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280, rue Slater
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par vidéoconférence

Commission Members present

Ms. Rumina Velshi
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Dr. Marcel Lacroix

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Mr. Marc Leblanc

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Me Marc Leblanc

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Ms. Lisa Thiele

Avocate-générale principale :

Me Lisa Thiele

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by videoconference / par videoconference

--- Upon commencing on Friday, November 12, 2021
at 11:30 a.m. /
La réunion débute le vendredi 12 novembre 2021
à 11 h 30

THE PRESIDENT: Good morning, everyone, and welcome to this hearing on an application that we have from Bruce Power for authorization to restart Bruce Units 4, 5, 7 and 8 from any unplanned outage. I thank you for joining us today to help answer questions that the Commission may have as we deliberate on this request that we have received.

I would like to begin by recognizing that our participants today are located in many different parts of the country. I will pause for a few seconds in silence so that each of us can acknowledge the treaty and/or traditional territory for our location. Please take this time to provide your gratitude for the land.

--- Pause

THE PRESIDENT: The Panel of the Commission for this hearing is comprised of Dr. Marcel Lacroix, Ms. Indra Maharaj and me, Rumina Velshi.

Also joining us are Lisa Thiele,

Senior General Counsel to the CNSC, and Marc Leblanc, the Commission Secretary.

We have with us today members of the External Advisory Committee on Pressure Tubes as well. Thank you for joining us.

The Commission has reviewed the submission that we have received from Bruce Power, staff's assessment of that application, as well as a submission from the External Advisory Committee and Bruce Power's response to the EAC submission. What we would like to do this morning because of some questions that we still have as we get into our deliberation is take this opportunity to ask those questions.

And so without further ado, I will turn to Ms. Maharaj to start asking questions.

Can you please just mute yourselves unless you are speaking, and again, use the Hand Up function if you want the microphone passed on to you.

Ms. Maharaj, over to you, please.

MEMBER MAHARAJ: Thank you, Madam Velshi.

I have a couple of short questions for the licensee if somebody is here from Bruce Power.

So my first question relates directly

to the submission on page 3, where it says that it is important to note that the inspections of the units in question -- which are 4, 5, 7 and 8 -- are aligned with the Unit 6 major component replacement. I wasn't clear why those two events are important to relate together. So perhaps someone from Bruce Power can clarify that for me.

MR. NEWMAN: Good morning. For the record, it's Gary Newman, Bruce Power. Thank you for your question. It's a good one.

What we meant by that was that simply it's concurrent with a planned outage campaign. So we're deep into the MCR 6 and all we were simply trying to indicate there is that there's work underway in parallel with our planned life extension outages on all the other units. So it's just part of the mix, nothing more than that.

MEMBER MAHARAJ: So to give context to the work that's being done, rather than to relate those activities together; is that right?

MR. NEWMAN: Yes, that is correct.

MEMBER MAHARAJ: Okay, super. Thank you very much.

MR. NEWMAN: It draws on the same resources I think is part of the reason that we

included that, just so you know in a larger way the amount of work that's being done onsite right now.

MEMBER MAHARAJ: Okay. Thank you.

My next question relates to the automatic heat transport feed pump trip enhancements -- it's a mouthful and I am reading it, in fairness. How will that particular piece of work improve the safety in the pressure tubes or reduce the risk of crack initiation? Can you help me connect those dots, please?

MR. NEWMAN: Yes. Again, for the record, Gary Newman. Another good question.

What this does through a software modification -- and to be clear, we've put that in place already for Unit 3 and are working to add that same feature to the other units. What this does when you're down at lower temperatures where we have lower fracture toughness is it provides a mechanism by which you can limit the pressure in the PHT system and so it will only go to a certain level and that way it avoids going to the maximum pressure that's possible. And so it's just a limitation on that and what that allows us to do is maintain the deterministic margins on our fracture protection calculations as part of the fitness for service work.

MEMBER MAHARAJ: I think I need a little more. I think I need just to step through it in a little smaller bite.

MR. NEWMAN: Okay. The pressure actually -- whatever that pressure value gets to -- so, for example, when we're at operating conditions we would be on the order -- the inlet of the fuel channels would be on the order of about just over 10 MPa, which is on the order of 1500-1600 PSI, and so what we do when we're in the cooler lower temperature state is we want to limit that pressure and that's what this does, is the software will detect a change in pressure and what it will do is simply trip off the feed pump at those lower temperatures to make sure that the pressure is limited in the system. And then when we go back -- when we get up above a certain temperature, then that software is disabled and you go back to normal operating sort of conditions.

