our point of view, as Dr. Newland says, I think the driver would be to do things within the plant design to mitigate whatever issues have come up to be able to meet the safety goals of the 500 metres.

MEMBER PEREIRA: Thank you.

Would OPG like to comment on the issue?

MR. SWEETNAM: Albert Sweetnam, for the record.

During the -- in preparation of the EIS, we did a study of the site itself as well as the local surrounding area in terms of potential impacts. Our position is that we will be able to meet the 500-metre zone with the technologies that we propose.

If for whatever reason this was not possible, we would then enter into an arrangement with St-Mary’s Cement for the additional meterage that we would need on their property to meet whatever zone was required.

We do not think that there would be a requirement to change the environmental

assessment because this is just an exclusionary zone. There are no impacts associated with the exclusionary zone.

So as a result, we don't feel that there would be a requirement for an EA. But our intent is to meet the 500-metre requirement.

MEMBER PEREIRA: Thank you.

I'll go on to my next question.

In PMD P1.2, Section 3.6.1, a table there presents exposure-control measures for safety goal based small releases. Sheltering is required for whole-body doses up to 10 millisieverts for the area within 10 kilometres and evacuation for whole-body doses were between 10 and 100 millisieverts.

What are the health effects that one might expect over these ranges of doses in a population exposed to these levels of doses?

MR. HOWDEN: Barclay Howden speaking.

I'll ask Patsy Thompson to respond to that.

DR. THOMPSON: Just for clarification, Mr. Pereira, your question is related to the dose associated with the need to

evacuate?

MEMBER PEREIRA: There are two doses quoted; one is -- it implies you can tolerate up to 10 millisieverts within a certain zone and then another action level 10 to 100 millisieverts.

So in terms of, you know, what would be the impacts of tolerating doses up to those ranges?

DR. THOMPSON: Patsy Thompson, for the record.

The requirements for sheltering and evacuation during -- for the early phase which is associated with a small release frequency and for relocation for the large release frequency are based on -- are lower than international guidance for similar protective actions.

For example, for sheltering and evacuation, the whole-body doses are from 1 to 10 millisieverts and for evacuation, 1 to 100 millisieverts.

And the purposes of these limits are to ensure that there are no increased risk of developing cancer associated with such exposures.

The epidemiological information gathered through decades of research on radiation

effects on the atomic bomb survivors, nuclear energy workers and other populations that have been exposed to various sources of radiation indicate that the likelihood of developing cancer from exposures less than 100 milliSievert is negligible. It can't be detected relative to populations that are not exposed.

And so those levels are safe and they have been set to ensure that people are evacuated before they're exposed to doses that could pose a risk.

MEMBER PEREIRA: Yeah, I asked the question because -- thank you for that clarification.

I asked the question because there are many intervenors who are of the view that even low doses pose a risk. And what you are saying is that these numbers are based on assessment of health studies that have been done over years?

DR. THOMPSON: Those numbers were based essentially -- there's new atomic energy -- the International Atomic Energy Agency has provided guidance and protective measures, and this guidance was updated following the accident at Chernobyl where a lot of experience was gained from both the

radiological consequences of the accident, but also the psycho-social consequences of the accident.

And so the small release frequency is associated with an iodine release, and essentially either sheltering or evacuation is to prevent essentially thyroid cancer from happening.

The guidance for large release frequency is prevention of long-term relocation because of the psycho-social impacts associated with long-term relocation, and they're associated with the deposition of caesium in the environment.

The assessment that OPG did in support of the environmental assessment and the licence indicate that for the small release frequency, which is the early phase of a potential accident, evacuation would only be required within a zone of two kilometres.

And in the same -- for the same type of assessment related to the safety goals in RD-337, relocation would only be required to meet the safety goals within an area within one kilometre of the station, which is essentially the industrial site on which OPG is located.

But in all cases, these goals are set to be protective of human health and they're

based on extensive epidemiological studies.

MEMBER PEREIRA: Thank you. Let's switch to another topic.

In your PMD P-1.2, Section 3.3.1, the PMD states that:

> "At the beginning of 2007, there were 12 existing monitoring wells on the site."

It states further that there are now 72 new monitoring wells installed for environmental assessment purposes.

What do these wells indicate about baseline groundwater conditions and, in particular, evidence of impact from current operations on the site and, by that inference, for future operations?

DR. THOMPSON: Sorry. Could you repeat the question, please?

MEMBER PEREIRA: In your PMD, there's a statement saying that at the beginning of 2007 there were 12 monitoring wells on site, that there are now 71 new monitoring wells installed for EA monitoring purposes.

What do these wells indicate about baseline groundwater conditions of the site and, in

particular, what evidence is there of impact from the current operations on the site and, by inference then, projections for future operation with the new facility?

DR. THOMPSON: Patsy Thompson, for the record.

In terms of the baseline information, the additional wells and the existing wells show some impact from the existing facility. For example, there are increased levels of nitrates which are associated with fertilizers and levels of tritium are in the range of about 500. The maximum is in the range of about 500 Becquerels per litre.

Five hundred (500) Becquerels per litre is lower than the existing Ontario drinking water standard of 7,000, but we also need to recognize that groundwater on an industrial site is not potable water.

So the conclusion is that the operation of the existing Darlington station for many, many years has had very little impact on groundwater quality on the site.

MEMBER PEREIRA: And looking forward, then, to new reactors, four new reactors, can one project similar conditions arising, similar

impact? An increase, but what level of increase would you expect given what you know about the new technologies?

DR. THOMPSON: Patsy Thompson, for the record.

The assessment was done for the bounding assessment with the PPE for the radionucleides. I will have the numbers for you perhaps in a few minutes.

But one of the things -- one of the recommendations that staff made during -- in the panel member document on our EIS is a recommendation once the technology is chosen for OPG to redo the atmospheric modelling, taking into consideration deposition from -- dry and wet deposition of tritium and other contaminants to validate the EIS information.

We'll be able to provide the EIS information in a few minutes.

MEMBER PEREIRA: Thank you.

CHAIRPERSON GRAHAM: Are you doing it now, or will that be an undertaking?

We're getting it now. Okay.

MEMBER PEREIRA: So we could go on to ---

CHAIRPERSON GRAHAM: Go on to another question while they're getting it there.

Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr. Chairman.

In relation to what has been asked in terms of evacuating people, on page 26 of Part 1 of PMD 1.2 it's mentioned that -- let me get my page now -- population distribution.

First bullet, relatively few people reside within four kilometres of the proposed plant. I'd like a definition of "a few people"?

MR. HOWDEN: Barclay Howden speaking.

Madame Beaudet, I would suggest that OPG respond to that. They'll have that information.

CHAIRPERSON GRAHAM: OPG?

MR. SWEETNAM: I'll be speaking for the record.

Could you please repeat -- or point us to the correct reference? Thank you.

MEMBER BEAUDET: We are asking OPG, but this is a judgment passed by CNSC. It's

in the document -- it's in your document.

MR. RICHARDSON: Ross Richardson, for the record.

The information you are referring to is essentially just a -- we are providing -- or reiterating what was in OPG's application, so we are essentially providing -- paraphrasing what OPG had provided to us.

Following that, we then provide CNSC staff's assessment of that information. So the question you were referring to is under really what was -- what OPG had provided in the application itself, which is why Mr. Howden referred your question to OPG.

CHAIRPERSON GRAHAM: For OPG's benefit, could you give all the cross-references?

MADAM BEAUDET: Sorry, Mr. Chairman. I'd like to finish with CNSC first on this because you have accepted, obviously, what OPG says. You didn't put in to question what OPG said.

And if we look at the land use, environmental effect -- sorry, land use assessment of environmental effect technical support document.

If we look at the Figure 4-2-1, it indicates that there may be few people now, but it

indicates that there is a growing population and there are proposed buildings, not for 20,031 or 20,056, Item No. 18 and 52. Eighteen (18) is already under construction and when we did our site visit we saw from our own eyes that it's already under construction and this will provide for 389 units.

Fifty-two (52) is already council approved, and it will provide 406 units.

Now, I believe, when I look at the map, bird’s view, this is 2,000 feet -- sorry -- it’s two kilometres. And also, just above the potential contiguous zone, there’s a school.

So when we talk of evacuation, we talk of more people to be evacuated and also a school to be evacuated.

You have proposed sensitive land use that, as I can see, are within two kilometres, like 2.1, 2.5 kilometres. And this is bird’s view so it’s even more complicated when you look at the streets and you have to evacuate these people.

So I was surprised when you said that relatively few people reside. I mean, we visited. I mean, it’s -- you know, when you evacuate, it means you put people on camping beds

and whatever. It's not just in terms of being able to evacuate them in time; that's fine. But it's the stress that you add to people for God knows how many days.

So I'd like to hear now from OPG, please? I'd like to have comments on this.

MR. SWEETNAM: Albert Sweetnam, for the record.

In our emergency planning and preparedness support document that was submitted as part of our application, we indicated the population levels in the proximity of the site.

So in the range of zero to three kilometres there are 39 people and the school that you're referring to is outside of that zone, and from zero to 10 kilometres there are about 113,262 people.

MEMBER BEAUDET: And within the first zone, how many?

MR. SWEETNAM: Thirty-nine (39).

MEMBER BEAUDET: Thirty-nine (39)?

MR. SWEETNAM: Yes.

MEMBER BEAUDET: But does it include the new builds?

MR. SWEETNAM: This is ---

MEMBER BEAUDET: I don't think so. If you have 389 units, you'll have at least 389 people.

MR. SWEETNAM: It does not. These are the population levels that were in place at 2006. And that's what the study was based on.

MEMBER BEAUDET: And the school has how many students?

MR. SWEETNAM: Albert Sweetnam, for the record.

The school is outside of the three-kilometre range, but we don't know at this point in time how many students are in the school. But we could find that out if it's a requirement of the panel.

MEMBER BEAUDET: Well, in the scale on this figure, it must be approximate. Because, for me, if I look at it, it's not 3,000 (sic) kilometres.

Could you check on that, please?

MR. SWEETNAM: We can check on that.

CHAIRPERSON GRAHAM: I think this is a very important subject so we'll have to give this an undertaking for an update of, first of all,

the population of the school and is it within the three kilometres.

Is that right, Madame Beaudet?

MEMBER BEAUDET: Yes.

CHAIRPERSON GRAHAM: And also, since your records were only in 2006 maybe we could have more. That would be correct?

MEMBER BEAUDET: Well, I don't know if there are official figures on that.

CHAIRPERSON GRAHAM: May not be able to get that but the undertaking certainly is the school.

MR. HOWDEN: Mr. Graham, would we be permitted to provide a little contextual commentary for Madame Beaudet?

CHAIRPERSON GRAHAM: Anything that will clear the air, yes.

So that's undertaking 12 to start with, but I think ---

THE REGISTRAR: Number 13.

CHAIRPERSON GRAHAM: Number 13, I guess.

CHAIRPERSON GRAHAM: And we'll go with you, Mr. Howden.

MR. HOWDEN: Thank you very much.

First of all, Emergency Measures Ontario is coming later in the week, and I think as the competent authority for off site response, they will be able to provide certainly some good answers in terms of being able to evacuate people and also being able to accommodate people which I think is one of the concerns Madame Beaudet has raised.

The second thing is from the ability to be able to evacuate in an area, from a regulatory standpoint, we require a number of things.

One is the maintenance of this population data that OPG needs to work with the off site authority. So exactly as the growth continues they need to be able to be aware of what is occurring and being able to interact with the off site authorities. And they do have a committee that meets on this that I think they can describe in more detail.

The other thing is they have to continue to look at the physical characteristics around the site for the ability to evacuate off the site and then people who are not on the site further away.

Madame Beaudet has raised the

issue of they need to be able to focus on populations that are difficult or potentially difficult to evacuate, schools are one, prisons, hospitals, and it's very important within planning.

And finally, the ability to maintain the land use activities in the protective zones such that it will not impede the implementation of the emergency plans.

So one of the things we require a licence to construct is confirmation from OPG and working with the off-site authorities that this can be done. Because what we do is we assess OPG's ability to evacuate the site; we look at their integration with the off site authorities.

Off site the competent authority is Emergency Management Ontario with Durham Region and they have to be able to execute that. But we do look for confirmation through the licensee because that is our regulatory link that the competent authorities have advised them that they can carry out their duties.

So I just wanted to give you context of sort of how everybody interacts with each other. But I think in terms of some of the details you're asking, obviously they can provide

some details. But Emergency Management Ontario should be able to address some of your specific comments.

CHAIRPERSON GRAHAM: Thank you, Mr. Howden.

OPG, do you want to respond?

Then we'll go back to Madame Beaudet for further questions.

MS. SWAMI: Laurie Swami.

As part of our environmental assessment, we considered the evacuation time estimate studies that were complete.

And in doing that we looked to what the population growth would be in the region; 2006 was the baseline.

We also looked at 2025. That was based on the regional plans and planning framework that they've established. We used their numbers to establish what the population growth would be.

We also looked to the plan published by the region on what type of land use would be permitted around our facility. As part of that process, we identified to the region that there were special needs around the Darlington facility to ensure that we wouldn't have

residential encroachment close to the facility, and that was very important to us going forward.

That's now recognized in their plan and you will see the plan and I'm sure we'll discuss this when the land use discussions come forward. But you can see in the plan that the growth around our facility is compatible with our land use which is a commercial and industrial usage closer to the facility.

The growth that may be taking place in the region is directly into Bowmanville or closer to the Curtis areas in this community. So we factored that into our predictions of whether or not there would be adequate ability to evacuate the plant in the surrounding areas now and into the future.

And that material, we could provide more details. I know that it's in our material here with us. I just don't have the exact figures of what that would be in 2025 in front of me.

MEMBER BEAUDET: Yes. I wanted to ask these questions today because I wanted to have precise data when the municipalities are here.

I also noted that one of the

mitigation measures is this committee that you have with Durham and Clarington, and for me, I'm reassured a little bit that you can have some power in convincing the municipalities that they should not develop residential areas close by.

One of the amendments, number 128, I believe is this new proposal for a residential area closer than we would expect. I mean, it's already started to being built.

So we'll discuss more when we have the issue about land use and when we have Emergency Ontario here. But I wanted to know exactly the population to be evacuated, where the figures and which year you were based?

My impression is that you and the municipalities are coming on a collision course. And I think we have to try to assess certain things.

But we'll do it when the municipalities are here.

Thank you.

I think Mr. Pereira is waiting for an answer, so maybe we should pursue with his question, Mr. Chairman?

CHAIRPERSON GRAHAM: First of all,

Madame Beaudet has an Undertaking Number 13 for an update on population models and so on and on the school population.

That correct, Madame Beaudet?

MEMBER BEAUDET: Yes.

CHAIRPERSON GRAHAM: So that's Undertaking 13.

Now, we'll go to Mr. Pereira. You had -- Dr. Thompson was going to give you an answer?

DR. THOMPSON: That's correct. Patsy Thompson, for the record.

It was in relation to the projected increases in groundwater contamination with the new build.

Essentially what OPG did was, we have a baseline monitoring of about -- a maximum of 500 becquerels per litre on the site. And for the new build what was done was projections for onsite and offsite moving forward.

Two assessments were done, initially without the EC-6, and for those in that situation, there was a marginal increase in tritium deposition in groundwater with minimal offsite consequences.

When the plant parameter envelope was modified to accommodate potential releases from the EC-6 technology, then there were increases of tritium onsite and there was predictions of an increase offsite up to about 300 becquerels per litre in groundwater.

And following this assessment, the staff's recommendation captured in the RPMD on the EIS was for both better modelling once the design is chosen and, secondly, an adjustment to well water monitoring and going forward if the project goes ahead.

MEMBER PEREIRA: Thank you.

CHAIRPERSON GRAHAM: Okay.

I have several questions. First of all, my first question to OPG -- not OPG but CNSC rather.

You're recommending a 10-year licence pending all the other approvals that are required first. Licence to construct may not come along for a considerable time and there may be considerable other aspects that relate to licence to prepare a site.

Do you look at any hold points or any time of coming back and reporting like we do in

other licences. This is a considerably long licence for a Class 1 facility and I guess preparation for a site would still fall under the Class 1 category.

What are you proposing?

MR. HOWDEN: Barclay Howden speaking.

Yes, under Licence Condition 4.3 in the proposed licence there is a requirement for the Proponent to come back and report on a yearly basis or to provide an annual report.

Additionally within the Licence Condition 10.1 which is on the follow-up program, there's a -- we're using that licence condition to manage the follow-up program. But there is a requirement under CEAA that an annual report be put together regarding the follow-up program which then gets posted on the CEAA website. So that information would be available there.

But we require CNSC annual reporting of once a year.

CHAIRPERSON GRAHAM: It would only be handled though in such a way it would be in the annual review of all like Class 1 licences in the annual report, and that's where it would be

handled.

There would not be any specific hearing on levels reached and so on. Is that what you're saying?

MR. HOWDEN: That is correct. There's sort of two things.

One, there's an industry annual report for power reactors done every year which is presented to the Commission in a Commission meeting. And the Commission has allowed interventions by the public at those particular meetings.

As well, there's another licence condition on reporting for events and any events that have to be reported under the NSCA would come to us.

As you know, the Commission has an early notification report system set up, so that as events occur the ENRs are prepared and are made public right away. And then when the Commission meets on a monthly basis at Commission meetings, those are reviewed by the Commission as well.

So those are opportunities for the information to become public as quickly as possible.

CHAIRPERSON GRAHAM: I know of the early notification reports and all that. But I guess an opportunity for people to come and intervene that they will have that opportunity.

I know some of the procedure, but I guess for the benefit of the public, they will have an opportunity to intervene on an annual basis when the status of nuclear reactors and this specific licence comes at a meeting?

MR. HOWDEN: That is correct.

CHAIRPERSON GRAHAM: The other question I have is I'm a little confused with regard to site preparation. And on your Slide Number 8, the activities, and you list one of them as installation of services and utilities as one of the activities for licence to prepare a site.

Can that be done without knowing the reactor -- the type of reactor that's going to be done? What do you do, take it to site boundary, take it to a certain area those services, and all the rest will go into the construction licences? Or how do you install services not knowing the design that is going to be used?

MR. HOWDEN: Barclay Howden speaking.

They would be prepared up to the point with the information that they know.

A lot of it is just to get the site service such that you can bring a licence to prepare or a site preparation crew on board and also to build the administrative buildings.

In terms of how much they could provide in advance of the technology, I think OPG would be better able to tell you the details of that. But it would be with the information known.

Then they would have to continue during a construction licence to finish off any of the servicing that they would need that was technology specific.

The licence to prepare site as it's set up now, as proposed, is basically -- understands that there is no reactor technology chosen. So the work that they are doing is for generic site preparation activities.

Once they chose the technology, they would have to come for an amendment of the licence to prepare site or submit a construction application in order to do further work.

CHAIRPERSON GRAHAM: But my question is, if a design is chosen while the site

is being prepared, how do you do that? And you said they would have to come back with an amendment. Is that correct?

MR. HOWDEN: That is correct. Because the licence to prepare a site has been set up with the understanding that there is no technology chosen; so once your technology is chosen that changes the activities that they might want to do on the site and they would have to come back with an application.

CHAIRPERSON GRAHAM: I have one other question and that is with regard to -- it's not a question really I guess. But my other question would be with regard to financial guarantees and preliminary decommissioning plans and so on.

You're indicating I believe, and as I read in the documents, that zero dollars for financial guarantee but at such time as a design is not chosen and so on, would that also change the financial guarantee once the design is chosen with regard to licence to prepare site?

MR. HOWDEN: It would not change without an application to do further work. So the two licence conditions that are in for preliminary

decommissioning plant and financial guarantee are basically placeholders at this point because we've accepted, and we're recommending to you, that OPG can do the site preparation to a finished grade of 78 metres above sea level.

If they wanted to do any more work, i.e. chose the technology and then wanted to excavate for the reactor block or do work for the condenser cooling water, they would have to supply an application to do that. And, because of that, they would then have to resubmit the preliminary decommissioning plan that they have previously submitted.

And then they would have to prepare a financial guarantee so that if they did that work, determined that they weren't going to continue with the project and were -- they would have to return the site back to the 78 metres above sea level, finished grade.

CHAIRPERSON GRAHAM: But, just to be clear, if licence to prepare site was issued, site was prepared and then it was decided not to proceed further on the project, you're saying there's no financial guarantee required.

But as an example, the nine

million-metre stockpile on the north easterly part of the premises, that will not require any other remediation if the site was abandoned? Is that what you're saying?

MR. HOWDEN: Barclay Howden.

I'm not sure about the nine million cubic metres, the number exactly. But what they're planning to do with this proposed licence is to prepare the site to the finished grade which would mean moving dirt, for sure, and installing services.

They have indicated and we've agreed that if they were to cancel the project that the site would be in a basically industrial status that they would use for the existing site and, therefore, there would be no decommissioning work required so they wouldn't need a financial guarantee.

CHAIRPERSON GRAHAM: My only other question would be -- and maybe it's out of order -- but the Chair, I guess, have prerogative to ask it?

How soon or when do you think you might be able to choose a technology? And that's to OPG.

MR. SWEETNAM: Albert Sweetnam,

for the record.

OPG will not be choosing the technology. The technology choice will be chosen by the province. The present situation of the province is that the province has indicated in their long-term energy plan that they intend to negotiate with the new owners of AECL based on the restructuring of AECL that's presently happening by the federal government.

As soon as the owners of the AECL, the intention of the Ontario government is to sit down and negotiate a deal with the new owners, so it could be Candu technology.

If those negotiations proceed, and we were unable to arrive at a deal that was good for the people of Ontario, then we would proceed with other bidders. But the intention of the Ontario government is to first proceed with Candu technology with the new owners of AECL.

I hope that has answered your question.

I'd just like to add a few other things related to what went on previously, Madame Beaudet's question on the schools.

CHAIRPERSON GRAHAM: Yes. Madame

Beaudet, I think, has several other questions, but if you want to clarify something first, go ahead.

MR. SWEETNAM: Yeah. Albert Sweetnam, for the record.

We were able to pull out the report that has the information on the schools. It's the socioeconomic environmental study that we've done and submitted with the EIS.

The school you're referring to is the Dr. Ross Tilley Public School located in Bowmanville and you are correct. It measures about 1.6 kilometres from our site boundary, so from the reactor building, it would actually be more. But from the site boundary, it's 1.6 kilometres.

There are 681 students and 60 teachers. So that would satisfy Undertaking No. 13.

MEMBER BEAUDET: Yes, I believe so.

Thank you.

I have two more questions for CNSC.

The first one regards the EC-6. On page 12-20-43 of 61 of Part 2, you refer to certain things that I think it should be clear that

you did consider the EC-6.

I know that in the Appendix J -- like John -- you give tables with the data that was included in the third version submitted by OPG on the plan parameter. However, why I'm asking this question to make sure that you had in mind the EC-6 everywhere.

Maybe that's just a typing mistake, but in Part 2, the licence condition handbooks, page 43 of 61, in your preamble, second paragraph, line 3, you say:
"The design quality assurance programs for each of the three nuclear vendors …"

So that includes full reactor technology because Candu is one vendor. Is that what we're supposed to understand?

CHAIRPERSON GRAHAM: Mr. Howden?

MR. HOWDEN: Yeah, thank you. Barclay Howden.

I'm going to ask Ken Jones to respond to this.

I just want to confirm, so we're on page 43 of 61 of the licence conditions handbook where it says:
"OPG provided the pre-screening assessments and

audit reports of the design quality assurance programs from each of the three nuclear vendors who submitted proposals of the infrastructure Ontario."

So I'll ask Mr. Jones to respond.

MEMBER BEAUDET: So that would include the EC-6?

MR. RICHARDSON: Ross Richardson, for the record.

Yes, it would include EC-6. The fact that we had three vendors there was written under the -- because AECL was included as part of the Infrastructure Ontario process, and AECL also was added, as you know, the EC-6 design. And so this should be modified under the next revision of the licence conditions handbook.

MEMBER BEAUDET: Thank you.

My other question is trying to have some coherence between the EA document and this document.

In the EA -- in your EA submission, you provide 27 recommendations and some of them apply to before the project goes ahead and before the licence to prepare site goes ahead and in the licence to prepare site.

And when I looked here at the

Addendum D, all I have is environmental protection and all it covers is the follow-up program.

I don't see any correspondence to what you propose in your EA which I believe would be licence conditions to prepare site.

Are we missing part of the handbook documents? I believe we would have to sign a blank cheque. We don't know what will contain these plans; let alone how they'll be followed?

You reassure us and you say that OPG's record has demonstrated that we can trust them. But here you have proposed a lot of things in the EA document for licence to prepare site. And I don't see any details here in the document that the project goes ahead, we would have to sign.

MR. RICHARDSON: Yeah. Ross Richardson, for the record.

So just to provide clarification, the Appendix D in the licence condition handbook, those were extracted from an information request response that OPG had provided, and these are, as documented, the OPG's commitments for EA follow-up.

Now, our recommendations have not been included as part of the licence condition

handbook because obviously there will be a joint review panel report that's going to be presented. And any recommendations that are incorporated as part of that report for follow-up will become captured in this licence condition handbook.

So again, the handbook, this is a preliminary handbook. It's a draft. And it will be updated based on the recommendations from the Joint Review Panel report.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: So all of that will be incorporated at the time we decide on licence to prepare site issuance in that hearing on licence to prepare site. Is that -- that will all be available at that time after our report is written on the environmental assessment.

Is that what you're saying?

MR. RICHARDSON: That's correct.

CHAIRPERSON GRAHAM: Okay. Thank you very much.

My agenda now says that I turn to OPG to see if they have any questions of CNSC.

Mr. Sweetnam?

--- QUESTIONS BY THE INTERVENORS:

MR. SWEETNAM: Albert Sweetnam,

for the record.

It's actually -- I'm not sure if I should pose it as a question. It's more of a clarification on what was said with regards to applying for amendments to the licence to prepare site.

One example that was provided was that we would have to apply for an amendment if we wanted to go below the 78 metres which we fully agree on.

However, our understanding is that we would not have to apply for amendment to service the site. OPG’s intention would be to -- to service the site. The servicing of the site would be independent of technology, and in our opinion, it would not require an amendment.

So maybe my question is to the CNSC. Given that the servicing is independent of technology selection and it’s covered under the license to prepare the site, would they see this as a -- requiring an amendment?

MR. HOWDEN: Barcley Howden speaking.

No, we wouldn’t see it as requiring an amendment. We were just reacting to

the Chair that if there was further work that was technology related, that it would be. But in terms of just the generic servicing to the site, the proposed license to prepare a site covers that.

CHAIRPERSON GRAHAM: Mr. Sweetnam, any other questions?

MR. SWEETNAM: No further questions.

CHAIRPERSON GRAHAM: Okay. My next thing on the agenda would be government officials that may want to speak to this. I -- nothing has been indicated to secretariat, so my understanding is there's none.

