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ONTARIO ENERGY BOARD

FILE NO.:	**EB-2013-0321**	
VOLUME:	**16**	**UNREDACTED - CONFIDENTIAL**
DATE:	**July 18, 2014**	
BEFORE:	**Marika Hare**	**Presiding Member**
	Christine Long	**Member**
	Allison Duff	**Member**

EB-2013-0321

THE ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, Sched. B;

AND IN THE MATTER OF an application by Ontario Power Generation Inc. pursuant to section 78.1 of the Ontario Energy Board Act, 1998 for an order or orders determining payment amounts for the output of certain of its generating facilities.

Hearing held at 2300 Yonge Street,
25th Floor, Toronto, Ontario,
on Friday, July 18th, 2014,
commencing at 9:37 a.m.

VOLUME 16

BEFORE:

MARIKA HARE	Presiding Member
CHRISTINE LONG	Member
ALLISON DUFF	Member

A P P E A R A N C E S

MICHAEL MILLAR	Board Counsel
VIOLET BINETTE RICHARD BATTISTA	Board Staff
CHARLES KEIZER COLIN ANDERSON CARLTON MATHIAS	Ontario Power Generation (OPG)
DAVID CROCKER	Association of Major Power Consumers of Ontario (AMPCO)
JAY SHEPHERD	School Energy Coalition

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Friday, July 18, 2014

--- On commencing at 9:37 a.m.

MS. HARE: Good morning. Please be seated.

Are there any procedural matters before we begin?

PRELIMINARY MATTERS:

MR. SHEPHERD: Madam Chair, my friend and I have talked about the contract. And they sent the contract with a list of the schedules yesterday at about 5:30, but through the wonders of the Internet it arrived in my inbox about 1:00 a.m., so I haven't yet looked at it. They sent it at 5:30, but it arrived in my inbox at 1:00 a.m.

And so what we've agreed is, I've taken a quick look at what I -- this morning, and what we've agreed is they are going to send me the schedules themselves, and I'll then work with them later today to take out the schedules that we don't need. And I will have no questions on it in cross-examination, but it will be on the record for argument.

MS. HARE: You'll have no questions on it in cross-examination?

MR. SHEPHERD: I will not. What I've seen allows me to understand the answers to the questions I would have had. I don't need to ask them on the record. They're straightforward. And I will need to refer to some things in cross, but -- in argument, but I don't need to put them to witnesses. They're straightforward.

MS. HARE: Okay. Good. Thank you. And is any of this confidential?

MR. SHEPHERD: I think it will all be confidential.

MR. KEIZER: All of it is confidential.

MR. SHEPHERD: I would be very surprised if any part of this contract should be on the public record right now.

MR. KEIZER: Oh, and I think also something I should note is, in that regard, the contract, I think the other reason for its confidential nature, not just because of the commercial aspects, but I think it is currently subject to litigation in respect of Freedom of Information. So it is currently an issue of dispute with respect to that.

So I think it would be unfair to disclose it in public, given the fact that it's currently in dispute as to parties seeking it and the counter-party to the contract attempting to keep it undisclosed pursuant to the Freedom of Information Act. I just wanted to put that on the record so it was clear.

MS. HARE: No, that's fine. And Mr. Shepherd, you agree with that?

MR. SHEPHERD: I was not aware of that, but as far as I'm concerned, if it's -- I think it's confidential anyway, so --

MS. HARE: Mr. Millar, do you have anything to say on that?

MR. MILLAR: I don't. I haven't seen the contract. I tend to agree with Mr. Shepherd. It probably is confidential, but I haven't seen it.

MS. HARE: We have a long list of things that we'll deal with at the end of the day that still require discussion as to confidentiality, but on this one -- let's just knock them off one at a time. This one the Board deems to be confidential, so we won't have to deal with that later.

MR. SHEPHERD: Thank you, Madam Chair.

MR. KEIZER: But I think also related to that, Madam Chair, is the fact that we did disclose in confidence a summary of the contract by way of undertaking, so to be -- to ensure that we're consistent, is it possible to have that undertaking made confidential as well? I think it effectively deals with the same matter.

MS. HARE: Okay. Mr. Shepherd? Mr. Millar?

MR. SHEPHERD: No.

MR. MILLAR: We have no submissions on that, Madam Chair.

MS. HARE: No? Thank you. That's fine. So that also is also deemed confidential.

MR. KEIZER: Thank you, Madam Chair.

We have one preliminary matter, and that is that yesterday I think through the course of discussion it was clearly indicated to OPG that they should make very clear what the nature of their ask is in respect of the commercial and contracting strategy --

MS. HARE: Yes.

MR. KEIZER: -- and that aspect of the issues list. So that -- that thinking is -- my understanding is that thinking has been done, and that Mr. Reiner can speak to that now, and then that would enable my friend to ask any follow-up questions as part of his cross and then proceed on with the day.