MEMBER MAHARAJ: So what is the enhancement? What is the change from what was the previous state of affairs to currently this new software or improved software?

MR. NEWMAN: Yeah. It's just an adjustment to existing software -- for the record, Gary Newman -- but what it does is... So it's just an

adjustment to it. So instead of going to the maximum possible pressure where you would then have a relief valve lift, right, to control, in this case what it does is it limits it to a lower pressure and that way you don't load then the fuel channel with a higher pressure condition.

Even though these transients are very infrequent -- I think we've only seen maybe a half dozen over all the units over their entire lives -- we thought it would still be a worthwhile measure to put in place.

MEMBER MAHARAJ: Okay, super. That's very helpful. Thank you.

THE PRESIDENT: Ms. Maharaj --

MEMBER MAHARAJ: Yes.

THE PRESIDENT: -- before you leave that, maybe we can ask staff and get their perspective on that.

And staff, I believe you had said you were going to be doing an inspection on this modification. So anyone from staff want to comment on what we've heard from Bruce Power?

DR. VIKTOROV: Good morning. It's Alex Viktorov here, for the record.

I believe this enhancement is still in

progress, but once we see the work is completed, we include a reactive activity in our inspection plan so we can examine the process used for making it happen and also have a better appreciation of the impact on the safety margins with regards to pressure transients.

I believe that's pretty much what we have to say at this time. Again, as I said, it's still a work in progress. Thank you.

THE PRESIDENT: Thank you, Dr. Viktorov.

Back to you, Ms. Maharaj.

MEMBER MAHARAJ: Just one final follow-up question and I don't know whether this is a staff or a licensee question.

With the heat transport operating conditions, does that have an impact on the relationship between the Heq concentration and its interaction with a flaw or is this a separate operating enhancement that is more functional? I'm trying to understand how these things play together or if they do, they may not. Perhaps licensee?

MR. NEWMAN: For the record, Gary Newman. I just have to get off mute there.

If I understood your question

correctly -- maybe I'll repeat back. Does the question that you're asking relate to the pressure and temperature conditions in the PHT system and how that influences the flaws and the hydrogen together as an aggregate picture?

MEMBER MAHARAJ: Kind of. So what I understand is the risk of crack initiation is a function of the relationship between the hydrogen concentration and a particular shape of flaw. So if there's an elevated Heq and a flaw of a particular shape, then there's a risk. Does the controlling of the transient, the cold overpressure transient, have a relationship to those two factors as they work together or are they separate issues?

MR. NEWMAN: For the record, Gary Newman.

So the pressure is the primary loading mechanism for the fuel channel and the pressure does not influence obviously the hydrogen equivalent concentration, but the heat transport temperature does. So as you operate over the lifetime of the unit, the heat transport temperature from inlet to outlet will influence the rate at which a deuterium isotope or a hydrogen isotope will be absorbed through the corrosion process, right, and the influence of

pressure is only how that pressure tube gets -- you know, carries the load that results from the pressure and then that factors directly into the fitness for service work that we do in order to demonstrate that that's okay. So in the absence of a flaw, we wouldn't really have the same concern. If there's no flaw in the region, then there would be no driving force for the pressure to create, you know, an initiation site, if that makes sense.

MEMBER MAHARAJ: Yes. That's exactly what I was asking. Thank you.

MR. NEWMAN: Okay. Okay.

THE PRESIDENT: Mr. Carroll, you wish to add something to the discussion?

MR. CARROLL: Blair Carroll, Specialist with Operational Engineering Assessment Division at the CNSC.

I just wanted to put in perspective that this cold overpressure transient is a design basis load. It is considered in the design basis of the pressure tubes and all flaws in pressure tubes are analyzed to be able to withstand that load. So while this process is being put in place, this is an extra measure. It's over and above the analysis that would have been done for any flaws present.

In this particular case our focus has been on proving that there are no flaws at risk of cracking in the region of interest. So while this is an enhancement, an additional measure, if we have the confidence that there are no flaws present to begin with, whether the cold overpressure transient occurs or not, it will not impact the integrity of the pressure tube. The pressure tube will be able to withstand it. It's designed to withstand it.

MEMBER MAHARAJ: Thank you, Mr. Carroll.

THE PRESIDENT: Thank you very much.

Let's turn to Dr. Lacroix.

MEMBER LACROIX: Thank you.

I do have a follow-up question concerning this matter.