And I will go now to questions from intervenors.

And I just have a couple of procedures that I just want to note first before we start because the Chair has tried to be very lenient on all questions and so on.

Hearing procedures note that my questions may be limited due to time, and I'm looking to try and get this -- this subject wound up this morning. And then we're still on yesterday afternoon, even when we start this afternoon with PNNL, I believe that is.

I would ask that everyone be succinct in both questions and answers. And that goes also for answers. I would ask that the answers be kept as succinct as possible.

We have approximately about 20 minutes for questions from intervenors, and I want to give everyone an opportunity to present their questions. So please limit your questions as we have one, two, three, four people who wish to speak.

And if your question does not specifically relate to this license application, which is the application of a license prepare site, it will not be allowed. So I ask for your cooperation.

And, Northwatch, you are first on deck with your questions.

And I hope that my comments are taken sincerely.

MS. LLYOD: Thank you. Thank you, Chair Graham. Brennain Lloyd for Northwatch.

I have two questions. The first question is for the Canadian Nuclear Safety Commission. And, Mr. Chair, we've heard numerous times in this hearing already that we should not be

concerned that significant issues are deferred to the future licensing exercises because we'll have an opportunity to participate.

My experience in participating in CNSC licensing exercises, which are largely limited to licenses for facilities in -- in Northern Ontario, has been that we have 10 minutes before the commission and no opportunity to ask questions. And I'd like to hear from CNSC whether that opportunity to participate will be expanded for future licenses related to the Darlington new nuclear given the significance of the issues that are being deferred to those exercises.

CHAIRPERSON GRAHAM: Just for clarification, that is more or less a commission decision and a commission set of rules, which I don't think that Mr. Howden or CNSC can answer.

Your -- your concern is noted and will be relayed to the commission that this is a concern that was brought up at this meeting.

But I -- in fairness, I don't think Mr. Howden has the authority to answer on how the commission chair and panel -- and commission members allow time. So I sympathize and realize that you're -- of your concern, and we will relay

that through our -- through our -- my co-managers -- co-manager to the commission that this was a specific concern brought up at today's hearing.

MS. B. LLOYD: Oh, Mr. Chair, then we should assume that that opportunity to participate is as presently circumscribed, 10 minutes, no opportunity for questions.

CHAIRPERSON GRAHAM: As it is right now -- and I do not have the authority to speak for the commission and the commission chair, but your concerns -- as it is today, yes. But your concerns will be brought forward because of the importance of this subject when it comes to a license to construct that fairness will be applied. And all I can do it relay that.

MS. LLYOD: Thank you. My second question relates to the discussion around the exclusion zone. And we heard from CNSC that a change to the exclusion zone or a change to the application based on a need for additional properties to meet the exclusion zone requirements could trigger a new EA.

And we heard from Ontario Power Generation some notion of an agreement with St. Mary's if they need to expand their property to

meet the exclusion zone criteria or exclusion zone requirements.

And I'm wondering if we could hear from CNSC a little bit more about what criteria would be used to determine whether a new EA was required if OPG was unable to meet the exclusion zone requirements.

And I'd like to hear from OPG the status of their discussions with St. Mary's on this notion they have of adopting St. Mary's property to meet their exclusion zone requirements. Is that an idea OPG has, or do they have an agreement with St. Mary's in place?

CHAIRPERSON GRAHAM: Start with Mr. Howden and then go to Mr. Sweetnam of OPG.

MR. HOWDEN: Thank you. I'm going to pass the floor to Patsy Thompson in one moment.

I'd just like to -- on the previous subject, as you said, CNSC staff has no authority to do anything. However, I just wanted to reiterate that the CNSC has launched a participant funding program to at least help people to be able to participate more, but it's still up to the commission to determine how they participate.

On the second point, on the EA process, I'm going to ask Dr. Thompson to speak to that.

DR. THOMPSON: Patsy Thompson for the record.

I will ask Mr. Andrew McAllister to explain the process CNSC staff goes through when either an application for a license comes to the CNSC or an amendment or approval under a license is required.

MR. McALLISTER: Thank you. Andrew McAllister for the record.

In determining the need for an environmental assessment under the Canadian Environmental Assessment Act, CNSC considers, as would any responsible authority, if there's a trigger under section 24(2) of the Nuclear Safety Control Act and if there is a project as defined by the Canadian Environmental Assessment Act.

If both of these questions are answered affirmatively, then CNSC considers whether any exclusions under the Canadian Environmental Assessment Act exist or if the project has been considered in a previous environmental assessment.

If there are no exclusions and the

project has not been considered in a previous EA, then a new environmental assessment would likely be required.

MS. LLOYD: Mr. Chair, then I don't understand how that relates to CNSC's comment that a change to the property to meet the exclusion requirement could trigger a new EA. That doesn't sound to me like it would trigger a new EA. So I want to understand the comment from CNSC this morning that said it could trigger a new EA.

CHAIRPERSON GRAHAM: Dr. Thompson, would you like to comment a little further?

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

Essentially if the need for extra land for an exclusion zone -- for the need for extra land by OPG to have an exclusion zone that would meet the requirements of the CNSC would -- would require a license amendment. This would be the first consideration for us to look at whether there's a -- an EA would be required.

But first -- the first consideration is whether the license would need to be amended.

If the license is amended, then we

would look at, under the Canadian Environmental Assessment Act, whether this type of activity requires an environmental assessment.

And if it does, we would look at the environmental assessment that has been done under this process and to see what additional assessments might be needed to meet the needs of the Canadian Environmental Assessment Act and the needs of the CNSC.

CHAIRPERSON GRAHAM: Okay. We'll ask OPG. There was a -- part of Ms. Lloyd's question related to OPG. Would you like to respond?

I -- what I'm trying to do is allow 5 minutes for each intervener. We have four. And so we'll try and get that answer for you, Ms. Lloyd.

MR. SWEETNAM: Albert Sweetnam for the record.

I think the question was associated with what discussions that we are having with St-Mary's Cement.

We are good neighbours with St-Mary's Cement; we've been working together for many, many years. We have an ongoing agreement

with them in terms of vibration limits at our property line. We also have an agreement in place with them in terms of notification on their blasting, when they're blasting.

We do not anticipate having to have any additional land for an exclusion zone over the 500 metres limit. So we have not started any discussions with St-Mary's Cement along those lines. However, if that were the case, because of something associated with the technologies that we proceed with, we would then enter into those discussions.

And, like I said, they're a good neighbour; we have very good relationships with them. We have ongoing agreements with them.

Not to this question, but if the Chair would like, to this session, we are prepared to address Undertaking Number 11 which was associated with Madame Beaudet's comment on N-288.1.

CHAIRPERSON GRAHAM: In fairness, I want to give allowed time to the intervenors.

So, Ms. Lloyd, if that's the end of yours, we will go now to Lake Ontario Waterkeepers.

I would expect the preambles to be short and the questions to be direct, because you have five minutes.

MR. MATTSON: Thank you, Mr. Chairman.

And I can skip my one question about public participation rights at the licensing hearings. I'm sure you'll raise that with the Commission and the concerns expressed by my friend.

The question, Mr. Chairman, is CNSC staff has stated that in their opinion, OPG must provide more information to the CNSC in order to obtain its licence. And this information will be provided after the conclusion of this Joint Review hearing and after the panel has made its recommendations to the Environment Minister.

So how can the CNSC explain, in its opinion, the arrangement between CNSC staff and OPG, how it does not fetter the authority of this Joint Review Panel?

CHAIRPERSON GRAHAM: Mr. Howden?

MR. HOWDEN: I'd like to see clarification on the question. Is the intervenor talking about the hold point within the licence that's being proposed?

MR. MATTSON: I guess, if that's what you want to call it, a hold point. But what it says, effectively, and you can disagree, Mr. Howden, but what you're saying is that you don't have all the information during this hearing in order to provide OPG with their licence?

MR. RICHARDSON: Yes, Ross Richardson, for the record.

We made it very clear in today's presentation that and in the CMD that OPG has provided sufficient information for the issuance of a licence to prepare a site.

Now, the hold point or what we're calling it which is licence condition 1.1, is merely just a check to ensure that OPG has in fact honoured its commitments, that all site preparation implementing documents will be in place.

And so, in summary, we do believe that there is sufficient information to issue the licence as proposed.

CHAIRPERSON GRAHAM: Your next question, Mr. Mattson?

MR. MATTSON: So, Mr. Chairman, I tried this last night, too. But how does the putting the -- the delaying of the information in

order to give the final licence after this hearing has concluded?

I'd like to hear from CNSC specifically, how that does not fetter the discretion of your responsibilities and the understanding of it.

If they have an understanding of it, if they say they've done it in the past, whatever. But what it their understanding of how that hold point does not fetter the discretion of this panel? That's really what I want to know, under the *Environmental Assessment Act*.

MR. HOWDEN: Barclay Howden speaking.

This licence is being -- would be issued under the *Nuclear Safety and Control Act*. So I think the relation to the *Canadian Environmental Assessment Act* is, the panel goes through their review of the EIS and then considers what kind of recommendations that it would make to the Minister of the Environment.

Within those recommendations, they would recommend a follow-up program. That follow-up program would then be integrated into a licence and that would be the regulatory authority to

ensure that the Proponent, OPG, actually follows through.

If you look at the licence condition 10.1, it talks about the requirement for a follow-up program. So we feel that there's integration between the two.

Additionally, the hold point is set up from a different perspective. The hold point is set up such that the panel is able to issue a licence to prepare a site. And the hold point has a point where authority -- regulatory authority would be used.

And if you read the licence conditions very carefully, the panel or the Commission is able to exercise that authority themselves or the panel may delegate the authority to staff.

Under the *Nuclear Safety and Control Act*, the Commission has the authority to delegate authority to staff for these types of decisions.

CHAIRPERSON GRAHAM: Just to reiterate that, Mr. Mattson, after the EIS goes through and government gives their decision, the final say still rests with this panel on the

issuing of the licence to prepare a site.

Our job will be done at the end of that, but only at the end of that. And we will have the opportunities to review all of the documentation that were brought forward at that time, handled, completed, and all the other conditions put in the licence.

And, if we see fit that other things need to be done, it will be handled by this panel as a Commission.

That's my understanding.

MR. HOWDEN: Thank you.

CHAIRPERSON GRAHAM: That's what my experience has been. And you can rest assured there are -- if you want to call them hold points, there are hold points along the way and the last hold point or release point is us.

MR. HOWDEN: Thank you.

CHAIRPERSON GRAHAM: Thank you.

Okay. I will go now to Mr. Kavelor. You have five minutes.

MR. KAVELOR: Thank you, Mr. Chairman.

Considering what happened here yesterday morning and what I heard from colleague

intervenors, I am tempted to say that this Commission should consider having a supplementary public hearing so that all these points can be caught later on.

Because we -- at least I feel -- I'm sure it's probably shared by other intervenors -- that we are not getting a fair shake in terms of asking the questions we need to ask on some of the points that are being reviewed and postponed and so on.

So that is my one suggestion that the Commission might take under advisement for a supplementary public hearing later on.

My question which I wanted to bring -- I think it was Slide 13 here. I don't know if you can put it up. That triggered it to me. Thirteen (13), I think, wasn't it? No, it might be ---

CHAIRPERSON GRAHAM: That's 13.

MR. KAVELOR: Yes, it is. No, it was the previous presentation, probably. Anyway, forget about the slide, okay? I'll just get to the point.

The radiation level of the planet is rising, as I see it, roughly 5 Rem per year

since, say, 1945, something like that. And I would like to know, what is the total radiation leaks, releases, accidents, fires at the generating station in the old Darlington, and Pickering, and produce ---

CHAIRPERSON GRAHAM: I'm sorry; this is not a hearing on Pickering. And if you can get to ---

MR. KAVELOR: Okay, well ---

CHAIRPERSON GRAHAM: --- your question and then we can try and answer it for you sir.

MR. KAVELOR: Yes, exactly.

So, basically, all the Ontario's nuclear stations, what are the total releases, radiation release that has happened historically, the cumulative effect?

Because, as I said, their impact is obviously on the rising level of radiation on the planet and we are making the planet sicker every day by these releases.

Now, I would like to know what the new Darlington will add in its life, radiation, to the planet?

CHAIRPERSON GRAHAM: I think I'm

going to try and answer that myself, rather.

This is a licence -- this part of the hearing today is a licence to prepare a site which really doesn't address this.

But I want to tell you, we're in the third day, or two and a half days into a 21-day hearing. I have said on more than one occasion that if we don't have all the information at the end of the 21-day hearing, we'll go further.

There are a whole menu of topics that are going to come up. And at least one or two places the question you have asked today will be addressed. And if it was not addressed clearly enough, then you'll have the opportunity again to have it clarified.

This panel is, I think, trying to be very, very fair. We will go through the transcripts at the end of the day. We brought in this morning a request by Ms. Lloyd which was not really covered yesterday to our satisfaction, either.

We put it as an undertaking. We're doing that every day. And Mr. Kavelor, we want to be fair.

And this question that you have is

a question that is not relevant today and I'm not going to accept it to a licence prepare site.

And look, I'm not trying to be ---

MR. KAVELOR: (off mike) with all due respect, I'm just giving you as a thing to ask further down the line. Because I can assure you that the location you have picked where there is no public transit, no lunch counter, nothing. We are just -- at least I am not able to come here every day. And I won't be here all 21 days.

So I don't know when you will deal with it. I am just giving you notice ---

CHAIRPERSON GRAHAM: Look, I appreciate that, and we will be asking. Your question is noted, and we will ---

MR. KAVELOR: Okay.

CHAIRPERSON GRAHAM: --- try and endeavour to ask every relevant question so that people in the general public will feel that at the end of the day, whatever that decision will be, whatever we decide, whatever conditions we put on or whatever things happen that we will have really exhausted everyone's questions to the extent that we have answers.

I'd like to now call on the last

one for the day, Theresa McClenaghan.

And the floor is yours and I appreciate your couple of questions.

MS. McCLENAGHAN: Yes. Thank you, Mr. Chairman.

` I have two questions. Both of them pertain to the CNSC's CMD 11-P1.2.

The first one is that on page 61, after some discussion, it was noted that in terms of analyzing the potential for large release, it indicated that for the SGB large release long-term relocation for the local population within one kilometre of the plant may be required.

And my question is whether CNSC in its review noted or determined whether any scenarios requiring long-term relocation beyond one kilometre had been evaluated?

CHAIRPERSON GRAHAM: Mr. Howden or Dr. Thompson? I think it's -- whoever wants to. I think it's Dr. Thompson nodding her head.

DR. THOMPSON: Patsy Thompson, for the record.

Essentially, what was done was to use the safety goal approach to the assessment. And so the largest release that would be -- would

meet the requirements of RD -- regulatory document 337 were projected forward and so that essentially release would result in the need to -- for long-term relocation for a zone one kilometre around the plant.

And so this is the largest release that would be acceptable to CNSC staff under the requirements of RD-337. And, as such, if a plant design would have larger releases and the need for permanent relocation beyond the one kilometre zone, it would not meet the requirements of RD-337.

CHAIRPERSON GRAHAM: Thank you very much, Ms. McClenaghan.

Do you have another question?

MS. McCLENAGHAN: Yes. Just before I move on to my second question, just to clarify, then, I take the answer as no, that releases were examined up to a potential one kilometre evacuation, but not beyond that. And I believe it's due to the definitional approach in the safety -- in RD-337.

DR. THOMPSON: Just for the ---

MS. McCLENAGHAN: In other words, if there was a Japan-style scenario where we exceeded expected performance and we did see

releases for a broader area for some set of radio-isotopes necessitating a long-term relocation; that was not examined.

I'm just trying to clarify that.

Thank you.

DR. THOMPSON: Patsy Thompson, for the record.

I did not say that we looked at a release that would limit relocation to one kilometre. What I said is we considered the largest release that would be licensable in CNSC staff's opinion in line with RD-337. And that largest release that aligns with the requirements would not result in an evacuation beyond one kilometre zone.

MS. McCLENAGHAN: Right. Mr. Chairman, I think the way I put it is also accurate. And I've made my point and will pursue that with the other panels coming forward.

The second question has to do with page 64 of the same document. And it indicates that there were certain times for evacuation within the 10-kilometre region in terms of the population as of the 2006 level as well as the population in 2025. And they indicated a time factor of four to

six hours in the first case and six to eight hours in the second case.

What I was wondering is, was a similar evaluation of the time required for evacuation done for 20 kilometres or 40 kilometres and, in particular, given the projected population growth that was discussed earlier for Curtis and Bowmanville which my understanding is would be within those distances, was that evaluated?

CHAIRPERSON GRAHAM: Do you have a question -- response?

MR. RICHARDSON: I don't believe the assessment was done beyond 10 kilometres. But we'd like to propose to the Chair that OPG provide that information.

CHAIRPERSON GRAHAM: Yes.

MS. SWAMI: Laurie Swami.

We did the evaluation based on the 10-kilometre evacuation zone that's currently applicable in Ontario. It did consider a shadow evacuation out to the 15-kilometre range in terms of what the evacuation scenarios would be.

I would also mention that in Ontario, the planning reference across the board is a 50-kilometre zone. And I'm sure that Emergency

Management Ontario will be able to speak to that more fully when they're here and perhaps address some of the questions and concerns raised.

MS. McCLENAGHAN: All right. Thank you, Mr. Chairman.

I definitely will be looking forward to that. But I take the answer that in this EIS, it was evaluated to 10 kilometres with your clarification about a shadow zone of 15 kilometres.

Thank you.

CHAIRPERSON GRAHAM: Thank you.

This concludes the presentation on licence to prepare site by CNSC.

We will try and finish tomorrow's agenda right after lunch, and I'm going to declare a one-hour recess for lunch and be back at 1:35.

Thank you very much.

--- Upon recessing at 12:36 p.m.

--- Upon resuming at 1:35 p.m.

CHAIRPERSON GRAHAM: Please take your seats. And my co-manager has a short comment. And then we'll move on to PN&L.

MS. MYLES: Good afternoon, everyone. My name is Debra Myles. I'm the panel

co-manager.

The other panel manager, Kelly McGee, will very shortly be at the back of the room along with the other panel secretariat staff. If you have any questions, please direct them to them.

We have simultaneous translation today and at all sessions. French is on Channel 2; English is on Channel 1. A written transcript is being created and will reflect the official language of each speaker.

Both the audio files and the transcripts will be posted on the Canadian Environmental Assessment Registry internet site for the project.

Please silence your cell phones and other electronic devices.

If you're scheduled to make a presentation, I believe you've already checked in with panel secretariat staff. And just a reminder, if you're a registered participant and would like to pose a question, please register with Gillie Bouchard, the panel -- the tribunal administrator, at the back of the room.

Opportunities for questions to a presenter or a brief statement –- a brief oral

statement at the end of the session will be permitted time –- or time permitting only.

In accordance with today's agenda, the Joint Review Panel will resume with a presentation by PNNL, and I think that that's all we have for administration, Mr. Graham.

CHAIRPERSON GRAHAM: Thank you very much, Debra. Good afternoon, everyone. We will now proceed to finishing up yesterday's agenda. We appreciate the officials from PNNL for adjusting their schedules and so on and visiting with us here today, and we look at –- look forward to PNNL that will make a presentation on the elevations –- or, pardon me, evaluation of the adequacy of the assessment of cooling towers for condenser cooling in OPG's environmental impact statement. So we'll proceed, and, I believe, Ms. Hickey, you're –- you're the main presenter. Welcome, and the floor is yours.

--- PRESENTATION BY MS. EVA HICKEY:

MS. HICKEY: Thank you. Good afternoon, Mr. Chair, members of the Joint Panel. My name is Eva Hickey, and my area of expertise is health physics radiation protection. My colleagues and I are pleased to provide to you a presentation

on the review conducted by Pacific Northwest National Lab related to the Ontario Power Generation's assessment of cooling towers for condenser cooling.

During our presentation, we will take a few minutes to explain who we are and our experience with nuclear power plant cooling systems. I will tell you about the request from the Joint Review Panel through the Canadian Nuclear Safety Commission and highlight the areas of our review. Then Mr. Lance Vail will give you an overview of alternatives for nuclear reactor cooling systems and will describe the methodology that we used for our reviews and our experience with such reviews. Finally, Ms. Rebekah Krieg will provide you with a summary of our findings and conclusions.

Lance, Becky, and I are employed at the Pacific Northwest National Laboratory. PNNL is a United States Department of Energy Office of Science Laboratory. For over 30 years, PNNL's staff have provided the US Nuclear Regulatory Commission with numerous subject matter experts for nuclear reactor licencing reviews, as well as relicencing of nuclear reactors in the US with a

specific focus on environmental reviews.

From these license activities, we have experience with various types of cooling systems currently being proposed in the US. We also have extensive experience in reactor design reviews, hydrology safety reviews, and emergency preparedness for the current US reactor fleet, as well as the new reactors currently being licenced in the United States. NRC considers PNNL the principal contractor for environmental reviews.

Our experience includes environmental reviews that are complete for US –- for US early site permits, and these permits have been issued by the NRC. We have also completed the environmental reviews for five combined operating licences in the US, and we are currently completing five additional environmental reviews for combined operating licences and we are working on one operating licence review. We have been involved in many US licence renewal reviews. And finally, we assisted NRC with developing the guidance that NRC uses for environmental reviews, and this document is called the Environmental Standard Review Plan.

We were asked by the Joint Review Panel to provide an independent review of the

assessment conducted by Ontario Power Generation on cooling towers used for condenser cooling of the proposed Darlington nuclear plant. PNNL staff provided a review of the data, the interpretation of that data, and a review of the methodology used by OPG for comparing cooling tower technologies.

We've reviewed the analysis of the cooling system alternatives, including the trade-offs between various cooling system –- cooling system technologies. In our review, we considered the use of the plant parameter envelope used by OPG.

I'd like to point out that we were not asked, nor did we review, the analysis of the once-through cooling, and we did not redo any of the analysis conducted by OPG.

This is the list of the areas that we reviewed, and in addition to Lance, Becky, myself –- and myself, there are six additional subject matter experts that were involved in the review. This discussion is going to focus on the first three bullets; atmospheric environment, surface water hydrology and aquatic ecology, and the last bullet, costs.

Now I'd like to turn the

discussion over to Mr. Lance Vail. Thank you.

--- PRESENTATION BY MR. VAIL:

MR. VAIL: Good afternoon. My name is Lance Vail. I've been a research engineer at Pacific Northwest National Laboratory for the last 30 years. All of my research is involved in somehow the nexus between water resources and energy resources, and I've also been involved in regulatory reviews during that period. Most of those have actually been for the Nuclear Regulatory Commission, and I have been the one who is responsible for the evaluation of alternative cooling systems for almost –- I think all except one of those reviews that Eva mentioned on the earlier slide.

And so when we look at these –- perform these reviews, we basically go back and try to evaluate the trade-offs between alternative cooling systems. When we look at the alternative cooling systems, it's broader than just the heat dissipation systems, it's also the intake systems, the discharge systems, water treatment systems, as well as the –- the water sources for those –- those systems.

As Evan mentioned, we also

developed the Environmental Standard Review Plan, and part of that provides guidance for this review about the depth of the analysis that we go into. And I just want to point out at this point that the depthly analysis that we consider is conditioned on the impacts that we expect to see and that –- that we are seeing in the analysis. So if we see smaller impacts, we may do a more qualitative analysis than we would if we were seeing some larger impacts, and that's key to how we sort of direct our impact assessments. Next slide.

There's a lot of different alternative cooling heat dissipation systems that are –- that are out there. Of course there's the once-through and there's wet cooling towers and there's hybrid cooling and dry cooling ponds.

The only distinction I sort of want to make, it's a point of clarification is, is that when we talk about hybrid towers, you can talk about those in different degrees of hybridization, and some towers, some hybrid towers, it's just there to abate plumes, and that's basically the –- the focus of the dry component is just to basically provide enough capacity for plume abatement.

But we also have examples where we

have much higher levels of hybridization. In the case in the US right now, the North Anna Application, this actually provides enough hybridization so that in cool weather, they could actually operate in a full dry mode capacity.

So there's a bunch of different technologies that we sort of consider in different realms of how those technologies are matured and what the experience with them –-. Plume abatement is relatively common technology. There's a plume abated tower that was actually being installed for Calvert Cliffs Site, which is near the Chesapeake Bay. The real motivation for that tower, however, wasn't the plume abatement feature necessarily.

I think the applicant was more interested in having the plume abatement feature maybe in the future if it became more of an issue. Their primary concern there was having a low profile tower, and these plume abatement towers would be lower than, like, a natural draft tower that you've seen.

I already mentioned the –- the hybrid tower that is proposed with North Anna, and the motivation here was –- had nothing to do with plume abatement at all.

It was -- they had a water shortage situation. They had very low water supply particularly in certain periods of the year. So they basically developed a cooling system that could work in what they call an “energy-conservation mode” and a “water-conservation mode.”

If you’re in a water-conservation mode during a cool period, like I said, you could actually not use any -- you could be in a full-dry operation mode and those temperatures are relatively cool particularly for that region.

For dry technologies, there’s none proposed in the -- that I’m aware of. I’m sure that there’s none proposed in the U.S. for nuclear power. I’m not sure in nuclear power globally and stuff if that’s actually being proposed either and stuff because there are some clear performance issues associated with dry cooling.

They are -- however, we do consider them in the evaluation and try to make a determination if we think that they merit deeper evaluation in sites that are particularly limited in terms of water.

When I do these evaluations -- and I want to point out that this slide isn’t -- I’m

not showing you what the impacts are. That's not what I'm basically saying. This is more a tool I use when I'm looking at a review based on the technologies about where I think the significant focus of activity and where things are going to be a bit more complicated than they might be on others.

So this is sort of from my professional experience where we might have some concerns. And what I want to point out since we're talking about an application that's focusing on a once-through design is the significance that it's in the very lower, right corner and that's basically dealing with this question of adaptability.

And I'll speak about that a little bit more, but there's a limited range of adaptability that you have in a once-through cooling design. And so committing to that can forego some options in the future.

And to make an example, in the U.S., outside New York City on the Hudson River, the Indian Point Power Plant was originally built with once-through cooling system.

At the time, the Hudson River was

not something that you can -- talked about much in terms of environment or fish. It was pretty, you know, well polluted by the history of the operations of activities upstream.

However, right now, the State of New York is basically determined that they're going to have to convert that plant to a closed-cycle cooling system to minimize impacts to fish. That's probably going to be more expensive than the owners of the plant are willing to achieve.

So that that fixed capital investment is basically that that plant is at the risk of being shut down because of the limited ability to adapt. And so that's why I'm just sort of trying to mention this adaptability to something that we try to keep focused on.