MS. HARE: Thank you. Let's proceed on that basis.

MR. REINER: Thank you. So we're clarifying our request for a finding that OPG's commercial and contracting strategies for the Darlington Refurbishment Project are reasonable. We're seeking a finding of reasonableness in respect to the guiding principles that form the commercial strategy, and the guiding principles are as follows: A multi-prime contractor model in which OPG retains the overall project management and design authority responsibility; the division of the Darlington Refurbishment Project into five major packages, and those packages are the retube and feeder replacement, the turbine generator, the steam generator, defuelling and fuel handling, and balance of plant; the model where the prime contractor is responsible for engineering, procurement, and construction or some combination of those activities within each of those five major packages; and a means for allocation of risk to the party that's best able to manage that risk through a pricing structure that's tailored to the level of project definition and also to the level of owner oversight that is required. And this means that the use of target pricing where projects are less defined and more oversight is required, or fixed pricing, where there is greater definition with less oversight required. All of the above would be subject to available contract options in the marketplace.

Now, in addition to this, if the Board finds that the record is sufficiently developed to render a finding on the reasonableness of the contracting strategies, we'd request a finding that our application of the principles that I just went through to the contracting strategies themselves is reasonable, as it applies specifically to the pricing structures in terms of how we've utilized fixed versus target or other pricing structures within each of the five packages.

What we're not requesting approval on is approvals of the contracts themselves, the conduct of the negotiations and the procurement processes that were used to achieve the contracts, any prices that were established through the contracting process, and the selection of the winning proponent for each of the five packages.

MR. KEIZER: I have no follow-up, Madam Chair.

MS. HARE: Okay. Thank you.

Mr. Shepherd?

ONTARIO POWER GENERATION - PANEL 8, RESUMED

Gary Rose, Previously Affirmed

Dietmar Reiner, Previously Affirmed

Eric Gould, Previously Affirmed

John Reed, Previously Affirmed

CONTINUED CROSS-EXAMINATION BY MR. SHEPHERD:

MR. SHEPHERD: That was very helpful. So I just -- I have two clarifying -- three clarifying questions. The first is, you've said that you're asking for agreement by the Board that the use of the EPC model, the engineering/

procurement/construction model, is appropriate. But then you went on to say "or some combination". And it seems to me that "or some combination" means there is no model, because basically you're doing it on a case-by-case basis, deciding how much you want the contractor take on.

MR. REINER: If I can answer that with an example where that would apply, when we talked yesterday about the turbine generator project, our -- so following these principles in our strategy, our efforts were to achieve an EPC contract for that work. And due to the intellectual property restrictions that the original equipment manufacturer has imposed on us, we were actually not able to successfully get to an EPC without a significant risk premium that we deemed uneconomic.

That resulted in us entering into an engineering services and parts agreement, so the EP is with one contractor and the C is with a different contractor. So we have two contractors essentially covering the EPC space. So that would be -- that's what we would mean by that principle.

MR. SHEPHERD: So what you're asking then is for -- your strategy is to issue a contract on an EPC, engineering, procurement, and construction basis, for each of the major work packages, and that that would be your default unless you can't.

MR. REINER: Unless we can't.

MR. SHEPHERD: So what you're asking the Board to approve is that that's a good strategy to try to achieve that and only back away from it if it's not feasible.

MR. REINER: If it's not feasible or it's --

MR. SHEPHERD: Okay.

MR. REINER: -- unattainable.

MR. SHEPHERD: That's the first question. The second question is, I asked you yesterday and I want to confirm with you that the method of minimizing risks through a gating approach, which minimizes extrinsic risk -- which we'll come to with Mr. Reed -- but also somewhat minimizes intrinsic risks, that's not part of the strategy for which you're asking approval?

MR. REINER: That's correct. The gated process is not part of the strategy. It is a control that we have that we utilize in project management, but it's not part of the commercial strategy.

MR. SHEPHERD: Okay. And then finally you've been very clear you're not asking this Board to render any opinion or approval of any sort on the resulting prices or even terms that you're ending up with.

And so when you come to close these items to rate base, those may be an issue, right? They will be open issues, but -- and here's the thing I want to be clear -- what you're saying is at that time nobody can challenge your resulting costs on the basis that you didn't take the right approach? They can say you didn't get the right answer, but they can't say you didn't take the right approach because the Board will have already approved the approach; is that fair?

MR. REINER: We would expect that a finding that finds the strategy reasonable, that the approach would then have been seen to be reasonable. Where the price would come back into play is we are working towards a release-quality cost estimate at the end of 2015. So through these various contracts, there is work that will progress that will get to us a schedule and a cost estimate.

And as we had said previously, that would essentially then establish a yardstick for cost and schedule that we would monitor the overall performance against.