From what I understand, the pressure tube is designed to withstand a cold overpressure transient and that's the reason why this enhancement was not made before or prior to the discovery of elevated concentration of hydrogen concentration in Bruce Units 3 and 6; am I right?

MR. NEWMAN: For the record, Gary Newman.

As Mr. Carroll correctly described,

this is a design basis requirement, and you're absolutely correct, Dr. Lacroix, the reason we've added this is as an additional enhancement over and above the baseline conditions that the pressure tubes were designed to manage.

MEMBER LACROIX: Okay. And I presume that modifying the DCC software is not a simple task in the sense that there must be a protocol established for testing, validating and implementing these modifications. So could you elaborate on this, on this endeavour?

MR. NEWMAN: Yes. For the record, Gary Newman. That is a very good question.

For any changes that we make of this nature, it would follow our engineering change control process, which is a very rigorous process that we apply to make sure that all aspects are considered. So, for example, the actual software adjustment, all of that has to run through a series of tests and so forth, and we actually do so also on the simulators to make sure that the software is working correctly. We also add training to the operations team as well to make sure they understand how this software adjustment will work and so it's all part of their training. And there's also documentation that has to be adjusted.

MEMBER LACROIX: Right.

MR. NEWMAN: So all of this -- what the engineering change control process does is it ensures that all of these items get addressed as part of this so that we don't miss anything.

MEMBER LACROIX: Okay. So it is a question of several months before it's fully implemented?

MR. NEWMAN: Typically the first time that you make an adjustment, which we did for Unit 3, the first time is the most work for the reasons that you're implying. Once you've done the first one, then it becomes a little bit more of a routine programmatic because you've already done all of the work, you just need to make sure that all the documentation, all the training, all of those. We expect that the majority of these adjustments will all be in place for all of the units by the end of the year.

MEMBER LACROIX: Okay.

MR. NEWMAN: As I mentioned in the first response, Unit 3 has been already adjusted.

MEMBER LACROIX: Yes.

MR. NEWMAN: And then Unit 7, which is currently in a planned outage, will similarly be adjusted before it restarts, and so on.

MEMBER LACROIX: Okay.

MR. NEWMAN: And then we'll have the rest of the units, all the paperwork, all the training, everything ready to go by the end of 2021.

MEMBER LACROIX: Okay. The adjustment onsite of the DCC software is done during an outage, I presume, always?

MR. NEWMAN: For the record, Gary Newman.

Yeah. We prefer to do -- although you could make the change on power, we find it's probably better to do that in the actual outage. We think that's probably a better place to do it, but it could theoretically be done online as well.

MEMBER LACROIX: Okay. That's good.

Am I allowed --

THE PRESIDENT: Dr. Lacroix, I'm sorry, I think staff want to add something to your question.

MEMBER LACROIX: Sure.

THE PRESIDENT: Dr. Viktorov.

DR. VIKTOROV: Just to provide additional assurance that the engineering change control at all licensees is a very well-established process, has been in place for many years and CNSC

staff regularly inspect this process to make sure it incorporates the expected rigidity. So we have confidence that the process, even though it takes time, will deliver the expected result with expected quality. Thank you.

MEMBER LACROIX: That's good. Thank you. I am reassured. That's good.

Am I allowed to ask another question?

THE PRESIDENT: Of course. Go ahead, yes.

MEMBER LACROIX: Okay. Concerning CMD 21-H13.1 -- that is the submission from Bruce Power -- I've seen in Attachment A that the inspections completed on Units 4, 5, 7 and 8 demonstrated that there are no elevated levels of hydrogen above licensing requirements. So you've reached this conclusion because the scrape samples from Units 4, 5, 7 and 8 were taken at the same location as those in Units 3 and 6, where elevated hydrogen concentration were found. Am I right?

MR. NEWMAN: For the record, Gary Newman.

So all of the scrape campaigns are conducted in a similar manner. So Unit 3 historically would have been sampled from the same axial and clock

positions as all of the other units. So very ---

MEMBER LACROIX: Ah, okay.

MR. NEWMAN: Right?

What we did on Unit 3 is we did further enhancements to where we were sampling once we had found that at one of the locations in the compressive region of the rolled joint that were higher than we expected. We then expanded the capability of our scrape tooling to be able to sample at other axial locations as well just to do that part of the investigation and so forth.

So for all of the units going forward, we will have elements of that same enhancement put in place. So for example, we're just going in to begin our scrape campaign on Unit 7 today. And it will have the same enhancements applied to it as we did for Unit 3.