Also, as Eva mentioned, we've done quite a few of these assessments particularly for early site permits where they used a plant parameter envelope. And as an engineer, I have an appreciation for the motivation and understanding of how the plant parameter envelope works. I think generally it works pretty well; however, there are some complications when you are dealing with heat-dissipation systems.

And a couple -- I can just sort of point out that we didn't even think of when we were originally considering the original plant parameter envelope. For instance, with a hybrid cooling system, you have a certain amount of blow down when the system is not operating in a full-dry mode, I'll say.

So you're primarily focused on the sort of max blow down capacity that you would have in that period. But it actually turns out that you also use that blow down typically to dilute some of the rad waste that's being released to the environment. All of a sudden if I go into a full dry mode, I have a question about what's my basis for diluting the rad waste because basically now I have zero flow available to us.

So you have to think about these really carefully when you define the plant parameter envelope and it is a good deal more complicated than you think.

Another area that I've just mentioned too that we didn't think of much at the time was the cooling towers. Normally you're thinking about the load, the biological demand to the water that's being returned -- the biological

impacts on the water that's being returned to the receiving water body.

You also have issues with -- from cooling towers having super saturation in the blow down water of air, oxygen and that can actually cause some potential impacts to fish which we just hadn't even thought about this issue of super saturation when we considered the plant parameter envelope.

When we do these analyses, it's also important to consider simple mitigations to the designs. So when you're doing a plant parameter envelope, you know, simple things that you might do to mitigate some of those impacts.

For instance, if you're concerned with a cooling tower system with a visual plume, you know, plume abatement is an option that you actually want to make sure you do some detailed consideration for.

And the PPE, like I said, makes all of those very difficult. Now, I'll give one exception to that is that if there is a determination that based on this PPE with all these dimensions to it, you know, all of the possible impacts are small and wouldn't require further

mitigation for all those alternatives then you can -- from -- at least the way the U.S. review goes, if we basically don't spend time looking for smaller and smallest. We basically say, "This is small enough. It doesn't require mitigation. We're done." That's a pretty heavy onus to put on any review.

Also want to mention that when we do these reviews, one thing that's difficult to keep track is consider future conditions. And I'm not just talking about some of the obvious ones like climate change and change in the demographics.

But, as was mentioned earlier by the CNSC staff, also want to consider the fact that Lake Ontario, in this case, 10 years from now is probably the most unlikely that it's going to be exactly what it is today.

It's been evolving ecologically. And we don't have perfect knowledge about what the system is going to be like in the future, but where it's incumbent on us to try to make some reason to estimate about what we think likely future conditions may be that we would want to consider -- make sure that we consider in our analysis.

I've just sort of provided a

simple little figure here of how we do the -- what we're thinking of in terms of doing the trade-off analysis.

I want to make clear that part of the objective here is to try to make some demarcation between the technical assessment and the decision that's going to be based on that technical assessment.

My role as a technical reviewer is just to provide the most information or the best information I think I can provide to people who are going to have to make those determinations about what those impacts will be to stay away from actually getting involved in that.

I think there was a comment -- I think it was by Mr. Pereira yesterday -- that it was basically trying to make this cost versus fish trade-off analysis. And that's very difficult and I don't want to do that. And I think from a technical side, I don't do that.

I try to clearly articulate what those tradeoffs are. So this figure that I'm showing right there if we just think of this simply as -- let's assume this objective was the number of fish impinged or a number of fish entrained. And

this was a power loss because of parasitic fan cost or -- and the -- you know, these would be two different objectives that we'd be looking at.

And I think that, you know, we could get general agreement, maybe not on the exact locations of these, but that, once through cooling and stuff, will result in greater fish loss. I don't think that there's any, you know, factual dispute about that in this hearing that I've seen.

A wet cooling tower would have -- you know, would have less -- and then maybe this up here -- you know, if this was like a hybrid tower and stuff where we would have an ability to reduce some of the -- those loses -- this is what we try to focus on providing in our part of the overall review.

And the determination about which point that gets picked is -- you know, as our president says, that's somebody at a higher pay grade gets to make the -- make that determination and stuff. That's -- that's a political process where we're trying to inform that decision-making process and stay as far away from it as we possibly can.

I also want to point out here that

they’re not just two dimensions that you look at and stuff. I mean, this is a multi-dimensional consideration.

The other part that we often see here is that these objectives that are handed to, you know, the public and the decision makers and stuff are expressed in things, you know, like the number of, you know, forage fish that are impinged or something like that.

It’s -- you know, I work in that a lot, and I have a difficult time sort of understanding and stuff what the significance is. So it’s really important that those objectives be expressed in something that have a clear connection and stuff to resource management questions.

And so basically through this, we have avoided this -- making a determination about the trade-offs between the, you know, increments or objectives because we leave them in those incommensurable -- incommensurable terms.

And, well, that’s basically what I have for this slide.

This -- this next slide was just trying to sort of make a point of a concern that we had with the -- the OPG assessment about trying to

use this preferred analysis, which is just sort of a ranking of one over one, instead of making clear what the impacts associated -- are those -- so if we look at this case, you know, where we have a variety of different alternatives, we could have come up with a case where, you know -- for instance, you know, once through a cooling system was preferred in a lot of, you know, areas. And then it was less preferred, you know, in some areas.

Now, if all of those determinations -- if we'd looked at that in terms of whether those impacts are small or large, the -- you know, this -- the fact that this one here is large is really where the story is. That's what you really want to be focusing on is, is that -- is the impact to the aquatic biota with a once-through system something that you have to worry about, for instance, with a once-through system? If not, your analysis, you know, and evaluation can be much easier.

So we look at those. We consider them both in terms of the sort similar notation, but we also focus on whether these impacts are small or whether they're not small.

And it’s those areas that aren’t small that we really have to sort of focus our attention to.

So the next slide. The -- the EIS and other documentation and stuff, the -- OPG’s review we didn’t feel always made a clear comparision between the once-through cooling and those with alternative cooling towers based upon the sort of description of the preferred versus less-preferred approach.

And even if the PPE approach is used, it’s still important to sort of consider all the different alternatives that are available.

And I know I have a note about Mr. Graham asked the question about the -- the filling and the evacuation numbers and stuff. And you basically have one bounding number for, I’m sorry, excavation. You have one bounding number and stuff.

Well, it’s important for you to know relative to those other technologies, you know, is -- was that only -- you know, was that one case, or are there options, like a hybrid tower, that wouldn’t require those additional excavation numbers?

So if you are going to provide those estimates, you have to make sure that the reviewers clearly understand that some of those options are in that zone, like you pointed out and stuff, between the excavation required for once-through and the excavation required for the bounding cooling tower analysis. And it would be really nice to know where you were on that spectrum and stuff in making a determination.

So OPG -- this is sort of the summarizing developed the -- the two scenarios, and we're basically looking at the -- the once-through compared to a bounding cooling tower analysis.

And the disadvantage of this approach that we thought was -- is that the condenser cooling option was difficult for a panel, like yourself, to clearly understand what those trade-offs were be -- would be and the -- the -- some of the effects of -- like, the visual effects of the -- the plume abatement tower. And I -- our understanding, it was -- when we did this review, I have to say that we didn't have access -- or we didn't know or weren't provided the -- the -- I guess there was a more recent plume abatement study and stuff that the -- the applicant had done. So I

don’t want to -- anyone to assume that we were -- knew what was going on there.

But the worst case -- plume from the -- the mechanical draft towers was -- would buy us a consideration of some of the other alternatives in the -- the cooling tower assessment.

That’s all I have. I know that someone had found a -- and as the person from OPG had mentioned, in full disclosure, yes, this is a slide that was provided by SPX, who is a vender who sells these towers, but I’ve seen and talked with people who have worked with these towers, and that’s not unusual with a plume abatement tower, that you do not have any visual plume.

MS. KRIEG: So for the record, this is Rebekah Krieg, and I am an aquatic ecologist, and I’ve worked at the Pacific Northwest National Laboratory for over 20 years. And I’d like to provide you with a summary of the remainder of the results of our review of OPG’s evaluation of the condenser cooling systems in specific resource areas.

So I’m presenting the results for an entire team of reviewers, and I’m not the

subject matter expert in all the areas that I'm talking about, but if the board has specific questions that the three of us cannot answer, we are -- we're going to be happy to contact the appropriate reviewers for a response.

So overall, PNNL found that the appropriate type of data was provided by OPG in the EIS and in the supporting documents. This is the type of data that one would need to support an evaluation of the trade-offs between the condenser and cooling options.

And overall, PNNL found the data analysis techniques, such as the use of models and codes for interpreting the data, were also logical and adequate with a few exceptions that I'm going to discuss in a minute.

Overall, the techniques that were used are similar to the techniques that we are familiar with from our review experience of evaluations of condenser and cooling options.

So the areas where we found some differences in the data interpretation methods include surface water, aquatic ecology, atmospheric environment, and costs. And I will discuss each of these in the order as shown on the slide.

I’m going to start with the surface water analysis. Our hydrologist indicated that the assessment of surface water on the slide.

I'm going to start with the surface water analysis.

Our hydrologist indicated that the assessment of surface water impacts using the bounding approach to analyze cooling tower options was inadequate, in part because of the model calibration which I will discuss later, and in part because the analyses did not include all reactor types and all cooling tower options and did not convincingly demonstrate that the data used for bounding conditions.

The water needs of all reactors and all cooling options being evaluated need to be clearly presented in order to perform the comparison, as Lance has indicated. Otherwise, it's difficult to be certain that the analysis performed really does bound all the possibilities.

So that leaves out, then, the potential that construction and operation of the final combination of reactor designs and condenser cooling options could result in greater environmental impacts than considered by the

analysis.

Our hydrologist's review of data interpretation concluded that the assessment of lake circulation, thermal impacts and chemical impacts was inadequate because the models used to perform the analysis were not completely calibrated.

Calibration is a process of adjusting the model until the output matches a set of real-world observations. And it needs to be performed under a variety of conditions to increase the confidence that the model will predict future conditions appropriately.

Further, the OPG analysis defined a maximum discharge rate, but they did not consider it in the model analysis. And that might be okay if it's very infrequent, but our hydrologist did not find any information regarding the frequency of the discharge rates.

And in addition, calibration as a three-dimensional hydrodynamic model for the range of anticipated conditions at the site is needed so the results are meaningful across a broad range of conditions.

Another important aspect of a

model analysis is the coarseness of the numerical model. And this diagram is a simplification to show graphically how a very coarse model would not allow a good representation of the mixing behaviour of the thermal plume.

As the discharge is released in the upper right-hand cell, the initial concentration or temperature in the model will be artificially low because the release will be mixed with the entire volume of the cell. As the calculations are done for the next ring of cells, the artificially low concentrations will be propagated out, resulting in the model under-predicting the thermal or chemical impact of the release.

Recommendations that our hydrology team had included reassessing the environmental effects following calibration of the model for diffuser performance in a range of anticipated conditions, evaluating the effect of the grid size on the temperature distribution pattern and, following calibration of the model, to perform the assessment by considering both the average and maximum discharge rates for all cooling options if it turns out to be appropriate based on the

frequency of the maximum discharge.

Our hydrology reviewer also considered the shoreline and bottom sediments and recognized the need for more detail on the velocity. However, subsequently, CNSC advised us of additional information that was provided on this analysis that had already addressed this issue, so I will not discuss it in further detail.

For aquatic ecology, we looked at impingement, which is when organisms are trapped against intake screens by the force of water passing through the cooling water intake structure. And we found that the analysis of impingement was adequate for the purposes of assessing whether the cooling tower impacts would be within the results of the PPE.

However, the information provided in the EIS or technical documents did not provide enough information to allow a full comparison of the trade-offs between different condenser cooling systems. And the data used could have been more specific to the type of cooling system.

For example, the estimates of fish impingement from an intake for a cooling tower scenario was based on data from the Fitzpatrick

plant in New York State, although there are several cooling tower systems on the Great Lakes that might have made a better surrogate. And there was no explanation why that one was the one that was chosen.

Entrainment was another thing we looked at, and that occurs when organisms are drawn through the cooling water intake structure into the cooling system.

The entrainment analysis appeared to be based on the assumption that the number of fish entrained by alternative cooling system designs would fit within the results of the PPE since the amount of water that is withdrawn for a cooling tower is smaller than it is for a once-through cooling system.

And that is correct, but again, it doesn't allow for a comparison of the trade-offs.

The lack of comparison of the trade-offs, then, does not allow a means to compare the potential for decline in the fish species.

And finally, as Lance indicated, the importance of entrained or impinged fish to the ecosystem as well as their value to the resource agency is a very important factor in the trade-off

analysis. And that was not clearly stated, especially in light of the permeations that have occurred and are still occurring to the aquatic ecology.

Our atmospheric reviewer considered OPG's analysis of cooling system impacts and found that the analysis was adequate with just one following caveat.

The characteristics of the land-lake breeze which are illustrated in these diagrams including the wind circulation and the associated changes in ambient air temperature and humidity, are not explicitly treated in the model that was used.

The model OPG used is a straight line plume-type model rather than a puff-plume type model. And the atmospheric reviewer indicated that the puff plume-type model is more appropriate for a dynamic system with land-lake breezes and provides greater confidence in the predictions of vapour plumes, salt deposition and other contaminants.

Hybrid cooling towers, dry cooling towers and cooling ponds were not considered in detail in the EIS, and OPG's basis to eliminate these alternatives was articulated in one of the

information request documents. But the environmental impacts, as we pointed out, would result in different atmospheric environmental impacts than were analyzed in the EIS.

OPG's analysis also assumed very low drift rates for particulates from cooling towers. Drift is made up of water droplets, not vapour, and it's carried out of the cooling tower with the air that's used to cool the water.

Higher drift rates may result in deposition of more salt and other particulates than reported. So admittedly, the 0.005 percent drift rate that was used is very low and is comparable to what our atmospheric reviewer has seen in other reviews based on current drift eliminator technology. However, they indicated that the basis for this low drift rate was not apparent to them, to the reviewer, and that basis is important to the analysis.

And the last area is cost.

The economics reviewer determined that the assessment of relevant costs were comprehensive and generally adequate. However, again, further clarification of assumptions and details would be useful to evaluate trade-offs.

Certain financing assumptions varied from one cooling tower scenario to the next, and inconsistencies were identified in the approach between or within documents, for example, in relationship to the excavation assumptions, the peak workforce and in the results of cost analyses presented in the preference tables and analysis documents.

This is our final slide, and the first two conclusions were on a previous slide, so I'm not going to discuss them further and just go to the last one, which is that PNNL found that the methodology for assessing the trade-offs between different condenser cooling technologies did not allow a clear comparison between the technologies considered.

Thank you.

With that, we'll answer any questions you may have.

CHAIRPERSON GRAHAM: Thank you very much for that presentation.

We'll start with my colleague, Madame Beaudet.

--- QUESTIONS BY THE PANEL:

MEMBER BEAUDET: Thank you, Mr.

Chairman.

I'm referring here to your document that was submitted on page 26, atmospheric environment. If we look at the third paragraph, the sentence before last, you say: "These alternative condenser cooling technologies would result in different atmospheric environment impacts than those analyzed in the EIS."

And you refer to visible plume.

But I'd like to know more in terms of air quality. Would there be a big difference?

MS. HICKEY: This is Eva Hickey, for the record.

I will have to get back with our atmospheric expert on that and we'll get an answer to you. I believe he's available and we'll be able to get in touch with him and get back with you on that.

MEMBER BEAUDET: Thank you.

My second question, are you saying that the breeze from the water side was not evaluated?

To what extent do you feel this would change the conclusion of OPG? I'd like to have some feeling that we should insist that they

should do this study.

MR. VAIL: Yeah, I think we want to make a distinction between -- there's a question of the data that was used, and we weren't arguing about whether the site that the data was used was adequate. And we felt, based on my conservations with atmospheric reviewer, he agreed that that would represent this land-lake interface and that data.

However, the model that was used would not well represent a situation where you did have those lake-land interface conditions. So it was a question, really, about the appropriateness of air mod relative to more of a puff model in the analysis.

MEMBER BEAUDET: Because you say the model they used, I think, doesn't include that variable, if I'm correct, of measuring the breeze from the waterside.

Let me get the reference here.

MS. KRIEG: This is Rebekah Krieg, for the record.

My understanding from my conversations with the atmospheric subject matter expert was that the Gaussian plume model that was

used doesn't have quite the flexibility that the puff plume model does in bringing in some of the additional factors.

I don't -- did not have the impression that he thought that that analysis was heavily flawed, just that it did not provide as good indication. But that's also something that might help if we, you know, talk to him and brought that answer back to you.

MEMBER BEAUDET: Yes please.

I wonder if OPG has comments on that?

MR. SWEETNAM: Albert Sweetnam, for the record.

We've actually looked at these comments that were made and Jennifer Kirkaldy will respond to that.

MS. KIRKALDY: Good afternoon. This is Jennifer Kirkaldy, for the record.

I'm with SENES Consultants and I was the lead for the atmospheric environment component of the EIS.

This is an issue that we actually discussed back at the June 22nd technical meeting in some detail. And this does relate -- what the

issue is, is the difference between a lake interface, because you have different warming rates of the land surface versus the water surface, it does create a boundary layer effect, which can be a concern, particularly for point source type release points. This is particularly an issue for things such as coal stacks, for example.

In the case of the modeling done for Ontario Power Generation for this particular application, the majority of the sources we did look at were, in fact, particularly -- were relatively low level sources.

The reactor buildings are not low level sources; however, they're large sources, which because of the size of the source and the relative size of the emission point above them, they create a lot of turbulence and any releases from those reactor buildings get mixed in to the entire volume of the source.

For our modeling, we did model those large reactor buildings as volume sources in order to account for some of those factors.

With respect to the issue around cooling towers, the intervenor is correct that the SACTI model does not actually capture that

fumigation effect. But with respect to the mechanical draft towers, again, they're relatively low level sources with a good deal of turbulence that would be captured around them.

So they are effectively modeled more as a volume source type. And so the emissions from that are mixed around the volume of these large structures which a mechanical draft tower would be a large structure.

And what this boundary layer does is it builds up from the lake boundary with the land and it builds up with distance, so the further away you move from the lake, the higher up that boundary layer goes.

We did do some coarse calculations to determine whether or not the releases from a mechanical draft cooling tower would be affected by this boundary layer and we found that the SACTI model was performing adequately for the purposes of the environmental assessment.

MEMBER BEAUDET: At the technical meeting, I think the questions were more around if there was a fumigation effect or not. Here, we're trying to find out if you -- what you have as results regarding the height and the length and the

shape of the plume is correct.

And I've looked at the document that you've submitted two days ago. It's hard to compare the results because in that document you use, for instance, 3,500 metres and then in the IR that we had, IR-230, you would use if it's bigger than 2,000 metre and bigger than 5,000 metres, so the results given in no way can be compared.

And two things that I'd like to know. I'd like to be able to compare these results. And also, I'd like to have an assessment if, with plume abatement, what's the range?

How much does it correct the plume in our climate compared to what you've done with the visual analysis, if that's possible, please?

MR. SWEETNAM: Albert Sweetnam, for the record.

Chair, if I may, can we comment on the request first and then take an undertaking to address it? Just provide an initial comment on it.

CHAIRPERSON GRAHAM: Proceed.

MR. SWEETNAM: Storm?

MR. KAUFFMAN: Storm Kauffman, for the record, MPR Associates.

MPR Associates performed the

report that Madame Beaudet is referring to.

The plume predictions for mechanical towers are consistent with what was provided by SENES for their environmental assessment because we used their models. We did not report them in the same way and apologies to you for that.

MEMBER BEAUDET: So we agree.

MR. KAUFFMAN: Yes.

MEMBER BEAUDET: Yes. Okay.

MR. KAUFFMAN: In regards to a question you asked Monday night, did we calculate a plume frequency and plume characteristics for a hybrid or plume abated tower, we did not.

The reason for that was our other evaluations concluded that hybrid towers would not fit on the site limited to the two-metre in-fill line. And, therefore, we considered that hybrid towers were an unlikely choice considering the balance of all environmental considerations.

However, if you did install a plume abated or hybrid tower, clearly the plume would be less frequent, less intense, less opaque. However, as shown in the picture that PNNL put up, you still can get a plume.

Our expectations as documented in our report is that for the Toronto locale or the Darlington locale, considering the relatively high humidity and cold temperatures during the winter, you would get some sort of visible plume approximately 20 percent of the year.

So even a plume abated tower, unless it's truly optimized, again, as PNNL said, to have a highly dry heat transfer characteristic, in other words, approach much more closely a dry tower rather than a wet tower, you still get some plume some of the time.

MEMBER BEAUDET: What I was trying to get at is individual impact, the plume simulation appears to be very dramatic and I would have liked to see how dramatic the plume remains when you use plume abatement.

MR. KAUFFMAN: We were concerned that -- Storm Kauffman for the record.

We were concerned that since hybrid tower modelling is not as advanced as regular mechanical towers that we could not come up with necessarily accurate enough prediction to quantify the plume that would result.

But that’s more in the detailed

design phase when you've picked a vendor with a particular design and start optimizing that design for your particular application.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: Madame Beaudet, just for clarification, do you have -- are you wishing an undertaking for those reports?

MEMBER BEAUDET: No, that's okay.

CHAIRPERSON GRAHAM: Okay. So then we're going to get one from PNNL on two different topics; the air quality and the one with regard to point 6, wasn't it? You'd given an undertaking to get those reports ---

MEMBER BEAUDET: On the breeze coming. To what extent that the model -- yeah, how to quickly describe the situation.

CHAIRPERSON GRAHAM: PNNL, are you clear what your undertaking is?

That's very good and we'll give that Number 14.

CHAIRPERSON GRAHAM: Okay. Very good.

I'll go now to my colleague -- you're finished, Madame Beaudet, are you?

MEMBER BEAUDET: I am.

CHAIRPERSON GRAHAM: Good.

To my colleague, Mr. Pereira.

MEMBER PEREIRA: I just have one additional point of clarification.

We talked about plume abatement and conversation seemed to be focusing on just hybrid towers.

Is plume abatement available on, say, mechanical draft cooling towers?

MR. VAIL: Yeah. I mean, plume abatement is something you would do on a mechanical draft tower typically and stuff, and that's basically by adding some dry heat to the plume however that's going to be expressed.

And it's normally from sort of lower profile but higher than a mechanical draft tower and stuff, would provide some additional heat to the air vapour so when the air vapour comes up it's superheated instead of super-saturated which results in the plume.

So that's the ---

MEMBER PEREIRA: So it's more or less drifting towards a hybrid tower in a sense?

MR. VAIL: Right. I mean, the more -- yeah, I mean, I make the distinction

between a plume abated tower and a hybrid tower just because we do have experiences where we have hybrid towers that go as far as being -- to the point of being dry during certain conditions ---

MEMBER PEREIRA: Good enough.

MR. VAIL: --- particularly when it's cool. And that, basically, avoids some of the loss of condenser vacuum issues and stuff that you would have like with a dry tower that couldn't achieve the same levels of vacuum.

MEMBER PEREIRA: What you're saying is that it is possible to have a variant of a mechanical draft tower with some features that provide plume abatement?

MR. VAIL: Right. And I think what you see is you see a mechanical -- they are -- you know, plume-abated towers are mechanical draft towers that have this additional dry piece added to it, and a lot of times it's basically sort of lift up the mechanical draft tower, you put some dry capacity to come in underneath that.

There's different ways that you can design those, but the ones that I'm most familiar with are like the ones that we showed that are the sort of round mechanical draft towers that

are elevated a bit more than a standard, round mechanical draft tower would be to get the dry heat in.

CHAIRPERSON GRAHAM: Two questions.

First of all, what is the optimal, or what is the distance from the plant that these towers could be? Footprint seems to be one of the concerns, adequate space to install towers.

How far away can they be from the existing power plant and still be economical? What's -- in metres rather than feet because you're American -- but just a distance?

(LAUGHTER)

MR. VAIL: You know, I would hate to postulate any specific numbers.

The concern that you have with towers in terms of the spacing is how much interference you're going to get between towers.

For instance, if you going to have linear mechanical draft towers that you see often, you want to align those in a manner that it's sort of consistent with wind patterns and consistent with other, you know, meteorological features so that you would avoid interference with those

towers.

I think the primary concern here though was it's just that these towers are generally going to be larger. You may require having more towers and more tower capacity and stuff.

And so the footprint, the aerial footprint, even if you were to pack them tightly together which you can't do because of the interference, that you'd have to -- you'd still have additional -- and I don't think there's any dispute that as you move towards towers away from once-through, your footprint is inevitably going to increase.

But there are technologies, you know, that we use to try to minimize those, so I wouldn't without having, you know, more experience and knowledge of that particular site and stuff.

I think you can look at some other sites that I've seen and, typically, those natural draft towers would be less than a kilometre, certainly, apart sometimes.

CHAIRPERSON GRAHAM: Thank you.

The other question I had is, in the days to come at these hearings, some of the

intervenors are concerned with the visual. Is that an issue in your experience, the visual of towers versus the once-through which is more-or-less not visual to the environment -- not the environment but to the landscape.

Is that an issue that you run into often or not?

MR. VAIL: Yes, certainly, if you're in an area and you're talking about a natural draft tower. They're very tall, you know, we call them Homer Simpson towers and stuff.

If those towers -- you're going to have one of those nearby and you have a populated area. We do see natural towers are being proposed in the U.S. for areas that are more remote. People may choose mechanical draft towers, like I said, for some additional flexibility in terms of the design too.

So we've had places in our reviews where we basically have consideration of alternative sites, determine that those alternative sites would not be preferable because of cooling towers or visual, you know, visible plumes in areas that have particular or, you know, cultural sensitivity and people wouldn't want to see there,

you know, visual plume in the background when they're at some historical/cultural site.

CHAIRPERSON GRAHAM: Thank you.

Does anyone have any questions?

If not, then we'll move to CNSC to see if you have any questions?

DR. THOMPSON: Thank you, Mr. Chair, no, we don't have any questions.

Thank you.

CHAIRPERSON GRAHAM: OPG, do you have some questions?

--- QUESTIONS BY THE INTERVENORS:

MR. SWEETNAM: Albert Sweetnam, for the record. We have two questions, if we may?

The first one is, could PNNL now confirm that vapour plumes are a function of relative humidity and temperature, and that at the Darlington site plume abatement would only reduce but not eliminate the occurrence of a visible plume?

MR. VAIL: Yes -- this is Lance Vail.

As I mentioned, the hybrid tower just provides some additional heat as that superheating dissipates quickly and you're in a

humid environment. As that cools, you would expect to see some plume occur. Without actually having looked at specific meteorological data and having done that assessment.

But I would agree with you generally, I just can't say how much that would change.

And, as I said, there is also options of sizing that, you know, the dry element of the system works much better as the environment gets much colder and colder, so there -- you can size the hybrid system and stuff to deal with some of those so you reduce the visual plume even further.