MR. SHEPHERD: Okay. Let's -- thank you. That's -- I think I'm very clear on the approvals that you're asking for in this area.

Is it -- does the Board want to ask any questions about that now, or is that clear enough that I can move on to another area?

MS. HARE: Please move on. Move on, please.

MR. SHEPHERD: Thank you. All right. The next area I want to talk about is the total cost of the project.

And what you've said is that you have a 90 percent -- 98 percent confidence that the total cost, the actual end result cost in dollars of the year as it's spent will be $12.9 billion, right?

MR. ROSE: That's correct.

MR. SHEPHERD: So that's -- that's not your point estimate; that's the 10 billion plus, so the top of your range, your confidence range?

MR. ROSE: That is also correct, yes.

MR. SHEPHERD: You had a discussion yesterday about whether the Board should set that as a cap and that sort of thing. And I understand that that's not what you're asking for, or proposing, but in terms of assessing what you're proposing in your overall project, is it reasonable for the Board to assume that the all-in cost at the end of the day will not be more than $12.9 billion? Is that a reasonable assumption for them to make?

MR. REINER: I would not say will not be, because there is also the potential for unknown things to arise, and then we would have to evaluate what the impact of those unknowns are.

MR. SHEPHERD: Yes.

MR. REINER: And then the decisions that were made to address those. But certainly if we were looking forward at this point in time, the 12.9 is our high-confidence estimate based on the work that's been done to date.

MR. SHEPHERD: All right. You have a point estimate, which is lower than that, right?

MR. REINER: That is correct.

MR. SHEPHERD: And that's a confidential number?

MR. REINER: Yes, it is.

MR. SHEPHERD: Can you just -- I understand why the components of that are confidential. I don't understand why the total is confidential. Can you just explain that? What's the concern?

MR. REINER: Because we have not yet agreed on target pricing with our contractors, we are reluctant to disclose any information that allows them to start figuring out what our views are on what those target prices would be.

So the sensitivity is around negotiations that are yet to be had with our contractors. And that's why we want to disclose them in a confidential manner, so that these don't become public information.

MR. SHEPHERD: I understand why the components of your point estimate are confidential for that reason. That's absolutely sensible.

What I don't understand is why the total would be, given that knowing the total is not going to help you with what each component is going to be, right?

MR. REINER: You know, it starts us down potentially slippery slope, you know, what groupings are acceptable to make public, what groupings aren't acceptable to make public. So our position was fairly black and white. Where it's point estimate-related, we ask that it remains confidential.

MR. SHEPHERD: Okay.

MS. HARE: Yes, I don't understand that at all. You've disclosed that it's 12.9, and then Mr. Shepherd asked is the point estimate lower. And you said yes. So you won't disclose that number, but you had no problem disclosing the 12.9?

MR. REINER: That is correct.

MS. HARE: I don't understand why you can disclose one and not the other one?

MR. REINER: The other --

MS. HARE: Again, we're talking total numbers, not the components.

MR. REINER: Yes. No, I realize we're talking total numbers. Our position has been where we get to point estimates, those are reflective of our views on what the target prices should be.

MS. HARE: Isn't that good for contractors, to see that so that they know that --

MR. REINER: No --

MS. HARE: -- you know, it's not 12.9; it's really something less?

MR. REINER: It can and it can't be good. If -- you know, there's a variety of negotiating strategies to take. I would not start with my point estimate if I was negotiating. I would want them to see a lower number than my point estimate, because in all likelihood there will be a discussion with the contractor that will try to get that point estimate as high as they can get it.

Our strategy will be to drive that down. Now, it will all be done within the scopes of work that we're talking about and the estimates, but, you know, it isn't necessarily good to be disclosing our view of what the price should be.

MR. SHEPHERD: Your point estimate has an uncertainty around it, and the 12.9 is the top of your uncertainty band, right?

MR. REINER: The point estimate doesn't have an uncertainty band. It's a point estimate.

The uncertainty band, there is a –- there is an uncertainty, if you're referring to sort of the class of estimate, yes. There is, based on the -- based on the discussion -- we had a technical panel. We're at a class 3 estimate, essentially, working our way down to a class 2 estimate, a more detailed estimate.

So there is a range around the point that does exist. It isn't the -- it isn't the, you know, 10 billion on the upper end or the 6 billion on the lower end. It falls within that.

MR. SHEPHERD: The reason I ask this is you've said publicly that your current estimate is a class 3 estimate. That you have a point estimate; that it's a class 3 estimate?

MR. REINER: Yes.

MR. SHEPHERD: It's actually a class 3/4, right? It's not quite 3 yet, but it's close?

MR. ROSE: I wouldn't say it's a class 3 at this point. I would say it's more likely more --

MR. SHEPHERD: And the classification relates to the level of certainty and the level of work you put into it. And so you have five levels. So you've done 4 and you've done 4, you're now at 3, and the release-quality estimate will be a class 2?