MEMBER LACROIX: Okay. Okay. That's good. That's good.

In section 4, enclosure 1, that is on page 20 of 37, you talked about the product of two probabilities would be virtually unaffected by increasing the actual extent of the database. And I was struggling to find out what are those two probabilities.

So when I read section 3, just above, you clearly identify three probabilities leading to an overall probability. So can you relate these two probabilities to section 3? Which is which?

MR. NEWMAN: Do one of you folks want to take that?

--- Discussion off record / Discussion officieuse

MR. NEWMAN: Gary Newman, for the record.

So we're just trying to find the exact position that you -- we'll get you a response momentarily.

THE PRESIDENT: While we are waiting to hear from Bruce Power, Mr. Carroll, you wanted to add something?

MR. CARROLL: Blair Carroll, for the record.

Thank you, President Velshi. I just wanted to respond -- provide additional clarification on Dr. Lacroix's previous question and the CNSC staff recommendations are not based on assuming that high Heq has not occurred in Units 4, 5, 7, or 8. We are proceeding with the assumption that in the region of interest elevated Heq could exist. And even with that, we've made the recommendation that a restart is

acceptable because of the low risk from having flaws that will initiate cracks.

MEMBER LACROIX: Okay. Okay. Thank you for this clarification. Yeah, it's good.

THE PRESIDENT: Ms. Maharaj, you've got your hand up. Is that to add to the question that --

MEMBER MAHARAJ: It is.

THE PRESIDENT: -- the licensee -- why don't you go ahead, then, please.

MEMBER MAHARAJ: It is. I just wanted to ask a little clarification while we're right on point here from the staff. Because Mr. Carroll has indicated that the -- I believe the assumption of staff moving through their analysis is that elevated Heq could possibly exist in the region of interest. But in the staff submission, there isn't a discussion about whether or not there is actually an elevated Heq. And I assume that's because the Bruce submission says there is not an elevated Heq in those particular units.

I just want to make sure I have tied together all of those items correctly. So perhaps staff could just assure me that I've made the correct conclusion to tie those items together.

THE PRESIDENT: Mr. Carroll?

MR. CARROLL: Blair Carroll, for the record.

So we have not accepted the position from Bruce Power that elevated Heq does not exist in Units 4, 5, 7, and 8. We probably should have made that more clear in the discussion of the CMD submission.

We are proceeding right now with the assumption that it could exist until we get more information to prove that it's not. So we're making our recommendation on the assumption that elevated Heq could exist in any of these reactors. It was an oversight I guess on our part not to include that in the CMD and be specific on it.

MEMBER MAHARAJ: That's okay, Mr. Carroll. I'm very pointed in my thinking, so I appreciate that.

THE PRESIDENT: Thank you. We've got that on the record now. Thank you.

Mr. Newman, are you ready for the response?

MR. NEWMAN: For the record, Gary Newman.

Yes, I am going to turn it over to

Mr. Jason Goldberg to provide that response. Thank you.

MR. GOLDBERG: Hi, this is Jason Goldberg, Bruce Power, for the record.

With regard to your question with regard to the probabilities, the first probability that's being referred to is the probability of having a flaw in the region of interest axially. And the second one is having a probability of a flaw in the region of interest circumferentially.

MEMBER LACROIX: Ah, okay. That's clear now. Okay.

And have you checked the -- well, you assume -- you make the statement that the product of these two probabilities would virtually be unaffected. Have you checked it? Have you performed a calculation or you simply assume it?

MR. GOLDBERG: Jason Goldberg, for the record.

We've performed a number of sensitivity studies across different lengths of the region of interest and also circumferentially. And we've seen in all cases that the results are acceptable.

MEMBER LACROIX: Okay, that's good.

Okay.

Still on page 20 of 37, I have seen that you refer to the Poisson distribution. And the Advisory Committee asked you why did you use the Poisson distribution, and your answer was that it's a common distribution for this type of data. But have you actually checked the data, compared the number of flaws with Poisson distribution?

MR. GOLDBERG: Hi, it's Jason Goldberg, for the record, Bruce Power.

So the Poisson distribution is a common distribution used for this application because of the random nature of the flaws that are created. So it's appropriate to apply a distribution which is tuned towards random arrivals.

MEMBER LACROIX: Okay.

I've also noticed that this distribution is predicated on a number of assumptions. And these assumptions are listed just below. And assumption no. 1, 2, and 3 are easy to understand. But assumption 4, you assume that the incidence rate is independent of the operating time. Does it mean that the rate of flaws -- apparition of, new creation of flaws is independent of the aging of the pressure tubes? Is it what you mean by this assumption?