MR. SWEETNAM: Thank you, Mr. Chair, for -- for the answers.

Just a follow-up in that, given that plume -- that 100 percent plume abatement would not occur and given the cost complexity in terms of boat operations of such towers and the boutique nature of these stars; in that, there are not many of them installed anywhere in the -- in the world -- actually, I think the picture that was actually shown of that tower has not been built anywhere.

The fact that PNNL has indicated interference between towers -- the natural draft towers, being approximately a kilometre apart, given the constraints of our own site, the question we would ask is that given that we have site constraints and given that we are located on a large cold lake, what would really be the choice for a cooling technology?

CHAIRPERSON GRAHAM: Is that a question?

MR. SWEETNAM: Yes, it is.

CHAIRPERSON GRAHAM: Go ahead.

MS. KRIEG: Well, this is Rebekah Krieg for the record.

I want to point out that the picture that was in the link in the report has not been built.

The picture that was on the screen earlier today is of a facility in Germany, and I will probably botch its name, but it’s Neckarwestheim, and it has two reactors, and the -- and one of them -- the one that’s cooled by that cooling tower is a 14,000 megawatt facility. And we know the diameter at the basin. We do not have distances, but it’s the one cooling tower for that

site, and it is operating and has been since -- well, I don't have that information, I'm sorry. But we can find that out. We can find out when it was -- how long it's been operating. I don't have that information with me, but it is currently in use.

CHAIRPERSON GRAHAM: The fact is it is operating, and it does exist.

MS. KRIEG: It is operating. It does exist, and it's in Germany.

CHAIRPERSON GRAHAM: Do you -- Mr. Sweetnam, do you -- do you wish to have more information on this facility since it may be helpful if --

MR. SWEETNAM: Albert Sweetnam for the record.

We know that this tower exists. We -- we were referring to the one in the report with the link. That tower does not exist.

MS. KRIEG: And he is correct.

CHAIRPERSON GRAHAM: And -- and that has been clarified.

MR. SWEETNAM: Yes. And I'll --

CHAIRPERSON GRAHAM: That has been clarified. But the one on the screen today does

exist.

MR. SWEETNAM: And our question hasn't been answered just yet.

CHAIRPERSON GRAHAM: Okay.

MS. KRIEG: So I need a re-clarification on the question. I forgot it.

CHAIRPERSON GRAHAM: Mr. Sweetnam?

MR. SWEETNAM: Albert Sweetnam for the record.

I was just saying given the cost of the hybrid towers with -- with plume abatement and the relative boutique nature of such towers, the complexity of operations, the fact that we have a limited site, and the spacing that would be required between such towers, the fact that we will be located at a limited site at the edge of a large cold lake, what would be, really, the choice of a cooling technology in such a situation?

MR. VAIL: This is Lance Vail.

I -- first of all, I want to make sure that we're not -- we're not here to basically make a determination of what the proposed technology is. We were here to review the analysis that was put in front of us. And so we're not going to go there, I guess, is that -- is the answer,

that we're not going to make a determination.

I think that those factors that were presented are all legitimate considerations and stuff, you know, particularly, you know, the -- the cost and the location and stuff. Those are -- I would add, though, that they're -- like I said before, there are two sites in the US that are undergoing licensing now that are using this, you know, boutique, as you called it, technology, which I wouldn't necessarily say that it's -- I probably wouldn't use that adjective in using that technology.

And that's a risk that you run into with any new technology, is, you know, all of the reactors that we're talking about we could call boutique reactors because they have a limited -- you know, I don't -- I don't think any of the ones proposed have been built.

So here we actually have a technology that has been built.

CHAIRPERSON GRAHAM: Thank you.

Mr. Sweetnam, in fairness, the role of PNNL here today is specific, and if you have another question regarding what PNNL has presented in their overheads or in their report,

please proceed.

MR. PETERS: John Peters for the record on behalf of Albert Sweetnam.

What I think is -- would be very helpful is for you to describe in a little bit more detail for us what the use of these hybrid towers has -- has been -- what the focus of the use has been in the States and to what extend that use is associated with plume abatement or if it's for some other purpose that's important in the locations -- in the -- in the two locations.

I -- we are not aware of very many locations where these towers are being used, particularly for plume abatement.

MR. VAIL: Okay. The two -- we do have two specific sites where plume abated towers have been -- we've gone through that process, and parts of the EIS process have been completed, and those are at North Anna in Northern Virginia and at Calvert Cliffs.

And it was -- the case in North Anna, again, was they're using a plume abated tower, but as I mentioned, that's primarily being driven by water supply considerations at that site.

In the case of Calvert Cliffs,

they installed a plume abated tower and stuff, and that was partly because it fit the profile that they had on the -- the landscape. They have not formally committed to operate it always in a plume abated mode.

The most experience with these towers have been, you know, in Europe where you have relatively close proximity of large numbers of people to large industrial facilities, and that's one of the reasons that the plume abatement technology was developed that way.

CHAIRPERSON GRAHAM: OPG, any other --

MR. SWEETNAM: Albert Sweetnam for the record.

Thank you for that clarification. My understanding is that the one plume abated tower that's operational in the US is basically for conservation of -- of water.

And then the second one at Calvert Cliffs has not yet been built; is that correct?

MR. L. VAIL: The -- neither of those -- the -- neither the North Anna unit three or Calvert Cliffs plants have been constructed, and I think that they're just in site preparation. I

mean, I'm sure that they're not beyond site preparation at this point.

MR. SWEETNAM: So there are no plume -- sorry, Mr. Chair. The question is there -- so there are no plume abatement towers in North America?

MR. VAIL: I'd have to --

MS. KRIEG: Well, this is Rebekah Krieg for the record.

What Lance is referring to is that nuclear power plant. And we have not done reviews on other facilities to look at plume abated towers or hybrid towers.

CHAIRPERSON GRAHAM: Madam Beaudet, do you have a comment?

MEMBER BEAUDET: Yeah. You haven't looked at other facilities, but I would presume that other industries would also use plume abatement if they -- for instance, if there's danger for traffic or -- am I correct?

MS. KRIEG: My understanding from talking to the gentleman at SPX that I talked to, there are other facilities who use some sort of plume abated or hybrid system, but I do not have a first-hand knowledge of that.

Our reviews are specifically for nuclear power plants, and so that's really the only place I feel comfortable talking.

MR. VAIL: I would add, however, though, I mean, there are our reviews are specifically for nuclear power plants, and so that's really the only place I feel comfortable talking.

MR. VAIL: I would add, however, though, I mean, there are dry towers in operation in the US. There's dry towers in, you know Wyoming. They're just not at the size of capacity that –- that you're talking about with a –- a nuclear plant. But, you know, they still have some relatively large –- I think there's a new dry tower system that was installed in upstate New York, so there are other technologies and stuff.

But normally when we're talking about nuclear plants, we're looking at a scale that a lot of other technologies just aren't operating in that zone because we're talking about such large, you know, thermal engineered systems. These are bigger than what we normally do.

CHAIRPERSON GRAHAM: There seems to be a –- more or less a stalemate –- not a

stalemate but an impasse with OPG at going the once-through cooling for various reasons they've given. With all the new technology in cooling towers, is there any new technology that you're aware of with once-through cooling, or is it even being considered now in nuclear power plants?

MR. VAIL: Yes, I –- I –- once-through cooling, as far as a heat dissipation system, you know, is –- you know, the physics is pretty simple. It's basically you take some cooler water and you heat it up. And So in terms of technology, there are things in terms of, you know, intake designs. There's been a lot to basically reduce impingement entrainment losses and stuff, so there's a lot of maturity, and OPG has discussed those and stuff. And so there's been a lot of maturity in that technology, and also some of the diffuser technology and stuff that's available to you and stuff. I'm not sure I would say that that's really dramatically changed, but there's certainly been a lot more interest in and a lot of investment in the intake screening technologies to reduce impingement entrainment losses.

CHAIRPERSON GRAHAM: OPG, do you have any more questions?

MR. SWEETNAM: No.

CHAIRPERSON GRAHAM: Thank you. On the agenda, then, would be government agencies –- government departments that may have questions. I know we had a question this morning from Environment Canada. Are any –- any government departments here to ask questions? Oh, CNSC now, okay. I want –- she wants –- okay, no problem. I just thought I'd overlooked you. Sorry about that.

DR. THOMPSON: No, you did, sir, I just spoke to quickly. Essentially the question we have is with regards to slide 11 in PNNL's presentation because the slide was not part of the report, and just –- we just wanted to make sure we understood how the terms minor, limited, and significant were used. And the question we had was for the factor, I guess, adaptability. The –- for once-through, the term significant, we're assuming –- we'd like you to confirm that our understanding is that significant in the terms of –- in terms of lack of adaptability whereas it provides significant adaptability.

MR. VAIL: I'm –- I'm sorry. Yes, I should have –- these are things that –- this table was basically what I use in –- this is sort

of how I –- when I come into analysis, what I'm going to be worrying about most. And in the case of, you know, once-through systems and stuff, one of the experiences that we have there and stuff is this lack of adaptability.

And so it's that concern that we want to make sure that if we're going with a once-through design, you know, particularly in things like thermal plumes and stuff, that in the future we're not going to have an occurrence where all of a sudden we're –- that's going to –- there's going to be a big inter –- big impact that we're –- you know, in the past we thought it was small and would have limited ability to adapt to that concern. So those are things that are sort of high on –- on our list. So the significance, the limited, minor and stuff are considerations I have for in terms of the –- the resources that I'm going to –- the level of effort I'm going to have in a review based on those designs.

DR. THOMPSON: And, thank you. That's how we understood it, but I just wanted to make sure that we had the –- the right interpretation of the table. Thank you.

CHAIRPERSON GRAHAM: Thank you

very much, Dr. Thompson. Next part of the agenda, and we'll allow ten minutes for that, we have two intervenors, Lake Ontario Waterkeepers and Northwatch. Mr. Mattson, you have five minutes.

MR. MATTSON: Thank you, Mr. Chairman. I'd introduce you to my counsel, Joanna Bull, who's going to ask these questions.

MS. BULL: Good afternoon, members of the panel. Thank you first to PNNL for this very clear and informative analysis and presentation –- hearing everything you've brought today. With respect to the chart that we've been discussing, I understand the clarification that it refers to the analysis as opposed to the effects. Can you just elaborate on why the aquatic impact consideration is significant for once-through while it's only significant for visual effects? So it's significant for aquatic impacts for once-through cooling while it's only significant for visual impacts for the towers.

MR. VAIL: Yeah, I think that's –- the large volumes of water that are being withdrawn for a once-through cooling system are so much larger, the considerations for impingement entrainment and the impacts of the inevitable

thermal plume, which there's no way to entirely mitigate with a –- a once-through design and stuff, are always going to be significant.

So we always –- as I mentioned –- or we –- as I mentioned, I think there was one reactor, the original North Anna design was for a once-through design. That was –- that had since been withdrawn, and in the US, because of some specific regulations in the US, we expect to –- very unlikely we'll ever see another once-through application.

CHAIRPERSON GRAHAM: Do you have another question?

MS. BULL: I do, thank you. You found that OPG's analysis with respect to service water, aquatic ecology, atmospheric environment, and costs was insufficient. These issues sound pretty fundamental to a complete cooling water assessment. What additional work could be done to provide this panel with the information to adequately address these four issues?

CHAIRPERSON GRAHAM: PNNL, I'm not sure who wants to do that. Ms. Hickey or –-

MS. HICKEY: I'm sorry, could you repeat the question? We were still considering

your previous question.

MS. BULL: Definitely.

MS. HICKEY: I'm sorry.

MS. BULL: And if you have anything to add on the previous question, I encourage you to do –-

CHAIRPERSON GRAHAM: Perhaps that might be helpful first if we can just wait a second.

MS. KRIEG: Rebekah Krieg for the record. I just –- I just would like a clarification on the first question as to whether the question was specifically about I think it was slide 11 and the limited, significant, and minor indications on that slide, or whether she was asking in general?

MS BULL: I'm definitely interested in hearing in general your thoughts on the matter. It was based on the slide in terms of why we have a significant consideration when it comes to once-through cooling for aquatic impacts whereas there was no significant consideration listed for the cooling towers except with respect to the visual impacts?

MR. VAIL: Well, and I think we –-

this is Lance Vail. I think we –- we tried to make that clear is we're talking about a huge difference in the amount of water that we're discussing and so the impacts of once-through cooling system. And I –- like I said in my earlier presentation, I don't think there's any dispute with anybody in this room the impacts to aquatic biota through impingement entrainment will be higher with a once-through system than they will be with –- with some of the alternatives. The question just gets back to, is that larger impact, you know, still, you know, small enough for the people who are making the decisions, and that's not a decision I'm going to weigh in on.

CHAIRPERSON GRAHAM: Thank you. Your second question.

MS. BULL: Thank you. So with respect to OPG's analysis on surface water, aquatic ecology, atmospheric environment, and costs, you note that their analysis was insufficient. Those issues sound fundamental to a complete cooling water assessment, so my question is, what additional work could be done to provide the panel was insufficient.

Those issues sound fundamental to

a complete cooling water assessment, so my question is, what additional work could be done to provide the panel with the information about surface water aquatic ecology, atmospheric environment and costs that would allow them to adequately assess the proposal?

MR. VAIL: This is Lance Vail again.

I think some of those questions we'd actually, you know, made suggestions in terms of some of the modeling issues that we had if the modeling was going to be the basis of the determination of the aquatic impacts.

We have to have more confidence that the modeling is a defensible. So you know, some of those we, in the report and stuff, sort of provided, you know, sort of our estimate and stuff about what we thought would be steps to move forward and stuff.

However, again, I want to say that, you know, we're not here acting as a consultant to the applicant to suggest how they do that analysis. I'm just saying that we're looking at their analysis and if we were working for NRC in the place of -- we would be -- there would be

certain questions we would be asking in terms of information and those are what we sort of laid out.

CHAIRPERSON GRAHAM: We appreciate that, and we take that. That's time.

If I could have Ms. Lloyd.

MS. LLOYD: Thank you, Chair Graham. Brennain Lloyd from Northwatch.

And I have a question which might be slightly broader than the report, which I understand is on the cooling towers for condenser cooling. And my question is on cooling systems more generally, but I'm hoping I can ask it while we have this expertise available to us.

As I understand the ongoing crisis at Fukushima Daiichi is as a result of cooling directly related to the loss of power. And in Section 1.1 of the PNNL report, they do tell us that OPG did not address whether malfunctions and accidents would have different consequences based on the use of different condenser cooling systems.

And it's my understanding they also didn't address the effect of extreme weather events on cooling systems more generally.

And I'm wondering if the team from PNNL could give us some advice or give you some

advice on whether it's possible for them to give some reflection on how various cooling systems can be compared in terms of their resilience in the event of an extreme weather event. And I'm thinking something that might occur in southern Ontario like a tornado or a hurricane.

So if it's possible to compare cooling systems for resilience in the event of an extreme weather event. And also for the degree to which they rely -- various cooling systems rely on power sources which may be lost for extreme weather or any other reason, blackouts, system failure and so on.

MR. VAIL: I think we need to make a clarification here about what the scope. We were talking about condenser cooling.

The issue at Daiichi is not condenser cooling; it's a reactor cooling problem. And so loss of, you know, the cooling water for the condenser cooling would have meant that the plant could no longer generate electricity. It was not the issue that was the safety concern.

So there's two different sets of water that were involved I think were being discussed in the comment, and one of them is safety

related and one of them is condenser cooling water. And we're not and nor did we attempt to, you know, consider anything about the core cooling capacity.

That's usually always a different -- has a different system and these cooling towers are not related.

CHAIRPERSON GRAHAM: I appreciate that.

So Ms. Lloyd, do you have another question?

MS. LLOYD: Well, I tried to acknowledge at the beginning of my question that it may be outside the scope of this particular report on condenser cooling and the tower options or the cooling options for condenser water.

But what I'm asking of PNNL if it would be possible not -- and I'm not necessarily asking them to do it on the spot, but is it possible to do that kind of comparison?

Say, for example, if you were to commission them to do another report, is it possible, does their team -- is it possible to do that kind of evaluation of cooling systems?

Not the condenser, not looking at tower options versus the options that OPG has

before them. Because I haven't found that comparison in OPG's ---

CHAIRPERSON GRAHAM: Okay. I'll direct that question.

MS. LLOYD: Thank you.

CHAIRPERSON GRAHAM: You've made the question.

Ms. Hickey?

MS. HICKEY: This is Eva Hickey, for the record.

I believe we do have experts at PNNL that would be familiar with the emergency core cooling systems. That is not us.

CHAIRPERSON GRAHAM: Appreciate that and we'll take that under advisement and see what might be done.

Ms. Lloyd, do you ---

MS. LLOYD: Thank you.

CHAIRPERSON GRAHAM: --- have another question?

MS. LLOYD: That's fine. Thank you.

CHAIRPERSON GRAHAM: Thank you very much.

That concludes yesterday's agenda.

(LAUGHTER)

CHAIRPERSON GRAHAM: I'm not doing too well. Day 3, and I'm still on Day 2, and with 21 days to go -- 20 days to go.

First of all, I want to just say thank you to PNNL staff for, first of all, coming here to this hearing which your -- the information provided, your report, your answers and so on have been very helpful to the panel and we appreciate this.

We also appreciate the fact that you were to be -- on your agenda and schedule it was to be yesterday, and you're doing it today. And we certainly hope that you have a safe trip back.

And thank you very much for the input you've had. It's been very profitable and very beneficial to the panel.

Thank you very much.

With that, I'm going to take 10 minutes until 10 after 3:00 for a short break.

--- Upon recessing at 3:03 p.m.

(TECHNICAL DIFFICULTIES)

--- Upon resuming at 3:17 p.m.

CHAIRPERSON GRAHAM: I have two

things. I told Madam Lloyd that I would take under advisement and we've had discussion and we will not be requiring that additional information or that topic that Madam Lloyd had referred to.

And secondly, my colleague, Madame Beaudet, has some -- has a question -- not a -- yes, a question and a request to OPG.

Madame Beaudet.

MEMBER BEAUDET: Thank you, Mr. Chairman.

Considering that the visual analysis is done without plume abatement, I think from what we heard this afternoon it would be necessary for OPG to give us an idea of what would be -- to give us a simulation of plume that would include plume abatement.

You can choose the technology. It can be hybrid towers; it can be mechanical draft. But I realize that you haven't done anything for hybrid towers, so if you choose hybrid towers, we're a bit in a Catch-22 here.

If you choose hybrid towers, you have to do both before plume abatement and after. If you use -- and we heard that there's nothing built with hybrid towers. But if you -- in this

type of climate -- if you use a mechanical draft, you would have examples as well. But I think it's important that the visual assessment be completed with this respect.

CHAIRPERSON GRAHAM: OPG?

MR. SWEETNAM: Can we have a moment to confer?

CHAIRPERSON GRAHAM: Pardon me?

MR. SWEETNAM: Could we have a moment to ---

CHAIRPERSON GRAHAM: Oh, to confer. Oh, I'm sorry. Yes.

(SHORT PAUSE)

MR. SWEETNAM: Albert Sweetnam, for the record.

OPG is willing to take that as an undertaking. However, at this point in time we will not be able to say when we can provide it.

Tomorrow morning, we'll be able to tell you when we could provide it.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: That would be very good, I think. I'll give this a number, Undertaking No. 15. Tomorrow morning you'll report on timeframe and then we'll have it on the record

as to when we can expect it. But I'll give you the time to do that.

CHAIRPERSON GRAHAM: But the important thing is you'll give us an undertaking tomorrow morning on timeframe.

Thank you very much.

Well, now we'll start. I'd like to start with Environment Canada.

And I believe, Mr. Dobbs (sic), you're the main presenter today with your team. And I also understand that there is a gentleman here, Mr. Gluck/Glick, from Department of Foreign Affairs and International and Foreign Affairs is with you, that there may be questions with regard to international questions.

So the floor is yours.

--- PRESENTATION BY MR. DOBOS:

MR. DOBOS: Thank you, Mr. Chairman.

My name is Rob Dobos. I'm the manager of the Environmental Assessment Section for Environment Canada, Ontario region, and I'm accompanied here by several of my colleagues from various branches of Environment Canada, including Environmental Protection Operations Directorate,

Canadian Wildlife Service, Meteorological Service of Canada and the Science and Technology branch.

My presentation, I will be describing Environment Canada's role in the EA process, go over Environment Canada's mandate, the focus of our review of the environmental assessment and summarize our submission to the Joint Review Panel by identifying the key issues and recommendations made in our submission.

Our role in the EA process is as a federal authority under the *Canadian Environmental Assessment Act* for the project. At the JRP's request, Environment Canada has actively participated in the EIS review. We have submitted proposed information requests to the Joint Review Panel on seven occasions during the EIS all of which had been issued to OPG. I think that totalled about 85 information requests.

We also reviewed OPG's responses to these information requests and advised the Joint Review Panel on their adequacy. We have worked closely with OPG on a number of occasions to discuss many of the issues we raised.

At the Joint Review Panel's request, we provided our written submission to the

panel as a government participant on January 31st.

Environment Canada's mandate is determined by various statutes and regulations as assigned by Parliament through the Minister of the Environment. It's also shaped by policies, guidelines, codes of practice, inter-jurisdictional and international agreements and through our various programs.

Some of the key legislation and policies that may apply to the Darlington project and that shape Environment Canada's submission to the panel include the *Department of the Environment Act, Fisheries Act, Migratory Birds Convention Act, Species at Risk Act, Canadian Environmental Protection Act, International Boundary Water Treaty Act* and the federal policy on wetlands conservation.

While Environment Canada does not have any permits or other regulatory approvals to issue in relation to this project, the proponent must construct and operate the facility to be in compliance with certain provisions of several of these Acts, some of which I will highlight next, the first of those being the *Fisheries Act*.

Environment Canada has

administrative responsibility for the pollution prevention provisions of the Act through a Memorandum of Understanding with Fisheries and Oceans Canada.

Subsection 36(3) of the *Fisheries Act* provides that:

"Unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, no deposit of a deleterious substance in any other place where it may enter such waters. Any substance with potentially harmful chemical, physical or biological effect on fish or fish habitat would be deemed deleterious. That includes sediment or heated discharges."

Deleteriousness is typically identified through effluent toxicity tests.

This provision does not allow for a dilution or mixing zone. It's measured at the point of discharge to fisheries waters. And there is no exemption from the *Fisheries Act* by other permits.

Its relevance to the Darlington project, the Proponent must ensure that effluent discharges are in compliance with the Act, in

particular the thermal discharges, any contaminants, stormwater releases, accidental spills or possible migration of contaminants, be it groundwater to surface water.

The *Migratory Birds Convention Act* implements the Canada-U.S. Convention for the Protection of Migratory Birds. It aims to protect and conserve migratory birds.

Subsection 1(1) prohibits depositing or permitting the deposit of a substance that is harmful to migratory birds in waters or in area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

Subsection 6(a) of the migratory bird regulations under the Act provide a prohibition against the disturbance, destruction of taking of a nest, egg or nest shelter of a migratory bird without a permit.

We should note that there is no permitting for incidental take which could result from a commercial activity.

Its relevance to the Darlington project, in particular, would relate to the destruction of the bank swallow nesting colony on

site or any other site alterations that may impact migratory bird nesting habitat.

The *Species at Risk Act* aims to prevent species from becoming extirpated or extinct. The Act requires the development of recovery strategies for endangered and threatened species listed under the Act or manages species of special concern.

It also provides protection for critical habitat when defined.

Prohibitions under Sections 32 and 33 of the *Species at Risk Act* make it an offense to kill, harm, harass, capture or take an individual of a listed wildlife species, damage or destroy the residence of one or more individuals of a listed, endangered or threatened species or one that is listed as an extirpated species if a recovery strategy has recommended its reintroduction into the wild in Canada.

It applies to listed species wherever they are found and to species that are designated under the *Fisheries Act* or under the *Migratory Birds Convention Act*. It also applies only on federal lands for any other SARA listed species.

Its relevance to the Darlington project; it provides a requirement that the federal environmental assessment must identify adverse effects of the project on any listed wildlife species or their critical habitat or identify measures to avoid, lessen effects and monitor those measures.

Move on to the review Environment Canada undertook of the EIS. The topics that we focused on included the following: the thermal effluent plume modeling; stormwater management; other water quality issues related to radiological and conventional releases; the aquatic environment, in particular the round whitefish population; water quantity issues including a potential for the *International Boundary Water Treaty Act* licensing requirements for bulk water withdrawal; radiological matters in context of the atmospheric dispersion modeling and ecological risk assessments undertaken; accidents and malfunctions, both radiological and conventional; the terrestrial environment and with a focus on impacts on the bank swallow colony; species at risk; and the effects of the environment, including climate change as they impact on the project.

Cumulative effects were looked at in consideration of any of these issues throughout our review.

A couple of other aspects that we focused on in terms of our review of the modeling. As you know, many of the predictions of effects in EA were based on modeling approaches, so our review of these models were to ensure that appropriate model selection was made, appropriate application of a model as well as validation of the model and appropriate input of data sources.

Environment Canada focused in particular on the thermal plume modeling and the atmospheric dispersion modeling, both in relation to radiological and conventional air quality aspects which were key factors for the ecological risk assessment and also the human health risk assessment in that Health Canada relies on Environment Canada's review of the atmospheric dispersion modeling to inform their review.

And further, related to the review of the ecological risk assessment, just to point out that in terms of the radiological parameters, CNSC -- we rely on their review of the pathways, those calculations, and internationally accepted

standards and practices.

Our focus of that is we review the pathways to migratory birds and species at risk to ensure that they were appropriately characterized.

So in our submission to the Joint Review Panel, we included 44 recommendations. Overall, we are of the opinion that the project can be planned, built and operated in a manner that is protective of the natural environment.

Impacts associated with normal operation of a nuclear power plant are generally known and can be mitigated. However, given that a specific reactor technology has not yet been selected, specific details on certain effects are not available at this time and thus cannot be fully assessed.

Certain issues will need to be addressed at various CNSC licensing phases which will require the participation of Environment Canada.

EA follow-up programs also need to be developed and Environment Canada is willing to assist in their implementation as appropriate. Also point out that, from our perspective, environmental assessment follow-up program may

include monitoring requirements that do go beyond the minimums established through regulatory compliance monitoring.

So now to go over our more specific recommendations.

With respect to the thermal effluents of the cooling water discharge, Environment Canada considers that significant adverse impacts on the round whitefish could occur if thermal plume with a temperature change that exceeds the Canadian Council of Ministers of the Environment guideline criteria for thermal effluent intersects with spawning area of the round whitefish. The exact location of the spawning area is not currently known in our view.

OPG has committed to do further studies to satisfy the round whitefish action plan developed with Fisheries and Oceans Canada.