MR. GOLDBERG: So Jason Goldberg, for the record.

The creation of flaws does not depend on the time of operation of the reactor. So a flaw could be created due to a piece of debris or interaction of the fuel bundle with the pressure tube. But it does not directly correlate to time. We don't see -- we see -- obviously, we get more flaws over time. But there's no correlation with time. It's independent because of the mechanism is not a time-based mechanism. It has to do with generally debris that's introduced into the channel for some reason.

MEMBER LACROIX: Okay. So that means that as the pressure tube ages, the -- well, the creation of flaws will not necessarily increase. It is not more prone to new flaws. This is what it means?

MR. GOLDBERG: Jason Goldberg, for the record.

That's correct that new flaws are not created because of the aging of the pressure tube, but they are created over time due to the introduction of external factors.

MEMBER LACROIX: Okay, okay.

And the last assumption, it means, well, you mentioned that no distinction is made between different flaw types. I presume that this assumption is discarded in enclosure 2. Am I right? In enclosure 2, you make a distinction between dispositionable flaws versus all the flaws and then another type of flaw. So I presume that this assumption is removed in enclosure 2.

MR. GOLDBERG: Jason Goldberg, for the record.

So in the first report that you are referring to, the distinction between types of flaws refers to the mechanism by which the flaw was created. And for example, it could be caused by a piece of debris or it could be a scratch or a mechanical flaw, a scrape flaw, et cetera.

And in the second one, it's referring to this distinction about the severity of the flaw where a dispositionable flaw is a flaw that has a depth of greater than 0.15 millimetres, but a reportable flaw has a depth greater than 0.1 millimetres.

MEMBER LACROIX: Okay, okay. That's good. That's good, okay.

If I proceed to section 5.1 and 5.2 --

THE PRESIDENT: Sorry, Dr. Lacroix.

MEMBER LACROIX: Yes, okay. Sure.

THE PRESIDENT: Mr. Carroll has something to add to the earlier discussion, so let me turn to Mr. Carroll before you move to the next question.

MR. CARROLL: Blair Carroll, for the record.

I just wanted to make Dr. Lacroix aware that we recognize that there are always questions about assumptions going into statistical and probabilistic analyses, and we raised some of these similar questions ourselves as we were going through and reviewing the submission.

And to help us in making our decision, we looked at different statistical methods using completely different types of assumptions that weren't relying necessarily on the assumed distribution type and several of these other questions that you've raised here.

And using two different methods, we still were able to calculate an expected number of flaws of less than one in the uninspected population of the pressure tubes. So it was our way of doing a bit of a sanity check on statistical analysis and not

relying on one method only but looking at different methods and seeing if we would get similar answers.

MEMBER LACROIX: Okay, okay. That's good. Good.

THE PRESIDENT: And maybe if we can turn to the External Advisory Committee, because you had raised some very similar questions in your submission, and Bruce Power has responded to your questions. I'd love to hear your perspective on the submissions that you got from Bruce Power but also the discussion we have just had whether it is in the kind of model that's been used for predicting flaws or whether it's probabilities and multiplication of different probabilities, et cetera.

So maybe I'll turn it to first, Dr. Luxat, and then you can bring Dr. Spekkens in the discussion as appropriate.

DR. LUXAT: Yeah, well, can I do it the other way around? I'd like to bring Dr. Spekkens in first. Sorry.

THE PRESIDENT: Okay.

DR. LUXAT: Sorry, so this is John Luxat, for the record. And I'll first pass it to Paul Spekkens and then I'll follow up with some other questions.

THE PRESIDENT: Over to you, Dr. Spekkens.

DR. SPEKKENS: Okay, Paul Spekkens, for the record.

I think the response from Dr. Carroll that the validity of the statistical model was tested by doing some other models, I think that's the right answer. That's a good answer.

And so the answer from Bruce Power directly was not quite as comforting because it's still based on assumption. Testing assumptions by doing things differently like using a hand calculation, by using a different statistical model, that's what should give us comfort, that the result isn't entirely dependent on an assumption.

THE PRESIDENT: Thank you.

And what are these different models other than the Poisson distribution, Mr. Carroll, that you've used to come up with the predictions?

MR. CARROLL: Blair Carroll, for the record.

I apologize, I don't have a specific name for them. But they're based on zero probability statistics and there are different estimators that can be used. So given not having seen say a

dispositionable flaw in a population of a number of tubes, there's a statistical estimator that you can calculate to estimate what that probability is, and then use that to estimate what the probability would be in a different population of tubes.

I have the references. I don't believe we've referenced them in the CMD, but if the Commission is interested, we can pass them along in a supplement -- in an email or a supplementary submission.

THE PRESIDENT: If you would, please. Thank you.

Dr. Luxat?

DR. LUXAT: Yeah. I have some difficulty -- sorry, John Luxat, for the record -- some difficulty with attachment A, where they presented the unitized inspection findings for Units 4, 5, 7, and 8. Prior to that, there was -- in attachment A there was a statement that they were using a database which consisted of inspection results from Units 3 to 8.

So the question is the inspection record is an historical record. Doesn't matter whether that Unit 3 is operating or Unit 6 is shut down for the major component replacement outage; that

data still exists.

Now, why was data for -- unitized data for Unit 3 and Unit 6 not presented? It appears that the assumption is made that they are all the same, of course. But when you look at the -- in looking at all of the six units, you have -- if I get the numbers right, one moment -- 2,432 channels uninspected in the population. How is Unit 3 and Unit 6 data not used? Or is it used in some way?

Because it's -- if there is data that exists which -- for those units, which would alter the estimation for any one of the other four units, then you have -- you would be altering the number of expected dispositionable flaws, for example, or the number of reportable flaws. So there's something that is not -- doesn't appear to be consistent in the approach, in the unitized approach.

So I don't know why that data has been presented and how it's being used to then draw conclusions about all of the six units which appear subsequently at the end of the submission.

THE PRESIDENT: Mr. Newman, over to you?

MR. NEWMAN: For the record, Gary Newman.

Thank you, Madam Velshi. And I agree with Dr. Luxat.

The only reason that we talk only about Units 4 through 8 and don't talk about 3 and 6 is because this CMD was specifically related to those operating units at that time.

But he's absolutely correct. We used all of the information, because it's all relevant, to developing an understanding of what's going on. And in fact, later in the attachment, I think it's the last page if I'm not mistaken, it actually talks about those other units as well. It just wasn't our focus for the purposes of this submission because Unit 3 was in a planned outage at the time and Unit 6, of course, is being refurbished as we speak.

But I agree. The information is still relevant and it was used.

THE PRESIDENT: Thank you very much.

Back to you, Dr. Lacroix.

MEMBER LACROIX: Yes, thank you.

With respect to the probability of having a flaw close to the outlet burnish mark, the binomial distribution is retained. And I was wondering, was this distribution adopted based on the assumption that the distribution -- the angular

distribution of flaws is symmetrical?

MR. NEWMAN: For the record, Gary Newman.

I am going to turn it over to Mr. Goldberg to answer that question. We may have to clarify your question there, but I'll leave that to him to do. Thank you.

MR. GOLDBERG: Hi, it's Jason Goldberg, for the record.

Sorry, Dr. Lacroix, could you please clarify your question?

MEMBER LACROIX: Yes, indeed. I've noticed that in section 5.1 and 5.2 you move from the Poisson distribution in one direction to a probability of having flaws close to the outlet burnish mark, which is modelled with a binomial distribution. And I was wondering, was the binomial assumption made based on the assumption that the angular distribution of flaws is symmetrical. Does it impose symmetry?

MR. NEWMAN: For the record, Gary Newman.

We don't seem to have an answer for you, Dr. Lacroix. What we do know is that prior to selecting the distribution, we did try different distributions to see which one seemed to work the best

and provide us the most robust results.

As to the symmetry as the rationale for it, we're not quite sure of the response for that. But we can get you that.

MEMBER LACROIX: Okay, thank you.

THE PRESIDENT: Okay.

Dr. Lacroix, any further questions?

MEMBER LACROIX: No further question for the moment, no.

THE PRESIDENT: Okay. Ms. Maharaj, then, over to you.

MEMBER MAHARAJ: Thank you, Madam Velshi.

I have a couple of much easier questions for the licensee, just really more by way of clarification and to ensure that this record is complete compared -- and not trying to be dependent on other records.

In your submission, at about page 10, there's a reference to the fuel bundle and pressure tube design, which I believe is the fuel carrier design, ensuring that flaws do not occur in the region of interest.

What I'm understanding that statement to mean is that this particular design has the fuel

bundle covered so that the debris can't create a flaw. Is that a correct conclusion?

MR. NEWMAN: Gary Newman, for the record.