Final placement and design of the outfall diffuser is to be determined during the licensing phase based on future modelling including information on climate change.

We understand that OPG has committed through the thermal plume potential effects and mitigation options report submitted to

the JRP to address these issues, and Environment Canada generally supports the recommendations in that report.

OPG has also requested regulatory certainty from Environment Canada under the pollution prevention provisions of the *Fisheries Act* for the thermal discharge. Environment Canada has indicated that we are willing to explore potential options to provide a clear direction with respect to the thermal effects for this sector.

In relation to other water quality issues, the storm water management plan has not yet been designed, but we understand will be developed during the licensing phase. We recommend that it will need to be developed such that it will prevent acute lethality from the discharges and minimize loadings in the discharge to Lake Ontario.

With respect to other conventional and radiological effluence, no details have been provided in the EIS based on the fact that the reactor design has not yet been selected, thus these will have to be addressed during the licensing phase.

A specific issue related to eutrophication potential was identified in that

that potential could increase, and Environment Canada has recommended that a follow-up program with adaptive management be implemented.

With respect to construction impacts from in-water works, we feel that those can be mitigated using standard approaches.

Related to water quantity. This will really only be an issue if cooling towers are selected instead of the preferred once-through cooling option.

The evaporative losses from the cooling towers is large. At a rate of 4.5 cubic metres per second, we feel that this may result in a measurable decrease in flows out of Lake Ontario which could have trans-boundary water management implications. The main effect would be on downstream water users.

Environment Canada's role is to advise the Department of Foreign Affairs and International Trade on possible licensing requirements by them under the *International Boundary Water Treaty Act.* They rely on Environment Canada's advice on impacts on levels and flows at the international border.

It's Environment Canada's

recommendation that the effects of this water withdrawal wouldn't need to be further assessed if cooling towers end up being the preferred option.

Related to migratory birds. Again, the key issue related to this is the loss of the onsite Bank Swallow colony in the order of the currently -- in the order of about 1,200 nests due to the removal of the shoreline bluffs that were predicted using the bounding approach.

The species is in decline and is currently being assessed by the Committee on the Status of Endangered Wildlife in Canada for potential future listing under the *Species at Risk Act.*

Environment Canada would consider the loss of this colony to be a significant adverse effect on the regional population, but we do feel that it can be mitigated. It is our preference to minimize the loss to the extent possible during the site preparation activities.

We have recommended that OPG create artificial nesting areas onsite to offset any loss of the colony, and OPG has initiated doing research with Environment Canada and other partners on the use of artificial sites starting this

spring.

I just wanted to clarify in terms of the assessment of Bank Swallows by the COSEWIC committee that was initiated since our written submission at the end of January.

Related to species at risk. There were at least 8 species listed under Schedule 1 of the *Species at Risk Act* that have been documented to occur recently on the Darlington site, these being Least Bittern, Peregrine Falcon, Chimney Swift, Yellow-breasted Chat, Western Chorus Frog, snapping turtle, Butternut and Monarch butterfly, plus one additional COSEWIC-designated species that is proposed for listing, that being the Bobolink.

And I would add again that since our January 31st written submission, the snapping turtle has been added to Schedule 1 of SARA. At the time of our submission it was proposed by COSEWIC.

Environment Canada doesn’t have any major concerns with the predicted impacts on any of these species given the proposed mitigation by OPG.

The site restoration proposed after construction would include creation of meadow

habitat of a suitable area that would replace the lost nesting areas for the number of Bobolink nesting at the site. The proposed small wetland areas that would be created, we understand, in the northern part of the property would provide habitat for snapping turtle, Chorus Frog and Least Bittern. And OPG has also proposed constructing artificial nesting structures for Chimney Swift.

Related to atmospheric issues. Environment Canada has recommended that best management practices be implemented for air quality impacts during the site preparation and construction phases, and also recommended the use of best available technology to reduce air emissions during the operational phase. We have recommended an air quality monitoring program for the operation phase.

We've also recommended that an onsite meteorological monitoring station be established. This would help to provide onsite information that would be required for future modelling; both the thermal plume modelling that's been identified for the regulatory phase as well as any future atmospheric dispersion modelling.

We also recommend that the

radiological environmental monitoring program be expanded to include the new facility.

Environment Canada. Late in our review, we did still have a few questions and had posed questions directly to OPG on their responses to Information Requests 268 and 269 that at the time of the start of the hearing were still unresolved to us. Those did relate to our questions on atmospheric dispersion modelling.

OPG did submit a response to us on March 18th, however, there are still a few unresolved questions on those that we can expand on.

In terms of the ecological risk assessment, our review didn't identify any major concerns, however, we do recommend a follow-up program be implemented to include direct sampling of stacks and other effluence to ensure certain parameters are not elevated which would include a multi-media sampling program to track contaminant trends.

With respect to accidents and malfunctions. For water releases, we found that OPG had not provided details on spills, responses to specific incidents. Environment Canada

recommends that the development of appropriate spill and prevention response plans be conducted during the licensing phase.

With respect to atmospheric releases. The atmospheric dispersion modelling was appropriately conducted for the two accident scenarios that were included in the EIS, however, we would point out that an accident scenario involving a high-temperature release of radionuclides was not conducted; in our view remains a gap.

And, given the events that are happening in Japan, we would put forward the consideration that such a scenario would be modeled. It's just not something that was included in our written submission at the end of January.

So, in summary, since the reactor technology has not been selected, there are some uncertainties related to specific impacts from the project footprint: Contaminant releases to air and water and placement of the thermal effluent outfall and diffuser. These can be resolved during the detail design at the CNSC licensing phases. Environment Canada would expect to be involved during the licensing review.

Regarding the bank's loss of the bank swallow colony, again there would be a significant impact but can be mitigated by on-site habitat creation.

In terms of once-through cooling, the effluent impacts need to be avoided through detail design. The cooling tower option would avoid these impacts, but would result in potential trans-boundary water implications and downstream impacts that would need to be assessed.

So that's the conclusion of our presentation and we're available to answer any questions.

And I would ask my colleague, Sandro Leonardelli, to coordinate the response of any questions by our various experts.

CHAIRPERSON GRAHAM: Thank you very much, Mr. Dobos.

Before I go to my panel colleagues and look for direction from them, there was a recommendation, more or less, that a modeling V might be required.

Would we want that, and give that as an undertaking to OPG for that modeling, before we start? Or do we want to do the questions first

and then decide?

Madame Beaudet, first? Or, Mr. Pereira?

Okay. It's been decided to do the questions first. And Madame Beaudet, you're first on the questions.

--- QUESTIONS FROM THE PANEL:

MEMBER BEAUDET: Thank you, Mr. Chairman.

Since you mentioned in the conclusion, we'll start with that, the water implications downstream, in the downstream impacts of water withdrawn with cooling towers.

Environment Canada is responsible for the enforcement of the International Joint Commission, but how would the process go?

And when you say that would have to be evaluated, you would have to evaluate the socioeconomic impacts or effects downstream, such as with Hydro Quebec, for instance? Because I believe the International Commission always regulates the level of the lakes, but then it means there's less water further down the river?

MR. LEONARDELLI: Thank you, Madame.

Sandro Leonardelli, for the record.

The loss is 4,500 litres per second. I'll have Aaron Thompson of our -- of the Meteorological Service of Canada speak to that.

MR. THOMPSON: Aaron Thompson, for the record.

Environment Canada does enforce the rules of the International Joint Commission. Lake Ontario is a regulated lake, and the outflows from the lake are regulated to balance the needs of interests on Lake Ontario and further downstream.

So this withdrawal is sizable. If under cooling tower option, if that was selected, the withdrawal is sizable and, although the lake is regulated, that withdrawal would not be compensated for by the regulation.

While it is possible to -- the withdrawal would at first increase the overall outflow from the lake, so right now all the water flows down through the St. Lawrence River.

But, with this new withdrawal under a cooling tower option, there would be water flowing through the St. Lawrence River, but there would be the new withdrawal from the Darlington

cooling tower.

So that regulation would not be able to compensate for that because that would be at the expense of the downstream interests or the lake interest.

Perhaps maybe I can get you to rephrase what you're asking, and I'll ---

MEMBER BEAUDET: Yes, what I'm asking -- because you're confusing, I think, myself even more when you say the regulation would not allow for compensation of the water loss.

You mean the International Joint Commission cannot say, because this -- what is it, four point something cubic metre loss? They can't say that we have to keep more water in the lake, and then give -- have some negative effect for -- on the St. Lawrence River for people, for companies, using it further down? Is that what you're saying?

MR. THOMPSON: Well, they could do that. But if -- regulation could -- if the outflow from Lake Ontario decreases by -- or increases by the 4.5 cubic metres per second, regulation could eliminate that. We could hold back more water on Lake Ontario, but that would be, again, at the

expense of the downstream interests in Quebec.

We could also let that extra water out to -- through the plants, to not have a downstream impact in Quebec, but then that would be at the expense of the interests on Lake Ontario.

So the regulation plan, we have to separate the regulation of the lake from the fact that this would be a new withdrawal that would result in a decrease in flow through the St. Lawrence River.

MEMBER BEAUDET: And what's the role of Environment Canada with respect to decisions that are taken by the International Joint Commission?

MR. THOMPSON: Environment Canada participates on the International St. Lawrence River Border Control which regulates Lake Ontario. We participate on that, but it's the authority of the International Joint Commission to make the decisions with respect to the outflows.

So we participate, but we don't make the decisions. We participate in our personal and professional capacity on that regulation, so it is, in fact, the International Joint Commission that has the final say on that.

MEMBER BEAUDET: And how does it function? I mean, you let it be and see if there's any complaints, and then you react, or?

MR. THOMPSON: Well, in this case, it would be -- if there was the cooling tower option, and there was the withdrawal of the 4.5 cubic metres per second, Environment Canada would make the recommendation that that's a sizable withdrawal.

We would then turn to the Department of Foreign Affairs and International Trade who would have to make an assessment whether a licence would be required under the *International Boundary Water Treaty Act*.

They may choose to involve the International and Joint Commission and ask for their opinion. They may choose to talk to the State Department in the U.S. and come up with a unilateral agreement.

Environment Canada, we act as technical advisors and do the technical and engineering assessment and what is ultimately decided by -- is Foreign Affairs, and/or the International Joint Commission.

I do have Stephen Gluck from

Department of Foreign Affairs and International Trade here who could expand on that, if you so desire.

MEMBER BEAUDET: Yes, please.

MR. GLUCK: It's Stephen Gluck, for the record.

Just to maybe step back a bit from your original question, if a particular project were in a boundary water, such Lake Ontario, were to potentially have an effect on levels and flows on the other side of the international line, then you would require under the Boundary Waters Treaty either an agreement between governments or an order of approval for the International Joint Commission.

So once those steps were taken, you would then, under the *International Boundary Waters Treaty Act*, have almost a referral to the Minister of Foreign Affairs who would then be in a position to potentially issue a licence based on recommendations coming from the subject matter experts which in this case would be Environment Canada as well as based on what you would potentially find in either the Order of Approval from the IJC or the agreement between governments.

And that would be sort of what

would make up the licensing conditions that the Minister would potentially issue for this particular project.

MEMBER BEAUDET: So it's automatically triggered. It's not like, for instance, there could be some impacts, not necessarily during winter or spring, but, you know, people could feel -- I mean, users of the lake could feel it in the summer or dry summer.

Automatically, if there's cooling towers in this quantity that is lost, it's triggered automatically. There has to be a permit and there has to be an agreement with the U.S.

Do I understand correctly?

MR. GLUCK: If there is a determination that is made that there would be effects on levels and flows on the other side of the boundary, then under our obligations under the Boundary Waters Treaty, we would need to either have an agreement between the two governments or an IJC Order of Approval as a first step.

Under the *International Boundary Waters Treaty Act*, the Article 11, I think it is, states that, you know, unless there is a licence in place, no person shall commit to a project that

would affect levels and flows on the other side of the boundary.

So yeah, there is sort of the, I guess, call it a two-step process.

MEMBER BEAUDET: Thank you.

I don't know if my colleagues have questions related to this with the expert being here at the moment.

MEMBER PEREIRA: Just a point of clarification.

In terms of the volumes of water we're talking about compared to the volume of water that goes over the controls into the St. Lawrence River, what percentage are we talking in change with withdrawal for cooling tower purposes?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

That question would best be answered by Aaron, Aaron Thompson.

MR. THOMPSON: In terms of overall discharge through the St. Lawrence River, the average is about 7,300 cubic metres per second, so the withdrawal here is 4.5 cubic metres per second so, in fact, it is very small and would be almost negligible.

But in the absence of -- if the cooling towers weren't there, we know that water would flow through the St. Lawrence River, so there is, in fact, a decrease.

MEMBER PEREIRA: But given the significance of the change, do you foresee this being a difficult issue for approval through this process that you have?

MR. THOMPSON: I don't think so because the -- you would not see the change on Lake Ontario level. The withdrawal is quite small. It would be immeasurable in terms of Lake Ontario water level.

But in terms of the outflow through the St. Lawrence, it would be a very minor increase. It's more of a -- almost a theoretical argument rather than -- we would not be able to really measure it.

MEMBER PEREIRA: So then is this really an issue?

MR. THOMPSON: It would still require a permit. But still ---

MEMBER PEREIRA: Is it an issue of significance, in your view?

MR. THOMPSON: I don't see

obstacles. I can't speak for all the parties involved, but it's very minor.

MEMBER PEREIRA: Thank you very much.

CHAIRPERSON GRAHAM: Perhaps External Affairs or another agency might want to just comment.

Do you see it as an obstacle also regarding IJC and so on?

MR. GLUCK: Yeah, Stephen Gluck, for the record.

I really can't comment beyond that. Technically, I wouldn’t know how much of an obstacle, you know, that would be.

I mean, the IJC would assess it based on their technical expertise and make a determination. But I don't know how long or how difficult that would be.

CHAIRPERSON GRAHAM: Very good.

The only other question I have for Mr. Dobos is the withdrawal is 4.5 cubic metres a second, but is that net or is there something that comes back in the form of condensation and so on, rains and rainfalls?

The 4.5, is that a net withdrawal

after certain amounts do go back into the -- from the atmosphere back into the ground?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

It's determined to be a net loss from the basin. It will not -- it's not expected to deposit back into the basin as rainfall.

To put some context on the magnitude of the withdrawal, there are different metrics. You can compare it to the total outflow of the St. Lawrence River which Aaron just mentioned.

The other metric is to compare it to other net withdrawals from the basin that we know about. And this withdrawal of 4,500 litres per second would represent an additional 30 percent of net withdrawals that are occurring from the lake.

And so that's part of the reason for requesting that an assessment of the downstream effects be undertaken, to understand what implications are on downstream users.

MEMBER BEAUDET: Has the international -- I know they were looking at -- the International Joint Commission were trying to get,

as you say, metrics to try to make the decision; do they work in quantities or in percentage or both? The figures you're presenting, have they progressed on such decisions?

MR. LEONARDELLI: Aaron Thompson has all the expertise to answer that question for you. Thank you.

MR. THOMPSON: We haven't -- under the *International Boundary Waters Treaty Act*, there isn't a threshold that's set so many cubic metres per second requires a permit. The wording reads whether it's a material impact. And that wording is not definite; so it's more on a case by case process.

And so there's no prescribed rule to follow on what size of an impact would be considered significant, so it's a case by case basis.

MEMBER BEAUDET: Thank you.

My next question is regarding the *Fisheries Act*.

I'd like to have some clarification on page 12, just the paragraph before Section 2.3 of your submission, PMD 11-1.6. You say:

"Any deposit of deleterious substance into water frequented by fish may constitute a violation of the *Fisheries Act* and warrant enforcement action."

Is it Environment Canada -- I know DFO issues the authorization. Are there they the ones that enforce the -- what would you call if there's -- well, it's an error to compare to what was agreed or if there's an exceedance of what agreed.

Who enforces when there's a litigation?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

It would be Environment Canada that undertakes that enforcement.

MEMBER BEAUDET: Interesting.

My other point referring to the *Fisheries Act* is the thermal discharge. And you say that you would cooperate in issuing the authorization with your expertise, I presume.

But what I found interesting was in the minutes of a meeting you had discussions with Environment Canada on thermal modeling issues for nuclear Darlington and I believe it was with OPG and yourself.

And you said that you were not aware that OPG had committed to obtaining a site-specific regulation respecting thermal emissions to the lake, if necessary.

I'd like you to comment on that. I mean, you were not aware; now you're aware.

What would be your involvement? And I know that you say many times in your submission that dilution is not permitted.

With regard to the thermal plume, what is your position?

MR. LEONARDELLI: I'm not sure which date you are referring to, but we were first made ---

MEMBER BEAUDET: I can give you the date for the record. It's Thursday, October 29, 2010.

MR. LEONARDELLI: Right, okay, that's about the time that we heard about the request from OPG. The request I believe we first heard about verbally during meetings in regards to the thermal plume discussions and, of course, the modeling.

So that was the first we'd heard of it. We took it under advisement. We mentioned

it to our management.

And we have, as Rob has indicated in the presentation, we are willing to have further discussions on what regulatory certainty could be provided.

Did that answer your question?

MEMBER BEAUDET: Yes. But I have some question.

In some ways, we have to determine -- I think you have to determine -- if whatever's done is lethal. Is that correct?

You were talking earlier acute lethality. And in this case, could we possibly talk of acute lethality? If not, why?

And then what would be acceptable conditions for you if -- for instance, if we make a condition or we recommend that it should not be more than two degrees above the ambient temperature?

I mean, you must have some discussion as to what would be the requirements or the standards that you would apply eventually if such a permit is done?

And the other questions in the discussion was that you were looking if it would be

-- I decide specific or with respect to other industries because there must be also discharge with other industries and how do you function with the other industries?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

You're asking two questions and I think Kim could speak to the first question in regards to acute versus chronic effects of effluent.

And Nardia Ali could speak to the -- I guess the process-related issue for discussions under the *Fisheries Act* for regulatory certainty.

MR. KIM: Duck Kim, for the record.

When we look at thermal discharge, we look at two types of defects on fish. One is chronic effects. They're generally sub-lethal, non-acute effects. But over time there would be accumulation of stress or effects on reproduction; just a general lowering of the fitness of fish to deal with other stresses which may ultimately lead to death.

There is also acute lethality

where in this case with thermal discharges where temperatures are high enough that it's beyond their range of tolerance and that may cause an immediate effect of death in fish.

So if I remember your question, I think you were asking something in relation to that to do with the mixing zone and the two-degree Celsius limit.

As far as the *Fisheries Act* is concerned, as Rob has already stated, the *Fisheries Act* does not provide for the allowance of a mixing zone. Therefore, other than by regulation under the *Fisheries Act*, there would be no mixing zone or two-degree limit allowed.

So, therefore, in this case, if the thermal plume within that mixing zone is hot enough to either cause acute lethality or to cause a chronic effect, then that would be considered a potential offence under the *Fisheries Act*.

MEMBER BEAUDET: So if I understand well, when DFO does their -- prepares the authorization, they have to make sure that in the end you will not come with the stick, shall we say, and force what you feel is not permitted.

But then -- I mean, are you there

when the DFO prepares the authorization?

MR. KIM: If I may -- Duck Kim, for the record again.

There is -- the authorization that DFO provides is specifically for habitat effects. So for HADD which is Harmful Alteration and Destruction -- I forget what the last D was for -- of habitat, so the DFO has the authority to authorize destruction of habitat where -- and there may be a compensation associated with that.

For Environment Canada, our pollution prevention or pollution prohibition clause under Section 36(3) of the *Fisheries Act*, there would be no authorization given. There is no permitting mechanism under that section.

So if there is a potential for violation or non-compliance with Section 36(3), it's not something that can be permitted under the *Fisheries Act*.

MEMBER BEAUDET: I may have a simple reaction here.

If you authorize to destroy the habitat, you destroy also the biota. So there's a hole in the net here.

Who takes care of that? I mean,

it doesn’t make sense.

Are you part of the discussions when DFO prepares -- we’ll talk with them later -- but are you part of the discussions when they prepare their authorization?

MR. KIM: We are not always part of the discussions in their habitat destruction authorization activities.

However, we are usually aware of what the issues are, especially in the context of the environmental assessment. We are aware of what effects -- so what habitat effects might need authorization by DFO.

As for the gap or hole that you’re mentioning, if I may, perhaps I can ask DFO to comment on that as well.

But from our perspective you are right that if you destroy habitat then you destroy fish. Our perspective, however, is from the perspective of depositing a harmful substance or altering the quality of water that it is rendered harmful, in this case the thermal discharge.

So that’s our mandate.

MEMBER BEAUDET: I’m not trying to put one minister against the other here. I think

the legislature has overseen a few things.

MR. LEONARDELLI: If I may, there's some additional context to provide on this. I'll speak first and Nardia Ali will also speak to this.

To be clear, DFO's authorization is separate from the 36(3) section that we administer. So in trying to make a distinction between the type of impacts you can have, for example, the in-fill could theoretically destroy fish habitat wherever that infill is occurring. You may have additional habitat away from the in-fill, they may still exist which could then be potentially impacted by the thermal plume.

And in terms of discussions with DFO, our working relationship, for separate reasons, is largely through this round whitefish action plan which will be carried forward.

Our interest in it is for 36(3) and the thermal effects and understanding how thermal plumes could affect the round whitefish.

DFO's perspective on it is in terms of outright habitat destruction.

I'm not sure if Nardia wanted to speak for the two to that?

MS. ALI: Let me see if I can make it a little bit clearer. There are two sections of the Act, right, there's Section 35, which deals with fish habitat and alteration of fish habitat, and then there's Section 36 which deals with deposit of deleterious or harmful substances.

We have a Memorandum of Understanding, that is Environment Canada Administers Section 36. So when EFO assumes, like, a Section 35 authorization, that could be to, like, alter, you know, disrupt or destroy that habitat. So for that particular area that's written off, like, we wouldn't apply Section 36 there, but as Sondra is explaining, there are other areas where the impact is mainly a water quality impact, you know, due to input of heat, like thermal effluent or other substances, and that's the section that Environment Canada looks after, and there's no provision in the Act to authorize deposit of deleterious substance.

The only way you can do that deposit is if it's authorized by a specific regulation; for instance, pulp and paper mills, mines, they have a specific regulation that allows them to put certain harmful substances into waters

frequented by fish.

OPG has asked for regulatory certainty under the *Fisheries Act* for the –- I guess for the Darlington site, possibly the nuclear sector. We have that out senior management. Environment Canada will have to explore options for how they deal with that and whether it will be applied just to either the nuclear electricity sector or to all sectors that discharge thermal effluence. I don't know if that makes things clearer for you?

MEMBER BEAUDET: Yes, thank you. It doesn't solve the problem, but it's clearer. I have some questions about the air emissions but the conventional ones. I've noticed in the different PMD we've received, there are some exceedances, and everybody says, you know, there would be a dust management program or whatever.

But I'd like to hear about Environment Canada about those exceedances, and, you know, there –- there can be some acetic acid and different things, and I'd like to hear from you if you feel that it's just temporary or it's just when the emergency measures or –- because, for me, I find that you –- the spirit behind your PMD is

very much you don't degrade the environment, and I was a little bit left on my appetite with your covering of conventional air emissions considering that, you know, you have –- what do you call –- the record of all over Canada, et cetera, and I was a bit perplexed that you did not take a stronger position.

MR. LEANARDELLI: I think I understand your question. If I haven't, by all means, please correct me. By the way, it's Sandro Leanardelli for the record. The –- we looked at it from the perspective of two different phases. We looked at it from the perspective of the site preparation activities, which is when the exceedences would be expected to occur, and we advised that best management practices be used. We have a specific guide that we refer to for these type of construction situations to mitigate those impacts.

In terms of operating releases, there are some conventional parameters that contribute to smog that could be released from the facility, nitrogen oxide, sulphur oxides, they're largely associated with the operation of the back-up diesel generators which get tested on a regular

basis according to a pre-determined schedule that OPG would follow.

There are other omissions that could potentially occur from the facility, things like ammonia, hydrazine, et cetera.

The bounding that was done for those type of substances was not complete. It was a qualitative evaluation, so our recommendation to that was that once detailed design was developed, we would have a better understanding of what those potential omissions would be and based on that, do a risk assessment for potential effects.

We also recommended that the air omissions be tested to verify the released to validate the predictions that are made during the detailed design phase.

So those would be –- that would be our perspective on that. I'm not sure if I totally addressed your question.

MEMBER BEAUDET: I believe OPG on most of these recommendations have agreed to do it, correct me if I'm wrong, but I think they have. Before –- I have many questions, but I think I'll let the others also have time to address their questions, and then we can do a second round maybe,

Mr. Chairman.

CHAIRPERSON GRAHAM: Yes.

Mr. Pereira.

MEMBER PEREIRA: Thank you, Mr. Chairman. I'll start off with the bank swallow colony and Environment Canada's recommendation that OPG develop artificial nesting habitat, preferably on site. Two points, one, the site is going to be a heavy-duty construction site for many years. Do you think that this will be conducive to a welcoming habitat for bank swallows, and secondly, as I think was discussed this morning and I think some of you were there, there was a concern that there isn't much space on the site, and even if you tried to retain some of the existing bank, there would be a problem with perhaps hazard to the construction activities or stability of the banks. Do you want to comment on whether your recommendation is feasible, and secondly, whether it would be a good option for promotion of continued nesting bank swallows in the area given that it's going to be a construction site.

MR. LEANARDELLI: Sandro Leanardelli for the record. For your first question, which I believe has to do with will the

construction site which will be –- it will be a construction site for many years, whether it would provide suitable habitat during that construction period, I'll have Mike Cadman from the Canadian Wildlife Service answer that. And then the other question had to do with space availability on the site, the slope stability issues, and I believe you're trying to understand how that reconciles with the recommendations we've made, and I might take the first attempt at that afterwards. Thank you.

MR. CADMAN: Mike Cadman for the record. In regards to the question of the suitability or how welcoming the site would be when it's a construction site, I don't think that would have a huge effect on the birds. They can travel some distance to forage. They like to forage over meadows, they like to forage over the open lake where there are insects near the surface. So I don't think that would be a large problem.

We worked quite a bit in –- now that we started to look at the bank swallow in more detail, we're often looking at them in active gravel pits that –- you know, very extensive areas of what looks like very unwelcoming habitat with

very heavy machinery moving around and that kind of thing, and the birds appear to be thriving in those situations.

MR. LEANARDELLI: Sandro Leanardelli for the record. I'll undertake the answer to the second question, and then if Mike wishes to add anything, I welcome him to join in.

The question about the site and the space available and the slope stability, a lot of these questions are somewhat unanswerable at this point because we don't have a detailed footprint for the facility. We've been working with a bounding framework, bounding footprint for the plant layout, so realistic scenarios that are based on realistic reactor designs have not been adequately evaluated for that purpose.