I think it more relates to where the plane of bearing pads would sit within this region of interest; right? So this first we'll say 75 millimetres, the bundle kind of straddles this region and sits -- typically sits outboard of that location. So there'd be -- and we normally associate the capture of debris right next to the pressure tube as being associated with the -- I'm going to call it the plane of bearing pads that go around the circumference of the fuel bundle. So outboard of the outlet burnish mark, you'd have two planes of pads. And then inboard, the other five -- or the other, pardon me, three planes of pads, but removed from this region of interest.

MEMBER MAHARAJ: Okay, and so that design itself is part of the foundation for the licensee's conclusion that there are no -- there's no potential for flaws to occur in the region of interest. Have I understood correctly?

MR. NEWMAN: We believe because of that -- sorry, for the record, Gary Newman.

We believe that it reduces the likelihood of that being the case because of where those planes of pads are positioned. It doesn't mean it's impossible, but it really diminishes the likelihood of that being the case. And then our inspection results tend to support that likelihood.

MEMBER MAHARAJ: Okay. And your submission also indicates that you have no measured elevated Heq in this area. So those -- I assume those two components together, the design which reduces considerably the risk of flaws, plus the fact that there's no elevated Heq, is the foundation for your submission that this Commission ought to allow for a restart from forced outages, correct?

MR. NEWMAN: That is correct. Historically, we have not seen flaws in the region of interest, nor have we seen elevated Heq results in that region. It doesn’t mean that we won’t find it going forward as the units continue to operate, but that is the basis for -- you know, all of our prior history is the basis for this CMD submission.

MEMBER MAHARAJ: If I've understood this CMD submission, you’re asking for approval to restart Units 4, 5, 7, and 8 after forced outages, correct?

MR. NEWMAN: For the record, Gary Newman. That is correct.

MEMBER MAHARAJ: Thank you.

THE PRESIDENT: So, Mr. Newman, let me just follow-up on that question. And if you were following the hearing we had last week on OPG's request to restart their units and their request too had been following a forced outage, Staff's assessment in that request, similar to here is, look, the risk is no different whether a unit is restarting from a forced outage or a planned outage. And Staff's recommendation to the Commission is that authorization be given for both forced and planned outages.

So the question, which the Commission had asked OPG, I'll ask you. Why was your request limited to just authorization from just forced outages and not just all outages?

MR. BURTON: Maury Burton, for the record. I'll take this one, I'll give Gary a bit of a break here.

I'll give a very similar answer to OPG. We were really looking at priority and sequencing of our requests. So the first request obviously was getting the planned outage for Unit 3 approved by the Commission. Then our second priority

was the forced outages.

Looking at what we have submitted, in reality we agree with the Staff recommendation, that the planned outages meet the intent of the order as well. And in our submissions, if we went to a separate hearing for say coming out of Unit 7, we would essentially be submitting the same information.

So what we are looking at here was really sequencing and not necessarily asking for too much at one time from the Commission as we move through the process.

THE PRESIDENT: Thank you. And, you know, I'd like to thank Staff for their submission. Because we want to make sure we're using everyone's time efficiently, and this just allows us to look at the fuller picture with the same information and really needing to come to the same conclusion on both fronts.

Staff, a very very quick question just making sure there is absolute clarity on the definition of the region of interest as defined by Staff.

It is 75 millimetres or is it 100 millimetres from the outlet burnish mark and of course the full circumference?

Mr. Carroll?

MR. CARROLL: Blair Carroll, for the record. For the Bruce Power units it's 75 millimetres axially from the burnish mark and full circumference.

THE PRESIDENT: Thank you very much. Thank you.

Dr. Lacroix, back to you.

MEMBER LACROIX: No, I have no further questions.

THE PRESIDENT: Thank you. Ms. Maharaj?

MEMBER MAHARAJ: Just one point of clarification, Madam Velshi, thank you.

So I just want to clarify. Is the licensee asking today, right now, to amend their application to a restart from planned outages or are we simply dealing with the submission, which is restricted to forced outages?

MR. BURTON: Maury Burton, for the record. From our point of view, I've mentioned earlier, we agree with Staff's recommendation and we would like the condition to consider allowing Units 4, 5, 7 and 8 to restart from any cold shutdown, which would include unplanned and planned outages.

Thank you.

MEMBER MAHARAJ: Thank you for the clarification.

THE PRESIDENT: Thank you. Just to clarify, it does not include Unit 3, separate decision from the last planned restart. This is just 4, 5, 7 and 8.

Let me just turn to EAC members to see if they want to submit anything else. Anything else on your mind after what you've heard today that you'd like to share with the Commission?

Dr. Luxat?

DR. LUXAT: Yes. Dr. John Luxat, for the record. I'm still a little confused about the statements regarding the fact that there are no high Heq in the other units, other than 3 and 6. The reason for that is we know that in Unit 3 there were Heq, high Heq, and Unit 6 high Heq.

So if you're using the whole database, can you say confidently that the conditions -- off-site conditions that led to the high Heq in the (indiscernible) region due to flow bypass as a result of diametrical creep of the channel will not occur in any of the other units?

So can you say at this point you have assurance that the equivalent full-power hours of

operation that occurred in Units 3 and 6 and led to -- has (indiscernible) to lead to the redistribution of the Heq circumstantially will not exist in these other 2,423 channels that haven’t been inspected?

MR. BURTON: Maury Burton, for the record. I'll start and I’ll handover to Mr. Newman if he has anything to add.

The statements that we have made in our submissions are really statement of fact in the fact that we have not seen, in our straight campaigns to date, the higher Heq in the units that we are discussing today.

However, as Blair Carroll mentioned earlier this morning, we too do assume that there is a possibility that we could have higher Heq in this region of interest in these units. And that’s why we are doing the -- we have modified our scrape campaigns for the inspections in the current Unit 7 outage, and will in future outages to target these areas so that we have a better understanding of the behaviour of the hydrogen.

Gary, do you have anything that you’d like to add?

MR. NEWMAN: For the record, Gary Newman. No, I agree with Mr. Burton's summary there.

We're just trying to separate out what we have already derived from the prior campaigns versus what we might find going forward. We're just trying to distinguish between those two.

Thank you.

THE PRESIDENT: Thank you. Dr. Spekkens, anything from you please?

DR. SPEKKENS: For the record, Paul Spekkens. I just wanted to comment on this discussion that's just been going on about high Heq, is it there or not, and flaws in that region, are they there or not?

In the case of the high Heq, because we don't have a model that confidently predicts when high Heq will happen, we are only sure about the things that we've inspected. And anything that we haven't inspected, we can't say with certainty whether there's a channel with high Heq.

In the case of the flaws, it's the physical configuration of the reactor, the position of bearing pad, as explained by Mr. Newman, that's how we come to the conclusion that it's highly unlikely that there's a flaw.

So the issue is whether you have understanding of something or not that allows you to

say things with confidence.

THE PRESIDENT: Thank you, Dr. Spekkens.

Dr. Luxat, is your hand up?

Thank you. Mr. Newman, anything else you wish to add?

MR. NEWMAN: For the record, Gary Newman. Thank you, Madam Velshi. No, I had nothing in addition, other than to agree with Mr. Carroll that, and to your point, about the similarity between a forced outage and a planned outage in terms of our case for coming out of that would be essentially the same. So I just wanted to agree with that and get that on the record.

THE PRESIDENT: Thank you. So before we sign-off, I know there were two undertakings; one for Staff, and one for Bruce Power. I just want to make sure we've got clarity around what the undertaking is and what the timing for that is.

So maybe, Dr. Viktorov, I'll turn to you first. Just let us know what the undertaking is and when can the Commission expect a response?

Or maybe I'll turn to Mr. Leblanc to tell us what the undertaking is and then you can give us the timeline.

MR. LEBLANC: Thank you. So my understanding is that the Staff has undertook to provide the references in terms of those alternate methodologies that they looked at in terms of the review of the matter.

And from Bruce Power, it was to respond to Dr. Lacroix's question on the symmetry and whether it had an impact on those two elements.

So, as President Velshi has mentioned, it would be appreciate if we could get an idea of how much time is needed for the Commission to receive that information.

Thank you.

THE PRESIDENT: So, Dr. Viktorov or Mr. Carroll?

DR. VIKTOROV: Yes, Alexandre Viktorov. I don't believe it's a challenging undertaking. I will provide references shortly, and perhaps even today. We'll do our best.

THE PRESIDENT: Thank you very much. Mr. Newman?

MR. NEWMAN: For the record, Gary Newman. Yeah, we can put together something pretty quickly on that, and we should be able to send that by end of business today.

THE PRESIDENT: Excellent. Thank you very much.

Okay. Thank you everyone for your participation, for having the patience to answer our questions, and for making yourselves available at short notice. It’s very much appreciate.

Thank you all. Stay well, and have a good weekend.

Thank you.

--- Whereupon the meeting concluded at 12:25 p.m. / La réunion se termine à 12 h 25