I have heard concerns that slope stability could be an issue that would prevent CNSC from approving a large slope within the vicinity of the reactor complex, so it's an open-question. When we hear a commitment from OPG that they can preserve that, although they are intending to make that commitment, we don't have certainty with respect to whether CNSC would approve that. There's –- as they mentioned earlier today we don't

have certainty with respect to whether CNSC would approve that. As they mentioned earlier today, they said that geotechnical studies would have to be done to support that type of a decision.

So it's an open question. It's a -- I guess in the context of the panel having to make difficult decisions about environmental trade-offs when you're considering cooling towers and the footprint that they would occupy versus ones through cooling, occupying a lesser footprint.

You would require that type of information as to whether the slopes could realistically be saved, in making that type of a determination.

MEMBER PEREIRA: Thank you.

We'll go on to a different topic. In Section 3.2 of your Panel Member Document, Panel Member Document 1.6, page 21, Environment Canada recommends establishment of a local meteorological data collection station and also additional lake current and temperature monitoring to support higher resolution thermal plume modeling.

Does this type of data collection require to be obtained over a number of years to enable refinement if you have plume modeling --

this is not an exercise that can be completed over a short time; am I correct in that assumption?

MR. LEANARDELLI: Sandro Leanardelli, for the record.

I'll ask Ram Yerubandi who's with our science and technology branch to address the question of how many years of meteorological data would be required from onsite.

MR. YERUBANDI: Ram Yerubandi, for the record.

Sorry, my voice is a bit course but that's because of the cold I'm going through.

The recommendation was made mainly because of the assessment that was done by OPG which used the winds far away from the site. And we know that in order to do the high resolution thermal plume modeling we do need the local winds.

And that was one of the reasons why we made it and we don't really need several years of data to carry out this kind of thermal plume modeling work. And anything within one or two years data would really give us an indication of how it can do.

Even that can be verified from the local -- or the meteorological stations around the

region and once we verify that probably we don't even need that long period of data to run these models.

MEMBER PEREIRA: So there'll be a time lag before we can refine the models with this sort of input.

In the interim is there a way forward for recommendations on inlake deployment of the diffuser to avoid impacts or a precautionary type of recommendation on where the diffusers should be placed?

MR. LEANARDELLI: Sandro Leanardelli, for the record.

There are a number of considerations involved in that. First of all, we will have some time available to us because the reactor technology hasn't been determined yet. We don't have a detailed design to work from.

The citing would need to be supported by the modeling, as we've recommended. The -- sorry, I've lost my train of thought.

Could you repeat the question just for a moment?

MEMBER PEREIRA: Given the fact that you need to obtain -- collect data to refine

your model, in the interim there could be a recommendation based on what you have done so far on where the diffusers should be placed to avoid the sort of impacts that your concerns may be present.

MR. LEANARDELLI: Right. The other consideration -- my apologies for losing my train of thought.

The other consideration is the location of the round whitefish habitat. So the round whitefish action plan is intended to address that issue and tell us where the habitat is specifically so that that can then become a consideration in citing the location of the diffusers.

What we can say, in a general sense, is that the deeper offshore that you put the diffuser the less likely you would be affecting round whitefish habitat.

So we stated that in our position -- rather, our supposition to that effect.

MEMBER PEREIRA: So based on your modeling you would conclude that deeper -- in a deeper location would be a location where there'd be lesser impact. How deep would that be, based on

what you have modeled so far?

MR. LEANARDELLI: I couldn't answer the depth question. There are other factors at play. For example, if you put it into deeper waters are you affecting something else?

Now, we do know that the round whitefish is the most thermally sensitive species in that area.

I'll ask Duck Kim if he has any additional input to provide on this.

MR. KIM: Duck Kim, for the record.

I believe the depth question came up yesterday as well and my colleague with CNSC has said that at least as deep enough that it'll be below the thermal cline which was at minimum 20 metres and without additional information on the thermal plume modeling that we are expecting from OPG if -- once through cooling is the technology that is chosen, that I would agree with my CNSC colleague that that would be a reasonable depth.

MEMBER PEREIRA: Is that based on modeling work that Environment Canada has done of any sort or is this just based on common understanding you have in this community?

MR. KIM: That is not based on the modeling that we have at this point. It is based on the habitat requirements of the round whitefish, specifically the spawning habitat and the egg -- where the eggs would end up being incubated over the winter.

MEMBER PEREIRA: Thank you.

In the Environment Canada recommendations -- I think it's in your report, in the PMD, body of the report, page 49, and you don't need to go to it because it's a simple matter.

Environment Canada proposes consideration of the use of some of the reject heat in the reactor cooling system condensers to service low-grade heating applications instead of discharging the heat to the lake.

And this, you suggest, might be used for a combined heating and power application -- type of application.

Has OPG evaluated such an option as a means to reduce environmental impact?

MS. SWAMI: Laurie Swami, for the record.

We haven't analysed it from the perspective of reducing environmental impact. We

understand that district heating would be a small slipstream, if you would, from the main steam system for the generation of electricity, so it would be actually somewhere on the turbine generator set.

And as a result that would reduce the efficiency of the overall plant and reduce the output from the electrical side of our business which would, in essence, really not change the environmental footprint, we'd still have cooling water, we'd still have all of those systems. All you would be doing is taking a small, small portion of that in order to get the right quality of steam required for district heating.

MEMBER PEREIRA: Thank you for that response.

Environment Canada, have you any comment on OPG's response given that you have made this recommendation?

MR. LEANARDELLI: Sandro Leanardeli, for the record.

Our recommendation was merely that they consider the possibility of using this.

MEMBER PEREIRA: Thank you.

I'll now turn to CNSC. In the

Environment Canada from the events in Japan and looking at different releases in the event of an accident. I think it was referred to as high temperature. Is that what he said; high temperature release?

Has CNSC got any comments on that type of accident scenario examination of impact on the environment on neighbouring populations?

DR. THOMPSON: Patsy Thompson, for the record.

Essentially, our understanding is that this concern was identified when people saw that nuclear accidents came with fire and that, you know, the discharge -- the release was likely to be a hot one.

For the purposes of the environmental assessment, the assessment, as we've indicated, is a bounding assessment based on the plant parameter envelope, and for accidents and malfunctions the scenarios are based on the safety goals.

For the purpose of providing a conservative assessment, modelling a cold release essentially ensures that the plume stays closer to the ground and the radiological consequences are

higher than if a high plume -- hot plume rising would be modelled.

And so for the purposes of the EA, our assessment is that this is a conservative assessment to demonstrate that the safety goals could be achieved and that the requirements of RD-337 would be met at this stage.

Moving forward, if the project goes ahead, once a technology is chosen, the expectation as part of an application for a licence to construct is that safety analyses be conducted, and at that time we would expect that a proper detailed modelling be done that would be more representative of the plant design and the characteristics of the various accidents and malfunctions associated with that design.

MEMBER PEREIRA: Thank you, Dr. Thompson.

Environment Canada, does that respond to the point you raised?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

You have to understand that when we took a look at the modelling that was done for these accident scenarios that Environment Canada

staff were not experts on nuclear accident scenarios, so we evaluated the modelling that was done for the scenario that was put before us.

In light of what happened at Fukushima, it seems pretty obvious that the plume that's being released is a high-temperature plume. And in light of the concerns being raised by intervenors about that specific accident, we felt it was important to point out that this type of a scenario had not been modelled as part of the EIS.

Some of the implications that we see for this is it may have implications for planning, emergency planning, and for evacuation-zone sizing.

We're not really clear on how the exclusion zone gets determined, but it seems to be tied to atmospheric dispersion modelling and some kind of a release scenario, so it may have some implications for that.

In terms of a cold plume versus a hot plume, if you wish to explore what the implications of that are, we have our meteorologist, Fred Conway, here who could speak to that.

MR. CONWAY: Fred Conway, for the

record.

The issue between the cold plume and the hot plume rests largely on the behaviour of the phenomenon.

As was mentioned earlier, the issue of fumigation was discussed and it was felt, based on the behaviour of the plume, the temperature of the release, the elevation of the events, that this would not be a necessary consideration, that fumigation which can be a problem with hot pollution releases, particularly high hot plumes as you sometimes see from coal generating plants, that the phenomenon can become an issue.

Our analysis of the air dispersion modelling for this study, we accepted the fact that any releases would be a cold plume, in other words, a stable plume such as might be trapped in the -- behind the building.

In the event of a hot plume, that would not be the case. Arguably, the kind of plume modelling that was done for this study might not be appropriate.

In particular, I think one of the -- there are specialized models that try to address

this case. They're shoreline models that do attempt to talk about the fumigation issue.

If I can maybe show one of the back-up slides that we have, if that's possible? Could we possibly show Slide 31? A little bit further. That one.

This is quite an old picture. Please, this is not to be taken as in any illustrative of a release from a nuclear plant.

But you see the kind of behaviour that was simulated for this work and that is the plume from the building. It's quite a -- it's a building of some height, but the stack is not very elevated and you can see the plume is trapped behind the building, largely.

So in other words, the plume is kept close to the earth.

Now, this would be what we would expect from a cold plume, which is to say a near neutral plume. So this is the behaviour that I think OPG decided would be appropriate to expect from a release from the reactor.

This, again, is a cold plume.

Now, if we can look at Slide 34; just a bit further on, I think. Oh, it doesn't

appear to be there. Pity, it was a nice slide.

In any event, what is more frequently observed with coal generating plants, a high stack but a hot plume, the plume could be caught in the -- trapped in the lake pre-circulation and consequently there may be fumigation effects, which is to say that the plume can be suddenly brought down to ground at some distance from the stack, and a fairly concentrated plume indeed.

I think this question was put to the -- was discussed in technical meetings some time ago, and it was decided that it need not be considered for the case at hand.

If a hot plume scenario is to be considered, then that comes back on the table, then the model that was used for much of this dispersion work is actually not appropriate for the purpose.

MEMBER PEREIRA: Thank you.

Dr. Thompson, would you like to comment again? Then I'll go back to OPG to comment as well.

DR. THOMPSON: Patsy Thompson, for the record.

There were technical meetings to

discuss the use of the modelling for the scenarios for accidents related to the safety goals. And if you would put back the Slide 33, it essentially demonstrates what I was trying to say, is that by modelling a cold plume you have a plume that stays and the likelihood of that position on the ground for caesium and radioactive iodine causing exposures to members of the public would be, with the information we have that was assessed by our specialist, would produce the highest consequences for the purpose of looking at the EA and the suitability of their site, recognizing that if the project moves forward and the licence to construct is applied for, that more detailed modelling would need to be done.

MEMBER PEREIRA: So does Environment Canada accept that what has been done is appropriate for this stage in the process based on what Dr. Thompson is saying?

MR. LEONARDELLI: Sandro Leonardelli, for the record.

That's a difficult question to answer because what we're trying -- what we're essentially comparing, as Patsy had mentioned, you can model it one way, which is like the one that's

shown up on the screen where you have a very high concentration in a fairly small area close to the facility and that would maximize -- I guess that provides the maximum dose to an individual, but for a hot plume scenario where it rises and spreads further, you can't really speculate whether you're still hitting some kind of dose concerns for the public at a greater distance. You'd have to run the model to see what the dispersion would be and then determine whether it meets these criteria levels, these action levels they could trigger.

DR. THOMPSON: Mr. Chair, if I could, could we propose that an undertaking where we would work to -- with Environment Canada and the Proponent if needed to do a comparison of a hot and a cold release so that the information can be provided and people actually have the information for that comparison?

CHAIRPERSON GRAHAM: I think that's an excellent suggestion, Dr. Thompson.

So we will give that as an undertaking, and I'm not sure who will be the lead responsibility, but I think I'll vest it in Environment Canada. And if you see different as we go along, if CNSC has to report, then fine.

DR. THOMPSON: Could I suggest that perhaps we confer and then we could ---

CHAIRPERSON GRAHAM: Yes.

DR. THOMPSON: --- confirm to the panel who would be taking the lead?

CHAIRPERSON GRAHAM: That's good. Timeframe -- this is going to take some time. What do you want? Say report in one week's time, a week from today, as to the status of that?

DR. THOMPSON: Could I propose that tomorrow morning we inform the panel ---

CHAIRPERSON GRAHAM: Okay.

DR. THOMPSON: --- of who would take the lead and then have some sense of the time?

CHAIRPERSON GRAHAM: Lead and timeframe, report tomorrow morning. Thank you very much, that's excellent.

And that will be Undertaking Number 16.

MR. LEONARDELLI: If I may, there's one other consideration in this which I did not mention in my discussion.

We don't know how these two scenarios that -- the iodine-release scenario and the caesium-release scenario -- how they would

compare to, for example, the Fukushima incident that everybody is mentioning at the hearings.

We don't have the expertise to tell you whether those types of -- whether these amounts being released are representative of that type of a scenario, so we'd have to look to get additional information on that.

MEMBER PEREIRA: From where?

MR. LEONARDELLI: I guess the CNSC has the most information updates that's coming in from the IAEA and so ---

MEMBER PEREIRA: Okay.

MR. LEONARDELLI: --- I would think they would be able to address that.

MEMBER PEREIRA: I think you can confer and come back with a position tomorrow morning as recommended by Dr. Thompson.

CHAIRPERSON GRAHAM: Yes, that's what I'd suggested.

Environment Canada -- no, Mr. Pereira, do you have any other questions?

MEMBER PEREIRA: Not now.

CHAIRPERSON GRAHAM: Madame Beaudet?

MEMBER BEAUDET: Thank you, Mr.

Chair. I'd like to look a bit more closely with species at risk and migratory birds.

Your conclusion is that everything will be okay for breeding pairs of Eastern Meadowlark and Bobolink because you believe that there'll be restoration of about 40 to 50 hectares of cultural meadow habitat and cultural thicket ecosystems on the site following construction, and I was wondering if our staff could put on the screen from the terrestrial effects TSD Figure 4 -- sorry 3.4.1?

If we accept the two-metre contour line, we've lost some restorable areas there already. And if also we look at possible effects from Coot's Pond activities that could indirectly affect for instance snapping turtles because of sedimentation and high levels of suspended solids like OPG has mentioned in IR-189.

What first do you feel -- are you confident now that these species at risk will be taken care of?

And then for the snapping turtles, what would be the best management practices proposed?

You mentioned this as a solution,

but I think we're getting site constraints here and one of our responsibilities is to make sure that there's coherence from all the different proposals and that we can still build nuclear power if, you know, there's no space left.

I mean, there could be, as the weeks will go by, we have other issues to look at, onsite waste storage buildings et cetera, and I'm trying to figure out to what extent that we would be able to restore habitats lost onsite.

MR. LEONARDELLI: Sandro Leonardelli, for the record.

The issue of ---

MEMBER BEAUDET: Can I interrupt you? It's not table, it's Figure -- sorry, 3.4.1.

Thank you.

MR. LEONARDELLI: The issue of the footprint and not having a detailed layout for the facility poses a challenge in terms of understanding what space is available after you start making all these other trade-offs.

In terms of the specific species you spoke about, I'll ask the Canadian Wildlife Service staff to speak to it. Mike Cadman, I believe, can speak for the bird species and perhaps

Madeline can speak for the snapping turtles.

MR. CADMAN: Yes, Mike Cadman, for the record.

I guess the simplest way of putting it is that the Eastern Meadowlark, there were eight pairs of birds on the site and Eastern Meadowlarks require about three hectares for breeding territory. So as long as 24 hectares of cultural meadow are on the site then that should be sufficient to accommodate the previous population of the Meadowlark.

Perhaps Sandro will talk more about the possibility of there actually being that much. My understanding to this point is that there's -- as you'd seen 40 to 50 hectares are intended to be rehabilitated.

MEMBER BEAUDET: So 24 -- but you say for the ---

MR. CADMAN: It would be 24, yes.

MEMBER BEAUDET: --- 24 hectares?

MR. CADMAN: Yes.

MEMBER BEAUDET: Do you have also in your conservation management practices regulations that restorations should be first onsite or compensation first onsite and do you

allow -- so I mean if it can't be onsite, what happens then? We have species at risk here so what's the next management practice? If you don't have in the end 24 hectares, what do we do?

MR. CADMAN: But we haven't really discussed this kind of thing -- Mike Cadman, again, for the record -- although in the discussions we have, related say to the Bank Swallow, the idea is if we're unsuccessful in restoring the population of the birds on the site then OPG has agreed to go elsewhere and help create additional habitat for the species to make up for the loss should that prove necessary.

MEMBER BEAUDET: And that's acceptable to Environment Canada?

MR. CADMAN: Yes, should the other means prove insufficient.

MEMBER BEAUDET: Okay, thank you.

MR. LEONARDELLI: Sandro Leonardelli, for the record.

I would add that our assessment has been based on what has been indicated as being available habitat.

So if you're asking a question, "Well, if we go from 40 hectares to 25 hectares is

that enough?", that has not been evaluated by us. We've been evaluating the scenario that's been put forward.

MEMBER BEAUDET: Oh, I understand that, but we have all the submissions here and we have to make sense of all of that.

I mean, we can tell OPG, "You have all the recommendations and you agree" and then when you look at it, it's not realistic and we have to use a bit of common sense here and try to have Plan B, you know, if Plan A doesn't work. That's what public hearings are for.

MR. LEONARDELLI: Yes, thank you.

Again, the primary driver is going to be the facility layout -- the detailed layout for that.

But now I'll ask Madeline Austen to speak about the snapping turtle question.

MS. AUSTEN: Madeline Austen, for the record.

For snapping turtles, the species that has just recently been added to the schedule 1 or the official list of wildlife species at risk in Canada. It was added to the list in February of 2011.

And for that species, our recommendation, as we've outlined on page 57, is that we'd like to have the pond that's being used by these breeding turtles, including the snapping turtle, acknowledged as an important ecological function for this species and other turtle species.

With regard to the biology of the species, it might help you understand, you know, can it tolerate sedimentation?

This species, it was -- the key threats to this species are mainly persecution. A lot of turtles aren't well regarded, so they can be killed purposely, they can be killed through road kills, and also through environmental problems.

But this species can handle a lot of contamination in ponds, and it's often found in ponds with contamination. Where you might see an effect is it can affect its reproductive output.

So those things, like it could handle some sedimentation -- in fact, it's often found in slow -- either ponds that are -- don't have a lot of fast water flow, and have muddy bottoms. So that -- for snapping turtle, it's relatively tolerant compared to other species of at-risk turtles like spotted turtles and Blanding's

turtles to sedimentation.

So the main reasons that it's -- oh, and the other thing to mention is that this is a very widespread species. It's occurrence on Darlington is one of many, many sites in Ontario, unlike some other species at risk that are only found in localized areas.

So we do feel that it can tolerate some of the sedimentation and that's why our recommendation is as we've presented in the submission.

MEMBER BEAUDET: That's very useful. Thank you.

MR. LEONARDELLI: Sandro Leonardelli, for the record.

I might also add, because I'm a little more familiar with some of the proposed layouts than Madeline would have been.

I believe on one set of drawings, there was a proposed storm water management pond at what they're calling the northeast landfill where they would stockpile the -- it would be the new area where they would be stockpiling soil.

There may be an opportunity there to create something similar to Coot's Pond which

was created by OPG and that could possibly provide another area of habitat for the turtle.

MEMBER BEAUDET: We did discuss that with OPG yesterday. And they took a commitment to create ponds on the northeast landfill because now, with the two-metre contour, what was proposed here in the technical support document will disappear. I mean, there's no land to make the ponds where they were proposed first.

I'll change the subject now. And I'd like to ask you one question about the environmental emergency regulation.

Health Canada is the lead among the federal departments and you mention on page 76 that you do have a role in dealing with the disruptive impacts of emergency.

What exactly is your role? Is it after -- is it with the debriefing after an event, or?

I'd like to have some clarification about Environment Canada's role, when there is emergency -- environmental emergencies.

MR. LEONARDELLI: Sandro Leonardelli, for the record.

There's two parts to this answer.

What you're referring to is under our mandate under CEPA, the *Canadian Environmental Protection Act*.

Unfortunately, the person that would be most able to provide a meaningful reply to you is not here today. We can make it an undertaking to get a fact sheet put together on that, if you so wish.

MEMBER BEAUDET: Or could he be there when we discuss with Emergency Ontario? I think it's Friday.

MR. LEONARDELLI: Yes, we can try to have him available for that.

MEMBER BEAUDET: We can check the schedule and ---

MR. LEONARDELLI: Yes. Okay. Thank you.

The other aspect of that is for nuclear accidents. Our role in a nuclear accident would be to provide Health Canada with advice on atmospheric dispersion that would be happening at the time of the incident.

So Environment Canada is capable of providing atmospheric dispersion modeling for those types of situations.

MEMBER BEAUDET: Thank you.

My last question is about dewatering. And I know Environment Canada has studied to a great deal the discharge coming from the nuclear site. But sometimes, when you look at briefs of other people, it triggers points that, you know, you never thought about.

And I think the discharge is in the order of 1.9 million litres per day or something like that from the once-through.

But then when you look at the document, the technical support document, the "Geological and Hydro: Geology Environment Assessment of Environmental Effects," on page 49, Table 421, the discharge to Lake Ontario from the dewatering operation is 46.2 litres per second.

I think it slipped the mind of all of us here, but what effect would that have on the lake? I mean, per second, how much is it per day? It's a fair amount of water and that's going to go on for several years.

MR. LEONARDELLI: Sandro Leonardelli, for the record.

I require a little more clarification, if you could, because the dewatering is occurring where?

MEMBER BEAUDET: It's the scenario 2, the dewatering. I'll give you the details here.

MR. LEONARDELLI: Unfortunately, I don't have the document in front of me.

MEMBER BEAUDET: No, I understand that, but maybe you can come back.

We'll take the summary of the document. It explains it in a succinct manner.

> "Total flow from the groundwater system into the toe drains and the forebay channel for option 1 will be of the order of 11 to 12 litres per second or 900 to 1,000 cubic metres per day at steady state. The effect of dewatering will reduce baseflow in Darlington Creek…"

Et cetera.

So on page 49, they give a summary of the model. Because it -- some of the water from the dewatering process, when preparing the site and a little bit also when they're constructing, will be discharged to Darlington Creek, Tulley (phon.)

Creek, Forebay (phon.) channel area, et cetera, into to Lake Ontario.

And I'd like for you to look at the quantities and if you feel that this amount of water coming to Lake Ontario has an impact?

MR. LEONARDELLI: The issue of groundwater in terms of quantity is something that Natural Resources Canada would have looked at in greater detail.

The only time we look at the groundwater issue is within the context of it having contamination in it that goes into a water body and therefore potentially it's affecting the surface waters. That's one aspect.

Another aspect would be if you were dewatering an area of sensitive habitat, for example, like a wetland.

So, if your question is with regards to contamination or is it in regards to potential effects on surface water levels? Because the discharge of the water itself as a quantity, an uncontaminated quantity into the lake, wouldn't necessarily be a concern for the lake or for the creek.

MEMBER BEAUDET: Well, it depends

on -- And that I will ask OPG. It depends on the quality of the water being discharged.

MR. LEONARDELLI: Yes.

MEMBER BEAUDET: In the IS side, it is said that the groundwater there is not potable. It's an industrial site, so not just in terms of possible pollution, but also in terms of quantity.

I know the Ministry of Environment of Ontario has to issue a permit on the quantity that is taken for the watering purpose, but I'm trying to find out who -- who is responsible for this discharge.

I thought you were because you have -- I mean, it could be under the *Fisheries Act* to some extent.

MR. LEONARDELLI: Yes. If it's a discharge to the lake, it would have to meet the requirements of the *Fisheries Act* in terms of its ---

MEMBER BEAUDET: Of its quality of discharge.

MR. LEONARDELLI: You know, whether it's deleterious, yes.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: It is a discharge to the lake, I believe --

MEMEBR BEAUDET: Yes.

CHAIRPERSON GRAHAM: -- if I read right, so who's going to answer this?

MEMBER BEAUDET: Because NRCan has looked at the watering aspect with respect to possible excessive -- the watering that would affect the water table, and then it would affect people with wells, let's say.

But it hasn't looked with respect to the discharge to the lake.

MR. LEONARDELLI: Okay. So then I -- I understand that you're -- the concern is primarily with the contamination in the ground water and what effect it may have on the lake or on Darlington Creek, so --

MEMBER BEAUDET: Especially the lake. And what -- my understanding was that when you look at the discharge, it's not just in terms of contaminants, but it's -- wouldn't it be in terms of quantity? Because you say the -- what -- how do you define the dilution that is not allowed, only if it's -- contaminates in terms of contaminants and temperature. You cannot consider

the dilution would take care of the problem. That's your definition.

MR. LEONARDELLI: Yes. So, for example, if you withdrew ground water and you were to discharge it, as long as you didn't dilute it with any other source of water, that's what we're looking at. We're looking at the raw ground water that would be coming out that would be undiluted.

If they mixed it with some other stream of water from onsite, you could potentially consider that a dilution.

MEMBER BEAUDET: I'd like to ask OPG if they have any comments on that page.

MR. SWEETNAM: Albert Sweetnam for the record.

I'll ask Dave Belanger to address this concern.

MR. BELANGER: Dave Belanger for the record. I'm the technical lead for geology and hydrogeology, and I'm part of the consulting team.

If I understand your question correctly, you're talking about the water that would be collected by de-watering systems as part of the excavation.

This ground water would have

flowed and discharged into Lake Ontario. So the water is being collected and discharging into Lake Ontario. So there's no net change in the loss of water to Lake Ontario.

MEMBER BEAUDET: Over the years -- but, I mean, you have suddenly an import of 48.5 litres per second. I mean, I don't think that the normal discharge from the lake through the groundwater discharge is that sudden.

MR. D. BELANGER: Dave Belanger for the record through you, Mr. Chairman.

The amount of water was the same because it discharges at the bluff from Lake Ontario. So you've got a very large seepage phase that occurs now. You're just collecting that same amount of ground water and discharging it to the lake. There is no change.

MEMBER BEAUDET: And what's the -- what -- what are the quantities that have been discharged through seepage?

MR. D. BELANGER: It's that -- approximately that same volume.

MEMBER BEAUDET: 46 litres or 48 litres per second?

MR. D. BELANGER: That's correct.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: Okay. Thank you, Mr. Pereira.

Any other questions?

I had several with regard to the bank swallows, which have been covered, and I'm not going to get into it any further.

But, Mr. Pereira, I just have one question.

Once-through cooling concern and will be concern and heard already concern with regard to fish mortality, larvae mortality, and so on, what is the best distance from shore that the -- that discharge should be made? Have you come to a conclusion on that, whether -- how far offshore, if once-through cooling is adopted, should the -- should the discharges and diffusers be made -- be located?

MR. LEONARDELLI: Sandro Leonardelli for the record.

We were waiting on the results of the round whitefish action plan to indicate where that habitat may be. You know, it's my understanding that the round whitefish habitat could be out to 12 metres. I'm not a fish

biologist. I think we're going from discussions that were between ourselves, CNSC, and DFO on the topic.

So if they wish to comment on that, they probably have a better perspective on it in terms of where that habitat might be.

CHAIRPERSON GRAHAM: So what you're saying, though, I mean, not to -- not to get technical, but what you're saying is that the diffusers should be beyond that whitefish habitat; is that what you're saying?

MR. LEONARDELLI: That it shouldn't be on the whitefish habitat?

CHAIRPERSON GRAHAM: It should --

MR. LEONARDELLI: Be beyond --

CHAIRPERSON GRAHAM: The diffusers should be beyond --

MR. LEONARDELLI: Correct.

CHAIRPERSON GRAHAM: -- that so when the --

MR. LEONARDELLI: Yes.

CHAIRPERSON GRAHAM: -- study comes and shows the location, the diffusers should be beyond that; is that what you're saying?

MR. LEONARDELLI: Right, because

within what OPG defines as the initial mixing zone, we've identified in our submission that we feel that it would be likely to be a deleterious effect to the round whitefish, assuming the habitat was there.

You'd have to do thermal plume modelling then to see -- the behaviour of the plume to see if -- if some of it is coming back on shore at a temperature that's hot enough to cause a thermal effect.

So it's one thing to put it beyond, but then you also have to see once -- once the discharge goes out, is it coming back onto these areas?

You also have to consider climate change considerations.

Excuse me for a moment, I -- let me consider a note here, some technical information.

CHAIRPERSON GRAHAM: Certainly. Just take your time.

MEMBER BEAUDET: Could we in the interim, if you would allow, Mr. Chair --

CHAIRPERSON GRAHAM: Ms. Thompson, yes -- or, Dr. Thompson, you want to comment.

DR. THOMPSON: If you would allow, Mr. Don Wismer has been involved technically in the discussions with Environment Canada and DFO on where the diffusers should be located. And perhaps he could provide some details while Environment Canada is conferring.

MR. WISMER: Don --

CHAIRPERSON GRAHAM: Please proceed, yeah.

MR. WISMER: Don Wismer. My concern was you're starting to get different answers. You heard 12 metres; you heard 20 metres earlier. And you might think, well, what's the right number?

The reason I said 20 metres is -- climate change is one reason. What we have now is not what we're going to have in 20 years.

So the water levels are -- in the worst case are predicted to go down a metre, maybe a metre and a half. And the water temperatures are going to go up.

And for cold water species, that would make them want to go deeper, so that's one reason why I said 20 metres. It's more than the 12 they need now, but I'm looking ahead to the future.

And the other one is, on average, that would put the diffuser beyond the thermocline, which is the dividing line between the productive inshore area where all the spawning is and the offshore, which is less fish density.

CHAIRPERSON GRAHAM: Thank you. I had -- I had followed what you had said, and that's what I was coming to. So maybe you -- you have a reaction or a further comment taking into account climate change, lake level dropping, so on, so forth -- have you got -- maybe you --

MR. LEONARDELLI: Yes.

CHAIRPERSON GRAHAM: Now that you've had a chance to review your note, you --

MR. LEONARDELLI: Sandro Leonardelli for the record.

I -- as I was finishing out my answer, I mentioned the climate change considerations.

I think Don has articulated it quite well.

It's one of the reasons that we've asked for the high-resolution thermal plume modelling to be done to -- to take into account a climate change scenario. It's an important

consideration in identifying where the appropriate location of the diffuser would be.

I didn't have a ready answer because I don't have the model in front of me to be able to look at and evaluate.

My colleague Ramir Abandi from science and technology branch has indicated that if we're -- if we're talking about a 20-metre depth, the lake has stronger currents out there.

I'm sorry?

CHAIRPERSON GRAHAM: I think you said 20 foot -- 20 metres?

MR. LEONARDELLI: 20 metres, sorry. That -- the 20-metre depths that we're talking about, there would be stronger currents in the lake at that depth, and, therefore, you'd have better dilution as well. So your thermal plume would dissipate more quickly with that.

CHAIRPERSON GRAHAM: Very good.

Now we're running way behind schedule, as usual, and I'm gaining a reputation very quickly here.

Are there any questions to Environment Canada from CNSC?

Then I go to OPG. Then we are

going to probably -- I guess there's -- allow probably five minutes for intervenors to ask questions. And then in respect to being the first provincial department here, I'm going to go then to Ontario Environment Department.

But does CNSC have any questions?

DR. THOMPSON: No, Mr. Chair, we don't.

CHAIRPERSON GRAHAM: Thank you.

OPG?

--- QUESTIONS BY THE INTERVERNORS:

MR. SWEETNAM: Albert Sweetnam for the record.

We have a couple of questions we would like to ask, unfortunately. I'll try to be as quick as possible.

There was some indication about the different depths in terms of the discharged model 1520. I would like to ask Environmental Canada if there are any studies at a 20-metre depth that actually show that the round whitefish fish eggs or larvae are in this area and wouldn't it be better to wait for the studies to be done before actually determining what the depths are?

The reason we ask that is that in

order to attain that additional depth you'd actually have to go approximately 800 metres more into the lake at a significant expense.

CHAIRPERSON GRAHAM: But I think we have to have the answers regardless of the expense, and we realize and appreciate that, but I think we have to go with some scientific findings.

So maybe EC may be able to respond to Mr. Sweetnam's question.

MR. LEANARDELLI: Sandro Leanardelli, for the record.

I guess I want to make it clear that there have been multi-agency discussions around the round whitefish issue, also including the Ontario Ministry of Natural Resources, and we are, in many cases, relying on their advice in terms of fish habitat, fish biology, et cetera.

So I can't give you the answer in regards to fish habitat at those depths.

CHAIRPERSON GRAHAM: Mr. Sweetnam?

MS. SWAMI: Laurie Swami.

I just have a question about the thermal discharge. There's been a lot of discussion about once-through cooling water as providing a thermal discharge. And I wonder if you

can comment on the thermal discharge associated with the cooling tower -- through the Chair.

MR. LEANARDELLI: Sandro Leanardelli, for the record.

The thermal discharge for the cooling towers it would be a much smaller volume. I don't recall the bounding scenario that they provided for temperature and I'm not certain as to what mitigation they had proposed to reduce those temperatures before discharge, but it would be a smaller volume.

I do recall that the way they had modelled it that it was a pipe discharge not through a diffuser. So it's a different type of discharge. If it was modelled with a diffuser you would have a lower impact showing from that discharge. But, in any case, this is a much smaller volume of water that's being discharged.

CHAIRPERSON GRAHAM: Could you be in a percentage -- by much smaller -- 10 percent, 50 percent, or do you have any estimation?

MS. LEANARDELLI: I'd have to ask OPG for that but I believe the quantity is related only to what comes from the blow-down circuit.

Is that correct?

CHAIRPERSON GRAHAM: OPG, could you respond, since I think maybe you knew the answer to your question before you asked it?

MS. SWAMI: Laurie Swami, for the record.

My comment was not necessarily with respect to the volume or the temperature but there was a lot of discussion with respect to regulations required for discharges.

I was looking more from a comment on what would the regulatory regime be surrounding a thermal discharge from a cooling tower in comparison to once-through cooling.

CHAIRPERSON GRAHAM: I think that clarifies the question a little better. Can you respond to that?

MS. LEANARDELLI: First of all, the discussions that I was privy to dealt with the once-through cooling discharge so I don't recall a discussion that I had in regards to discharges for cooling tower options.

But, in any case, the same type of requirements would apply; it's Section 36(3) under the *Fisheries Act*. So whatever regulatory consideration would be given to these thermal

discharges it would be the same type of analysis, be it for a cooling tower or for a once-through, the only difference being the size of the release and the size of the thermal plume that's extended.

CHAIRPERSON GRAHAM: Do you have any other questions, OPG?

With that, any government departments have questions to Environment Canada?

If not, as I indicated a few minutes ago, we are going to go to Ontario Environment Department right after this, in respect of them being the first department that's on deck.

Is that correct, co-manager?

We have three intervenors that want to ask questions, and with those three questions I'll allow one question each and we'll set aside 10 minutes for the three people.

The first is Lake Ontario Waterkeepers.

MS. BULL: Mr. Chair, it's Joanna Bull for Lake Ontario Waterkeeper.

We actually have two questions that need to be asked to Environment Canada, if that's possible at this time.

CHAIRPERSON GRAHAM: The rules say

that as time permits we're going to try and get through at least this morning's schedule before we adjourn for the day. And I said there'd be one question each at this time.

MS. BULL: Should we plan to submit those questions in writing to the panel?

CHAIRPERSON GRAHAM: Yes, you can.

MS. BULL: Thank you.

So my question for Environment Canada is that we heard earlier about the potential issuance of a regulation authorizing thermal discharge under section 36(3) of the *Fisheries Act* for Darlington or for the entire industry.

Can I ask Environment Canada to clarify, is a *Fisheries Act* exemption for the entire nuclear industry and development or is this hypothetical?

MR. DOBOS: I'll ask Nardia Ali to speak to that.

MS. ALI: Nardia Ali, for the record.

I just wanted to make a correction. Like, we did not say "a regulation". We said that Environment Canada would be looking at options for giving -- agree to regulatory certainty

for thermal discharges.

At this point we don't or we haven't explored it enough to say whether there's going to be a regulation for one sector or multiple sectors that discharge thermal effluent.

MS. BULL: Okay, thank you.

CHAIRPERSON GRAHAM: Since that didn't take too long I'll let you do your second question.

MS. BULL: Thank you.

CHAIRPERSON GRAHAM: And in the course of fairness we're going to try and get as much done as possible, and I don't like to rush anyone but please be -- keep it to the next question.

MS. BULL: Thank you. I appreciate that.

So we've heard from Environment Canada that there's a lot of missing information and unresolved questions with respect to the proposal and that these are going to be addressed in future licensing stages.

As a federal authority for this environmental assessment can Environment Canada clarify whether their recommendations to the panel

would be different if this were not a joint review and there was no associated licensing process, if this were just an environmental assessment?

Mr. DoBos?

MR. DOBOS: Rob DoBos, for the record.

If I understand the question correctly, no, I don't think our recommendations would be any different. Our review was based on a science based approach in terms of what we felt was -- what information was necessary to address environmental impacts for the project.

MS. BULL: So the information that you're counting on for future licensing stages wouldn't have figured into an environmental assessment?

MR. DOBOS: I'm not sure I understand that question. Can you rephrase that, please?

MS. BULL: You noted a number of different unresolved questions, and you've stated that they're going to be addressed in licensing stages in the future.

I'm wondering if those are relevant to the environmental assessment, as an

environmental assessment is its own legal process.

So I'm not sure that we can count on future licensing stages to fill in gaps and in the EA.

CHAIRPERSON GRAHAM: I think I'll try and tackle that.

We will, as a panel, regardless whether it's in various stages before we write our report, we will ensure that we have gathered all the information that we need. And we'll work very closely with the various departments that have made commitments to have other studies and other aspects of the whole environmental assessment to be thorough, and I think that your question will be answered as we go forward.

MS. BULL: Okay.

CHAIRPERSON GRAHAM: And I apologize to you. I mispronounced your name twice, and I apologize, Mr. Dobos.

Mr. Kalevar, a question?

MR. KALEVAR: Chai Kalevar, for the record.

I heard from, I think, CNSC table that they're going to do some study about hot and cold plumes.

I did not hear what temperature range they have in mind. I think hot and cold is not just hot and cold. I think it would be nice to know what temperature ranges we are looking at and that perhaps from that temperature range should we determine, in my opinion, from the experience that is under the belt in many other jurisdictions. So that's ---

CHAIRPERSON GRAHAM: Thank you.

I think the question is, is what temperature range would you say the temperature of the lake water has to be when it is mixed and not cause adverse effects.

Is that what you're asking?

MR. KALEVAR: The plume.

CHAIRPERSON GRAHAM: Of the plume, of the plume at -- of that plume.

Do you have a temperature that might satisfactorily answer Mr. Kalevar's question?

DR. THOMPSON: I understood the gentlemen's question to be in relation to Undertaking 16. If that's not the case, then I have not understood the question.

CHAIRPERSON GRAHAM: I'm sorry, I missed that.

Are you referring to EC-6?

MR. KALEVAR: I am referring to -- they took an undertaking, as I understood, to do a study on hot and cold plume and that study will involve what temperature range.

I think we should have a clearer understanding of the undertaking.

CHAIRPERSON GRAHAM: I'm sorry. Undertaking 16 -- I'm sorry. I thought you said EC-6.

Undertaking 16, my understanding is that CNSC will get together.

And you're going to give us answer tomorrow morning, I believe, when you can have that study and how long it will take and you're going to confer with Environment Canada, I understand.

The question is -- is temperature -- I don't think that's arrived at yet, is it, or can you address that?

DR. THOMPSON: Perhaps I could respond in a general manner.

What the CNSC will do is work with Environment Canada and others as needed and we'll provide -- we will be the lead in the timeframe -- and the modelling would consider a hot plume

representative of nuclear accidents. And so we can provide those details, but I don’t have them right now.

MR. KALEVAR: A procedural matter, if you don't mind?

It would be nice at the end of day or beginning of the day or lunch or whatever to get a list of undertakings because it’s difficult for people like me to know what has gone on.

CHAIRPERSON GRAHAM: We’re working on that. This is -- we’ve discussed this, this morning and again at lunchtime, and we’re working on getting a list of undertakings, the ones that have been completed, the ones that are outstanding and the dates that they’re going to be provided. We will be having a list, as your suggestion.

MR. KALEVAR: If you could provide it on a daily basis that would help.

CHAIRPERSON GRAHAM: Yes, it will be.

MR. KALEVAR: Thank you.

CHAIRPERSON GRAHAM: As quickly as we can.

One more question. Ms. Lloyd?

MS. LLOYD: Thank you, Mr. Graham.

Brennain Lloyd from Northwatch.

I think a very brief question. I'd like a clarification from Environment Canada around a discrepancy in their evidence.

In their written submission of January 31st on page 67, their Recommendation 5.1, they talked about a "best available technology, economically achievable" approach.

In their slides today, and I think it was Slide 20, they talked about a BAT approach, a best available technology approach.

And those are quite different and I wonder if Environment Canada could be asked to clarify, as the regulator, are they going to apply a BAT approach or a BATEA approach? Thank you.

CHAIRPERSON GRAHAM: Thank you.

MR. LEANARDELLI: Sandro Leanardelli, for the record.

If I said best available technology, I misspoke. What I meant was what's specifically in our recommendation in writing.

So our position hasn't changed, it's as it's written in the submission.

MS. LLOYD: Then if we could, Mr. Graham, hear more from Environment Canada?

A BATEA approach is a quite subjective approach. In other regulatory applications there has been extensive discussion, multi-stakeholder involvement and so on.

How is Environment Canada going to apply a BATEA approach with respect to -- the instance under question is air emissions, but I'd be interested how they would apply a BATEA for both water discharge and discharge to air?

And there was some discussion earlier this afternoon about developing a site-specific regulation. I believe that was for discharge to water. If we could have more detail from Environment Canada on how that BATEA approach would be applied?

Thank you.

CHAIRPERSON GRAHAM: Do you care to comment any further?

MR. LEANARDELLI: Sandro Leanardelli, for the record. I just want to make sure I captured the question correctly.

I think what you're asking for is you want to understand how Environment Canada as a regulator would apply BATEA, Best Available Technology Economically Achievable, to air

emissions and water emissions.

And then you asked about the site-specific reg, and I'm not very clear on what the context of the question was there?

MS. LLOYD: Well, a BATEA approach -- implicit in taking a BATEA approach is a judgement call on what is that definition of "economically achievable". I'm most familiar with it in the context of metal mining effluent regulations and there was extensive discussion around that for a number of years on what BATEA approach meant in reviewing that particular regulation.

So I would like to know how Environment Canada is going to make that judgment call. I trust they are not going to leave it to the Proponent to make that judgement call unilaterally, so how are they going to exercise their regulatory responsibilities if they are taking a BATEA approach?

CHAIRPERSON GRAHAM: Okay, okay. We'll try it once more ---

MS. LLOYD: Thank you.

CHAIRPERSON GRAHAM: --- and that will be it. Thank you.

MR. LEANARDELLI: Sandro Leanardelli, for the record. I guess there's a couple of points to make.

In terms of the application of best available technology economically achievable, whatever that technology would be they still have to meet the requirements of the *Fisheries Act*. So we always rest upon that as the final determination of its suitability.

In terms of Environment Canada as a regulator per se for this project, the primary regulatory responsibility for this project rests with the CNSC. So they would be issuing the licence conditions on air and water emissions.

CHAIRPERSON GRAHAM: Thank you very much.

And now we'd like to proceed to the Ontario Ministry of the Environment, this being the first provincial department to appear. We want to welcome them, and I want to thank Environment Canada for their participation today and their commitment to work with CNSC staff on various issues to try and get further resolve.

Thank you very much, Mr. Dobos.

MR. DOBOS: Thank you, Mr. Chair.

CHAIRPERSON GRAHAM: While we're having a changing of the guard, I just want to say that we're going to try and get as much done today.

I think what we will try and do after Environment Canada's -- Environment Ontario's presentation, questions and follow-through as we've been following the procedures, we will probably get the ten-minute presentation from OPG for the record and not go into questions. We'll just get the ten-minute presentation that you have, and we'll carry on tomorrow. Also, I apologize for not getting the –- not understanding the question that Mr. Kalevar put –- Kalevar put, and I think we've got it resolved now, so thank you very much. Ian Parrot, manager, is here, I believe, to introduce his team and to give their presentation. Welcome and thank you for waiting. This was, I guess the first thing –- mid-morning this morning and you're here now at 5:00, so –-

--- PRESENTATION BY MR. PARROT:

MR. PARROT: That's right. Well, first of all, Mr. Chair, thank you very much for having us here today on behalf of the Ministry of Environment of Ontario. We're very happy to be here to explain our regulatory process to you and

all the other interested parties.

So my name is Ian Parrot, and I'm the manager responsible for the administration of the Certificate of Approval –- Approvals Program within the ministry. I work at our Environmental Assessment and Approvals Branch in Toronto, and I have oversight of the approvals program for waste water, waste, and air and noise approvals across the province.

So before I get into the presentation, I'll just briefly introduce my colleagues who have joined me today who may help me answer some of your questions. So to my far left is –-

MR. PANKO: Hi, Mr. Chairman. My name is Dan Panko. I'm the Air, Pesticides, and Environmental Planning Supervisor for Central Region and assisted in our coordination of our response to the panel.

MS. BAKER: My name is Kathryn Baker. I'm the Water Resources Unit Supervisor in Central Region, and I oversee the permit to take water program.

MR. FUMERTON: And I'm Dave Fumerton. I'm the District Manager of the York

Durham district office.

CHAIRPERSON GRAHAM: Thank you.

MR. PARROT: So it –- for the record, it’s Ian Parrot. So we’re here today to explain our approvals program and it’s –- we’ve got a short presentation that will really do two things. One –- the first part is to explain at a fairly high level how our process works, what we require our approvals for, what applicants have to go through to obtain an approval from us, and what we go through when reviewing an application.

Then the second part is to speak a little more in detail about this project and how –- and what approvals we think are required for it to proceed.

So Certificates of Approval are –- it’s our language for approvals, and they are required by our legislation. There’s a couple of pieces of legislation which I will get to in a moment, but they are required for activities that have the potential to release emissions to the atmosphere or do release emissions to the atmosphere.

And by legislation and –- both functionally within the Ministry of Environment,

they're divided into media, and the media are outlined on page 3 of the presentation. So air and noise, waste water, waste, drinking water, and renewable energy, which is covered under the *Green Energy Act*. In total, we issue about between 6,000 and 6,500 approvals annually across the province for all these media combined.

So, as I said, these are approvals documents, they're authorizing instruments that are issued to facilities that allow them to undertake a certain activity or build or operate an activity. The set environmental controls for each site-specific activity, and they're designed to protect human health and the natural environment from whatever emissions are or could be occurring.

They are issued on a site-specific basis, and they're intended to be regulatory instruments that we use for the purposes of compliance, and they're very specific as to how the facility is to be operated, in particular with relation to what emissions are allowable.

The approvals decisions are as a delegated authority within our organization. These are not ministerial approvals. They're issued within our branch and by a signing director who has

approval for each specific medium.

So slide 5 is just for reference purposes. These are the specific acts and specific sections of our legislation that authorize each type of media approval. The last one on the list is the Environmental Bill of Rights, and I'll talk a little bit more about that. That covers all of the approvals that we issue.

So the starting point for obtaining an approval is that the applicant who is undertaking the activity has to demonstrate to the ministry that they are in compliance with whatever acts or regulations or guidelines are in place for that particular facility. We have a wide variety of regulations and policies and guidelines like most regulatory agencies, and it's up to the applicant to show us in the application that they are able to meet those standards.

If we do approve it, we have the ability to impose standards in those conditions, and those standards –- those conditions are often used to take guidelines or standards and make them regulatory compliance limits in the permit. So we often use Certificates of Approval to put into place regulatory standards for a facility that

exists somewhere in a guideline.

Once issued, they are treated as an instrument that we use as a basis for compliance, and they are one of the primary focuses of our inspection and compliance program.

So the next slide is simply a flowchart that sets out the various steps that we go through when issuing an approval. I'm not going to go through every box in the flowchart for the interest of time, but there's a couple of things that I would like to draw your attention to in this process. One in stage one is that the onus is on the applicant to identify what approvals that they require and then to go through and prepare a complete application that demonstrates that they meet whatever standards are put in place for that facility.

Stage 4 is really the heart of the review, and that review is coordinated within my branch, the Environmental Assessment and Approvals Branch, and the –- within that review, an engineering review is conducted, but we also rely on a variety of people both within the ministry and outside the ministry to assist us in those reviews. So we rely on people in our district offices, in

our regional offices, to provide us with scientific expertise on reviewing the applications, and we are also often involved in liaising with other agencies that may have an interest in whatever is being proposed.

So typically that might be a municipality or conservation authority or another provincial ministry or, in a project like this, other federal regulatory agencies.

The other aspect of this, and I'll talk more about EBR in a moment, but we are also responsible for considering comments that we get from the public or interested stakeholders or First Nations before we make a decision on a particular proposal.

So just to summarize, a couple of key points about our Certificates of Approval, once they're issued, they are legally enforceable, and we use them as a basis for compliance assessment. They are issued by a signing director within the ministry, within my branch. They reflect whatever environmental requirements are in place at the time, and they are site-specific, so we tailor conditions to match the particular proposal. And as I've said before, the onus is on the applicant

to demonstrate through the C of A review process that they meet those standards.

So I've mentioned Environmental Bill of Rights a couple of times, so this is a specific piece of legislation that sets out public consultation requirements for government –- for provincial government ministries. The Ministry of Environment has a number of instruments that we issue that are subject to the public consultation requirements of EBR.

Basically the way it works is that once we get a proposal, an application, we post the proposal, a description of the application on a website called the Environmental Registry for a minimum of 30 days. That allows people to be notified of the proposal and to provide comments. So it's an avenue to submit comments on the application to the ministry.

We are obligated to consider all of those comments that we receive from the public, and when we make a decision on the application, we're required to post that decision and to explain what comments we got from the public and how we addressed them in the decision.

We do have the ability to require

enhanced public participation, which may be longer posting times or public meetings, that kind of thing.

There are some exemptions from the EBR posting requirements. There are exemptions for projects that go through the provincial environmental assessment process, and there are exemptions for insignificant administrative changes to approvals and also for emergency purposes.

Appeals, if you go back to the flowchart that I had up a few minutes ago, appeals is the last step in our process. Every decision that a director makes on a Certificate of Approval is appealable by the certificate holder.

So they can appeal all of the decision or any part of the decision to an independent tribunal called the Environmental Review Tribunal. They're independent of the Ministry and they have the ability to hear the appeal and to uphold or alter the director's decision, and that's done through means of a public hearing.

The appeal rights are good for 15 days so once we make a decision the C of A holder has 15 days to file an appeal of our decision. If

no appeal is filed then the conditions are final and they're legally enforceable.

For applications that are posted on the registry for public comment, there is an additional ability for third parties to file requests, the ability to appeal the decision. Unlike the Applicant, it's not an automatic right of appeal, they have to seek permission or leave of the Environmental Review Tribunal to file an appeal in the first place.

They also have 15 days from the date that we issue it to submit a request to the ERT to ask for leave and it's up to the ERT as to whether leave is granted or not. If it's not granted the conditions are final. If they do grant it then a hearing would commence after a notice of appeal was filed by the third party.

Finally, as I said, the ERT has the ability to alter or uphold the director's decisions. There are appeal rights arising from decisions that the ERT makes. If it's a legal matter it can go to divisional court so usually it's a point of law like jurisdiction, for example. All other matters, to the Minister.

So that's a fairly high level

overview of our approvals process.

So just to move now into more specifically the Darlington project, so I think we know what the project is. I think our view is that there are approvals that are required from us for this facility. Nuclear power plants operate throughout Ontario and they have attained provincial approvals, usually for air and waste water approvals. So we would say this project needing a couple of different approvals.

So, for an example, the existing Darlington facility has several approvals from us. So we've attached to our presentation and appendix showing a list of the approvals that are currently issued for the existing operation.

So they have an industrial sewage works, an air approval and they also have a permit to take water. I didn't talk about a permit to take water when I was talking about the CMA process but the process for permit take water would be very similar in terms of the Applicant's onus to demonstrate compliance, the posting requirements on ABR and the ability to impose conditions.

So just a little more detail about the approvals that are currently issued for the

Darlington plant: So there's an industrial sewage works approval that deals with the collection, transmission, treatment and disposal of waste water and storm water arising from the operation of the facility.

There are effluent criteria that are applied to the certificate that they are required to meet. These would typically be designed to ensure that no adverse effect occurs upon the receiving body of water, and would often represent chemicals or materials that are used in the process or that may exist on the site.

The air certificate of approval, we issue approvals for a number of operations at the facility that have the potential to issue -- sorry -- emit air emissions, so things like diesel generators.

There is a permit to take water. There's a significant amount of water that is or can be taken from Lake Ontario for the operation of the facility, and a permit to take water is issued for that.

I think, you know, our view is that the new project would require very similar types of approvals for this operation. They would

require industrial sewage works for a variety of sewage sources at the facility. I've listed some that I think are probably likely to occur in this operation. Similarly with air and noise approvals, we would expect these are the things that we would typically see in a nuclear power plant.

Waste approval, I'm not sure about this one. Some facilities do have on site landfill sites for the disposal of non-hazardous waste that may result from either the construction of the facility or for the ongoing operation of it.

So if there is onsite disposal in a landfill site then that would require a waste management certificate of approval from us. If it was sent off site for final disposal to an off site landfill site then a certificate of approval would not be required for that.

I know there's a lot of movement of materials going on at the site. If waste is used to be deposited on land then a certificate of approval for a waste disposal site is required for that.

So permit to take water, so I think I've talked about this for the most part. The trigger limit in our legislation for requiring

permits to take water is 50,000 litres per day. One is certainly required for the taking of cooling water from Lake Ontario. There may be dewatering operations occurring during construction. Those may or may not be greater than 50,000 litres per day. If so then they would require a permit to take water for us.

If there is a significant taking of water more than 19 million litres per day then there's a consultation process that needs to be undertaken with the Ministry of Natural Resources.

So this really concludes our presentation, I think, in terms of our involvement and where we see the next steps are.

We typically would meet with an applicant like OPG to talk about the specific approvals requirements and what they need to do in order to complete the Ministry's approvals process.

So I think there's discussions that should likely occur. You know, it may be premature at this point because I understand some of the details haven't been finalized, but at some point then I would recommend that OPG and their consultants and perhaps some of the federal agencies sit down and talk about what our

requirements are going to be and what the process is going to be to make sure that it's done in a coordinated fashion.

We're certainly interested in working with the Applicant and any other agency to make sure that everyone understands our process and we understand theirs as well.

So that's the end. Thank you.

CHAIRPERSON GRAHAM: Thank you very much.

Mr. Pereira?

--- QUESTIONS BY THE PANEL:

MEMBER PEREIRA: Just one quick point of clarification. I think I heard you say that for off site disposal of, say, soil excavated from the site there's a need for an approval?

MR. PARROT: It would be for off site disposal of waste. So if they were to create waste in the construction or operation and to send it off site it would need to go to an already approved landfill site.

So in the case of soil that is excavated, so that's not waste necessarily, unless it's become -- unless waste was deposited and now you're excavating it -- so there'd be no

certificate of approval requirements to move soil around or to excavate it or to move it around.

There are regulations that we have in place for contaminated sites. So for brown fill redevelopment then they'd come into play for moving soil around.

MEMBER PERIERA: So soil would not be subject to any controls -- approvals, rather, but if there was contamination above a certain level you have criteria documented for that?

MR. PARROT: Yes. So those would be in the regulations I spoke about in terms of where it could go and how it could be used. It's usually matched to the type of land use that's being proposed.

MEMBER PERIERA: Thank you.

CHAIRPERSON GRAHAM: Madam Beaudet?

MEMBER BEAUDET: So excavated soil if it's proven not to be contaminated you probably have level one, two, three, whatever, can be sent anywhere, can be dumped anywhere, there's no control.

We may have here a maximum quantity 12.4 million cubic meters. I mean, that's

a fair amount. There's no regulation for you to control anything of that, if I understand well?

MR. PARROT: I wouldn't say there's no regulation to deal with that. So if they created excess material that they need to send off site, you know, I think there's a couple of questions that we would have; first of all, is there any contamination in that soil and to what extent is there.

So wherever it will go to, will have to go to a site in conformance with our regulations for a brown fill redevelopment; they can't just put it anywhere. There are other requirements that municipalities may have, for example, for soil placement, or other regulatory agencies.

Dave, do you want to add anything?

MR. FURMERTON: Yes, in the case of soil movements ---

CHAIRPERSON GRAHAM: Identify yourself, please.

MR. FUMERTON: I'm Dave Fumerton. Thank you.

In the case of soil movement, municipalities, conservation authorities, in some

cases Ministry of Natural Resources licence or permit those activities. That would be the receiving site. They often use criteria established in our ground fill legislation. So the governing authority is one of those three agencies.

Once again, it’s not waste, per se, so we don’t govern it.

MEMBER BEAUDET: Do you have any landfill site that could receive this soil, for instance, to cover domestic waste?

MR. FUMERTON: Dave Fumerton again.

In the case of the two nuclear facilities in my district, Pickering and Darlington, during construction activities Pickering has two landfills and Darlington had one.

Those three landfills are closed, but certainly there's landfills in Ontario that can take waste -- domestic waste and construction demolition debris as well as transfer to facilities.

MEMBER BEAUDET: What I’m talking about is the soil that they use to cover domestic waste on a regular basis. Do you do that here in Ontario in order to avoid odours and problems with

seagulls?

MR. PARROT: Ian Parrot, for the record.

Yes, so that is a requirement of operating landfill sites to place daily cover on refuse and there are a number of landfill sites that would be able to accept that material as daily cover.

MEMBER BEAUDET: So that could be a solution for the disposal of the extra excavated material?

MR. PARROT: That could be, yes.

MEMBER BEAUDET: Thank you.

From the -- here you mention that there could be a near permit required, but what I understand, it's -- you regulate only for operation and you have nothing to do. There's nothing to be done during the site preparation and construction; am I correct?

MR. PARROT: That would -- for the most part that's correct. There may be activities that they undertake during construction that would need our approval, but by and large I don't think that they would.

MR. PANKO: Dan Panko, for the

record.

There might be mitigation plans that need to be developed in terms of controlling dust that might impact offsite receptors. So those types of plans might be needed.

There are also municipal bylaws that also govern that type of work and undertakings in terms of minimizing any type of offsite interference with receptors -- sensitive receptors.

So there are a few options depending on the scope of what they're going to be doing.

MEMBER BEAUDET: And also noise; is that with you or mainly with municipal regulation or do you have standards that have to be followed by the province?

MR. PARROT: Noise is handled by both the province, by us, the Ministry and also by municipalities.

So the air approvals that I spoke about would also include an assessment of noise and we do have standards for noise. So the ongoing operation of the facility would include acoustic assessments.

MEMBER BEAUDET: Thank you.

MR. PANKO: Sorry, it's Dan Panko, for the record here.

And I think those mitigation plans would be incorporated in that type of air approval in terms of, you know, setting out a guideline of what we would expect to see and that would be reviewed.

MEMBER BEAUDET: A change in subject.

It was brought to our attention that the Ontario Stormwater Management Planning and Design Manual comes under your ministry and it does not incorporate concerns about climate change effects on stormwater management. But I believe there's a document under review and I was wondering if you could give us some updates on that?

MR. PARROT: I'm familiar with the manual, but I'm not familiar with the review or the update of it.

What I can do is undertake to find out ---

MEMBER BEAUDET: Could you please?

MR. PARROT: --- the status of that for you, certainly.

CHAIRPERSON GRAHAM: That will be

Undertaking Number 17 from Ontario Environment Department with regard to studies that may be done with regard to groundwater and climate change.

And timeframe or something, when could you report back? Are you here every day?

MR. PARROT: It's Ian Parrot.

No, I'm not here every day. I think -- I just want to be clear, it's about stormwater management, the stormwater design manual.

CHAIRPERSON GRAHAM: The stormwater management, yes.

MR. PARROT: Okay.

You know -- no, I'm not here every day, but I can report back on the status I would think by the end of next week.

CHAIRPERSON GRAHAM: Thank you. That's fine.

MR. PARROT: I'll try to do it as fast as I can.

CHAIRPERSON GRAHAM: No, that's fine. Thank you.

MEMBER BEAUDET: On your submission PMD 11-P1.12 on page 2, the last paragraph, the last sentence you say:

"The Ministry may approve the effluent criteria adopted for the proposed undertakings in writing prior to the submission of an application."

I would like you to explain what you mean here, please.

MR. PARROT: So that's an important step in the approval process for a sewage works certificate of approval.

What happens in the process is that they and we have to agree what the effluent limits are going to be that the facility has to meet. And then the certificate of approval application that they propose to us needs to document how they're going to meet that effluent limit.

So they need to -- it's a step that they need to do before they can finish the final design that is needed in the certificate of approval application.

MEMBER BEAUDET: Okay, thank you.

My last question concerns dewatering or the permit to take water but

especially with respect to dewatering.

I've done some calculations and I believe they need a permit. I don't know if you agree with me.

MS. BAKER: Kathryn Baker, for the record.

We would likely -- we would encourage them to apply for a permit in the event that they needed to dewater more than 50,000 litres per day.

MEMBER BEAUDET: My calculations from what we were given would be like 1 million litres per day.

So I'd like to hear a bit more about the objective of the permit. Is it because you're worried about the water table in the area or you're worried about the discharge outfall in the lake? I'd like to hear a bit more. What are the objectives of this permit?

MS. BAKER: Kathryn Baker, for the record.

The permit application review process encompasses both of those; protection of the natural -- the taking is -- can be safely done and mitigated and the discharge has limited impact

on the environment to the satisfaction -- it can be mitigated to the satisfaction of the ministry.

For example, when we assess permit applications for construction dewatering, we look at what the zone of influence of the dewatering will be, will that impact local water takers, nearby wetlands and other watercourses.

In developed areas, we also ask the applicant to provide a comment on any subsidence impacts related to the dewatering and then we assess the method of discharge. It would be a large volume of water that would have to be discharged so that it wouldn't cause erosion, damage to habitat, impair water quality. Treatment options such as settling tanks are often employed.

Large volumes of water in navigable watercourses sometimes can require a diffuser, but that's done in conjunction -- DFO provides and NAV Canada provides the advice on that.

MEMBER BEAUDET: I'm trying to find your presentation here but it's okay, because I believe you had a consultation -- a public consultation process above a certain quantity.

Would that apply only to

withdrawal of water from the lake or does it apply also with dewatering?

MS. BAKER: The public consultation process through the ERT is determined on time. If a taking is longer than a year or -- and so it would be put out for -- the standard is 30 days and the signing director can decide that that is not sufficient consultation and can extend the consultation to 45 days, 60 days.

Oh, sorry, the Great Lakes -- an application larger than 19 million litres per day would require the prior notice and consultation process be initiated, through the Great Lakes Charter. And MNR, the Ministry of Natural Resources is the lead agency for that, so we would make the referral to MNR and assist MNR with the application.

MEMBER BEAUDET: I go back to the dewatering. It has been assumed here, or written in the EIS, that -- and also with the IRs that we asked OPG further down the line, there would be no damage to wells even north of the 401.

But, for you, you were mentioning that there would be a public consultation. Would it be automatically, when you give the permit, or

do you have a system for complaints, and what then would trigger an action if people claim?

I suppose they have to prove it, that it's not because of a dry summer but because of OPG. How does it work exactly?

MS. BAKER: Kathryn Baker, for the record.

So the public consultation process during the application is done through the EVR -- sorry -- Environmental Bill of Rights, but the ---

MEMBER BEAUDET: It's done by whom, sorry?

MS. BAKER: The Environmental Registry, sorry, that's what ---

MEMBER BEAUDET: Thank you.

MS. BAKER: --- you were referring to it.

And so the permit -- the nature of the taking is posted for -- and it's publicly available for the public to consult under -- the public to raise concerns.

Under Ontario Regulation 387 conservation authorities and municipalities are automatically notified directly by the province, and the province must consider the comments and

then post to the environmental registry how those comments were considered and incorporated.

Once the permit is in place, and the dewatering is occurring, any complaints about impacts to a well would be directed to the Ministry. Those usually go to the local district office, who then refers them to my unit and either a Ministry hydrogeologist would follow up on that -- a Ministry hydrogeologist will follow up on that complaint, sometimes in conjunction with the permit holder.

We might ask the permit holder to do an investigation, but the permit holder is required to address that impact. In the extreme case, that would be to provide an alternate water source to the private well owner.

MEMBER BEAUDET: And you were talking for the discharge into the lake, that you would look at the water quality, that it doesn't damage the water quality. What would be the standards that you would apply?

MS. BAKER: It's Kathryn Baker.

The Ministry looks to the provincial water quality guidelines, but they are guidelines and so they are not necessarily

incorporated into the permit. But the goal is that the discharge does not create an adverse effect.

MEMBER BEAUDET: Thank you.

CHAIRPERSON GRAHAM: Mr. Pereira, do you have anything else?

Thank you very much.

OPG, do you have any questions? I take it you don't.

CNSC, do you have any questions?

Thank you.

And we have one ---

DR. THOMPSON: Mr. Chair, again, I spoke too quickly, I'm sorry.

CHAIRPERSON GRAHAM: Okay, go ahead.

--- QUESTIONS BY THE INTERVENORS:

MR. WISMER: It's Don Wismer.

The question is about mixing zone. We heard earlier from Environment Canada, and they said they'd have end of pipe toxicity tests and they don't value a mixing zone when they're determining deleteriousness.

If we end up with a once-through cooling system and a diffuser -- I know the existing Darlington has a mixing zone. I'm just

wondering, would one be needed in this case, and how do you resolve these -- it looks to me like a bit of an issue: One agency says end of pipe, the other says mixing zone.

You both want to protect against adverse effect. How do you resolve that?

MR. PARROT: It's Ian Parrot, for the record.

There's a couple of answers to that question. I think, first of all, the effluent limits that we put into a certificate of approval would usually be end of pipe numbers, or at a point where it's measured, which would be end of pipe or near end of pipe.

So in terms of the compliance, once it goes into our approval, they would tend to be end of pipe because those are easy to measure for compliance purposes, if nothing else.

So in terms of how we resolve differences that different agencies may have, I think it starts with some specific discussion on that point. I agree, it's a major point and I think it's one where we need to sit down with our technical staff and talk through the details. Because I don't know right now what the answer is,

but I think we need to understand what everyone else's requirements are going to be and try to resolve them.

CHAIRPERSON GRAHAM: Anything else, CNSC?

DR. THOMPSON: I would just add that we have a memorandum of understanding with Environment Canada and we will be working cooperatively, both as a follow-up under the CEAA, and under the NSCA with Environment Canada, and we would propose to have technical meetings with the Ontario Ministry of Environment to ensure that there's alignment between everybody's requirements.

CHAIRPERSON GRAHAM: You followed the undertaking that we went through with Environment Canada and CNSC a short time ago, or earlier this afternoon, and you follow what Dr. Thompson is saying about involving you also?

MR. PARROT: Yes, I do.

CHAIRPERSON GRAHAM: That's fine.

Any other government departments, federal or provincial, who would like to add or question?

If not, we have Lake Ontario Waterkeepers has a question.

MS. BULL: A few short questions for the Ministry.

First, the Ontario Drinking Water Advisory Council Report on Tritium was released in 2009 but it has not been incorporated into this process by the federal agencies or OPG.

How will the Ontario MOE better disseminate the Council's findings in order to ensure that it is incorporated into this Darlington EA, and that Lake Ontario and human health are protected?

CHAIRPERSON GRAHAM: Did you get that question?

MR. PARROT: I think I did. Let me just read it back so I make sure I understand it.

How will the Ministry ensure that the proposal for revising the drinking water standards are incorporated into this EA?

CHAIRPERSON GRAHAM: Is that correct?

MS. BULL: Yes.

CHAIRPERSON GRAHAM: Yes, okay.

MR. PARROT: Our approvals program is premised on looking at our regulatory standards

for water quality objectives and air emission standards, and that's the basis upon which we look at our regulatory process.

So I'm not involved in revising the drinking water standards, so I don't have an answer for how that's going to be unrolled and involved in the federal EA.

CHAIRPERSON GRAHAM: I think though we know it's not resolved yet but, if and when it is, how will you administer your part in that?

Is that what you're saying?

MS. BULL: Yes. And how will it be considered in this EA in the form of a recommendation as well?

MR. PARROT: I think if it got finalized and our standards and guidelines changed before this process was finished, then we would incorporate those changing standards into our C of A process. And I think we would communicate those requirements to OPG and the federal agencies in our discussions that we just talked about having.

CHAIRPERSON GRAHAM: Thank you.

As I said, it's hypothetical at this time, but if and when.

Okay, thank you very much.

MS. BULL: I have two more short questions.

CHAIRPERSON GRAHAM: Well, it's -- we still have another part to do today, and that will only finish up this morning. I'll allow you one quick question, and to the point.

MS. BULL: Fair enough.

Do you know if this project will be subject to the Ontario environmental assessment process and, if not, why not?

MR. PANKO: It's Dan Panko, for the record.

The Ministry of the Environment today is working in the confines of the federal environmental assessment process and discussing those approvals for C of A that are applicable provincially.

This type of facility is not subject to the *Environmental Assessment Act*. The federal EA process specifically deals with these types of operations.

CHAIRPERSON GRAHAM: Thank you.

MS. BULL: Can we elaborate on the ---

CHAIRPERSON GRAHAM: As I said ---

MS. BULL: --- classification?

CHAIRPERSON GRAHAM: --- we're going to -- I think the answer's been given, ma'am.

MS. BULL: I did not hear an answer to the question. I'm sorry.

MR. PANKO: Dan Panko, for the record.

Nuclear facilities are subject to federal environmental assessments and do not fall under the Ontario *Environmental Assessment Act* and ---

MS. BULL: So just to be clear, are you saying ---

CHAIRPERSON GRAHAM: Thank you very much.

Look, we're going to get into a debate. I think the answer's been given as far as the Ontario Environment Department has given their observation, their interpretation, and we have to accept people at their interpretation.

Try what I said at the outset or a little bit earlier was we would have the 10-minute presentation -- hopefully it's around 10 minutes -- from OPG with regard to emissions. Tomorrow, I

will -- we'll not go into questions on that.

Tomorrow, first thing, I think is it going to be OPG with aquatic biota and habitat? They'll do that presentation and then we'll combine for questions.

So Mr. Sweetnam -- just one moment. I'm being told we're going to change the -- oh, yes. Pardon me. That's an oversight on my part. In a hurry here because we're so far behind.

Environment Ontario, we thank you very much for coming. We thank you for your answers. We look forward to your cooperation in this process, which is lengthy, and as the days get longer, they get a little bit more cumbersome.

But thank you very much for coming and thank you very much for your frank answers.

Now, as I say, I was rushing it a little bit. Mr. Sweetnam.

MR. SWEETNAM: Albert Sweetnam, for the record. Laurie Swami, Director of Licensing and Environment will do the presentation.

--- PRESENTATION BY MS. SWAMI:

MS. SWAMI: Laurie Swami, for the record.

CHAIRPERSON GRAHAM: Waiting for

the presentation to come up on the screen. I see, okay.

MS. SWAMI: I will begin the presentation while they sort out the graphics.

That's not ours.

The focus of our presentation this evening is on emissions. We have a number of technical specialists available to respond to your questions, which we will deal with tomorrow.

So I can introduce the team today. There's Dr. Doug Chambers, the technical lead for radiation and radioactivity. Ms. Jennifer Kirkaldy, the technical lead for atmospheric environment. Mr. John Sinnige, the technical lead for the surface water environment. And Mr. Dave Belanger, who you met earlier, the technical lead for geology and hydrogeology. And Dr. Harriet Phillips, the technical lead for the ecological risk assessment.

Again, we have Dr. Jack Vecchiarelli, our nuclear safety specialist, with us.

Building on OPG's extensive experience in operating nuclear and thermal and hydro power station, OPG assessed the effects of

emissions in the environment based on a comprehensive baseline sampling program, air and surface water dispersion models, and the use of standard approach to human and ecological risk assessments.

Using the effects predictions and our knowledge in effluent management systems, appropriate designs will be used to ensure all discharges meet regulatory requirements and standards and ensure protection of human health and the environment.

Examples of modern design features that are planned include recycling of our steam generator blow-down and treatment of all effluents to meet quality standards prior to discharges to the receiving environment.

Today, our existing Darlington Nuclear Generating Station must comply with a multitude of requirements contained in statutes, regulations, by-laws and operating permits. OPG will obtain all appropriate regulatory permits and approvals, including provincial certificates of approval.

Some of these requirements were provided in response to Information Request 171.

The assessment approach included a bounding framework for maximum emissions scenario. This approach ensured that a robust analysis was undertaken independent of the selected reactor technology. Conventional and radiological emissions during the site preparation, construction and operation phase were evaluated.

A precautionary approach was taken through the selection of emission estimates and assumed technologies to determine the bounding scenario. For example, the once-through cooling water diffuser design was based on the existing proven technology and did not take credit for the additional mitigation measures which are available.

Items such as thermal tempering and diffuser location will be included in the optimization that will be conducted during the detailed design phase as discussed in OPG's thermal emissions compensation options design report.

Regardless of opportunities to further improve the discharge, the assessment found no significant adverse effects.

CNSC have been clear in their expectation that during the submission for a licence to construct, OPG provide the specific

details on effluent releases, description of effluent treatment, including demonstration that the chosen option is best available technology economically achievable. OPG is committed to meeting these expectations.

Airborne and waterborne effluents from nuclear stations are routinely monitored for radioactivity. OPG assesses the impact of our operations by monitoring radioactivity in the environment.

OPG is committed to maintaining doses below regulatory dose limits and as low as reasonably achievable, or ALARA.

Tritium releases were evaluated from all reactor technologies, including the Environment Canada-6, emissions to air, deposit on soil and infiltrate into ground water. Ground water flow on the site is toward Lake Ontario, as illustrated in the figure on the slide.

The emissions from the Darlington new nuclear project are not likely to result in an adverse effect on ground water quality. In other words, they would not exceed 7,000 Becquerels per litre, the current Ontario drinking water objective, given that the existing tritium

concentrations in ground water are well below that standard.

Predicted concentrations of tritium in drinking water as a result of waterborne discharges were found to be a small fraction of current standards. OPG has voluntarily committed to maintaining the tritium concentrations at nearby water supply plants below 100 Becquerels per litre on an annual basis.

Currently, tritium concentrations at the Bowmanville and Oshawa water supply plants are less than 7 Becquerels per litre on an annual basis.

The detailed radiological evaluation, including tritium, demonstrated that there will be no effect on human health and the environment due to tritium emissions.

The potential effects of chemical exposure to humans and the environment were evaluated using a comprehensive baseline sampling program undertaken at the site and a risks -- and risk assessment methodology.

The figure on the site -- on the slide shows an example of sampling undertaken in the aquatic environment.

In addition, predicted concentrations were taken into account where information was available to evaluate the potential risk from project operations.

Specific usage and conventional chemicals and the design of the effluent treatment system for the new nuclear facilities will be subject to regulatory review during the construction licensing process.

Treatment systems will be designed based on years of operating experience. These systems will control chemical emissions at source to comply with all applicable criteria.

OPG has agreed with the CNSC and Environment Canada recommendations to revisit the results of the air water -- air quality, water quality, and risk assessment at the detailed design phase to confirm the conclusions of the assessment are bounding.

An extensive assessment of thermal emissions for the project was undertaken using two-dimensional and three-dimensional surface water models as illustrated in this figure.

The calibrated model illustrated temperature conditions for cool, average, and hot

climatic conditions, taking into account the presence of the existing Darlington operation and the combined effects of both new and existing diffuser systems. The results of this modelling exercise concluded that the thermal emissions do not represent a significant adverse effect.

OPG will conduct further detailed thermal plume analysis during the Darlington design phase, and the thermal discharge diffuser will be optimized to ensure that there will be no deleterious effect to aquatic habitat and biota.

OPG has committed to further analysis of the thermal plume with input from the agencies. As documented in our March 18th, 2011 letter to the joint review panel, we -- we documented this work, and we further understand that PNNL has not had an opportunity to review some of this latest work.

The assessment reviewed a wide range of possible conventional accident scenarios with respect to spills and fires resulting in potential emissions to the environment.

Five scenarios were determined to bound the range of credible upset events, including spills of chemicals and oil to both land and Lake

Ontario, also considered was a possible fire in a fuel storage tank and personal injury during construction of the project.

As OPG has detailed, prevention and contingency procedures for its existing operations which will be applied at the Darlington site -- across the site. It was concluded that these events will not result in residual adverse effects on human health or the environment.

Building on our operating experience and modern standards, OPG will develop appropriate spill prevention and response plans.

In conclusion, OPG's many years of experience in operating nuclear power plants has demonstrated that they can operate safely and well within the compliance of regulatory standards. OPG has the processes, procedures, and the resources to respond to unusual events.

OPG is committed to ensuring that emissions will be mitigated to minimize harm to the environment. We have committed to addressing thermal emissions as stated in the thermal emissions compensation options design report.

Consistent with the EA's use as an early planning tool, information will be used to

implement design features of the project to ensure compliance with regulatory limits.

The designs will be submitted to the appropriate regulatory agency for their review as part of the approval's process. The follow-up program will be developed based on collective input of multi-stakeholder groups and regulatory agencies.

Operation of the plant will incorporate adaptive management principles.

In closing, we are available to answer your questions tomorrow morning.

CHAIRPERSON GRAHAM: It's nice how we have to re-edit everything we say these days, whether it's morning, afternoon, or evening.

Thank you very much, Ms. Swami.

Mr. Sweetnam, do you have anything to add to this presentation before I call upon my co-manager?

MR. SWEETNAM: No, we don't.

CHAIRPERSON GRAHAM: Thank you very much.

With that, I'm going to call upon my co-manager to give a little bit of the logistics for tomorrow morning.

MS. MYLES: If I can read my notes well, I will.

I'm Debra Myles, panel co-manager.

And I just want to let everyone know that the panel intends to begin the morning session tomorrow, which is Thursday, at 8 a.m. rather than at the --

CHAIRPERSON GRAHAM: No, 8:30.

MS. MYLES: Okay. Yes, it is. 8:30 a.m., excuse me. At 8:30 a.m. rather than at 9 a.m. as originally scheduled.

Just to let you know how things should roll out tomorrow, we're going to begin with questions from the panel only on Ontario Power Generation's emissions presentation that we just heard.

We will then move to the presentation by Ontario Power Generation on aquatic biota and habitat, followed by questions from the panel again, and then move to questions from other hearing participants on either the admissions or the aquatic presentation.

This will be followed by the presentation by Fisheries and Oceans Canada that was rescheduled that was originally supposed to

happen today.

And then the Ontario Power Generation land use short 10-minute presentation.

This will be followed by the presentation of -- by Ontario Ministry of Municipal Affairs and Housing, Municipality of Kincardine, Municipality of Clarington, Regional Municipality of Durham. Those were -- those last four presenters were originally scheduled for this time anyway.

Just a note as well that the morning is likely to go beyond the noon hour, hopefully not too far beyond, but please be on notice that lunch break is likely to be shortened from its planned one-and-a-half hours, as it was today.

The panel’s plan tomorrow afternoon to be identical to the schedule that was previously released, with the addition of Transport Canada as the final presenter of the afternoon. So this -- so this afternoon’s session is scheduled to begin at 1:30 tomorrow and will continue for approximately four hours.

Thank you.

Mr. Graham?

CHAIRPERSON GRAHAM: Thank you very much. And, again, I thank all the participants today, staff, OPG, government departments, intervenors, and all of the staff that make this work. It’s been a productive day, I hope. And tomorrow morning at 8:30 we’ll reconvene with OPG again with questions from our intervenors.

So thank you very much and have a good evening.

--- Upon adjourning

C E R T I F I C A T I O N

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