MR. REINER: It will be between 2 and 3. In some cases, there may still be some elements of class 3 at release-quality estimate, but certainly for the large job, the re-tube and feeder replacement, it would be a class 2 estimate.

MR. SHEPHERD: Class 2 estimate means that you've essentially -- I'm going to oversimplify this, and I'm sure Mr. Gould will jump in and say: No, obviously you're not a specialist in this area.

But class 2 essentially means that you've done enough preliminary work to identify all the major risks, including the risk that would come out of engineering and design and that sort of stuff, and that you anticipate that you've got almost all of the major risks identified and quantified, right? Is that fair?

MR. ROSE: Yes, a class 2, the detailed design is done, the comprehensive work packages on how you're going to do the work are done. So you understand the job, you understand the risks associated with executing that job, and you have a tighter band of uncertainty, so to speak, against where you are before you do engineering.

MR. SHEPHERD: At a class 3 level -- let's assume your number is class 3 now, and here is why I was asking the question about confidentiality -- once we know that your top overnight number is 10 billion and your loaded cost is 12.9 billion, and you know it's a class 3 estimate, it's actually pretty mathematical to know where your point estimate should be, because you know what the uncertainty band should be around your point estimate and you know that the 10 is at the top of the range, right?

MR. ROSE: Not necessarily, because the -- for one, there's about 50 to 60 percent of the job which is direct to contractor work.

MR. SHEPHERD: Yes.

MR. ROSE: Of that each of those elements have -- some of them are at class 3, some are at class 4. There are some -- some minor ones that are still at class 5. So there is a blend. Generally speaking on average we are at class 4, progressing to a class 3, but I don't know that it's simple math and people could figure that out.

So in addition to that we have our contingencies that are in there that are based on the level of uncertainty. We also have our own assessment of where the other discrete risks that are above and beyond that estimating uncertainty, and we have our own management reserve.

MR. SHEPHERD: And -- okay. Contingencies are not intended to cover forecast uncertainty, right? They're intended to cover the fact that you will have things happen that will cost money that you don't have specifically budgeted. And so you expect to spend the contingency, right?

MR. ROSE: Our contingency is for the residual risk associated with an item, and it's really two major components. Estimating uncertainty. Based on our current planning, the price may be different than what our current plans say, plus it's a -- there's a contingency for discrete risks associated with specific events. As an example, the regulator asks us to do additional scope. There would be a discrete risk for that event. We would carry a probability, and a consequence of that, that residual risk, would be included in our contingency. For a Monte Carlo we get to a P90, which is embedded in our overall high-confidence estimate.

MR. SHEPHERD: Describe what a P90 is.

MR. ROSE: Ninety percent probability that the cost for that work will fall under that number.

MR. SHEPHERD: Okay.

MR. ROSE: So at our high-confidence estimate we're saying we've got in essence a 99 percent confidence that our estimate will fall under that number.

MR. SHEPHERD: So basically all the risks are quantified and treated like they're going to happen.

MR. ROSE: Yes, in essence, yes, from two perspectives, from the estimated uncertainty, the fact that some jobs are not as defined as other jobs so we carry a broader range for those. As you do the detailed engineering that range tightens, plus the discrete risks that we're aware of on this job.

MR. SHEPHERD: Here is why I'm going for this. I don't actually remember what the point estimate is. I've seen it, but I don't remember it, so I can't blab it. But let's say it's 8-and-a-half billion dollars. As I say, I don't know what it is. That implies a certain range of uncertainty around that, given that you've said 6 billion to 10 billion, right? Now, I heard you yesterday say 6 billion isn't really realistic any more. That's not going to happen. You know for sure.

And so it's really a range around 7- or 8 billion to

10 billion is really where you are right now, and somewhere in there is the number that you think is going to happen. And that just seems, at this point when you haven't done the engineering, it seems to us, and obviously you heard the questions yesterday, it seems to a lot of people like it's very narrow for where you are in the project.

Doesn't that concern you? And then I'm going to ask, Mr. Gould, for you to comment on that as well.

MR. REINER: I'll maybe start, and I'll ask Mr. Rose to chime in. If you look at that estimate and you break it down into its components, and in the confidential filing you can see those components, there is a sizeable cost associated with things that are fairly fixed but we can predict fairly accurately, and it would include things like waste-related cost, fuel-related costs.

The OPG project management costs are essentially time and material. We know what our burden salary rates are and how much time the project will take to execute. There is some uncertainty around that, because there is schedule uncertainty.

But when you peel all of those things away, and then what you are left with is the executable work that the contractors will perform, the refurbishment, scope of work, so to speak, that becomes a smaller number.

And then when you look at the amount of contingency that would be inside that point estimate, you then start to see that it actually -- the ranges actually do line up.

MR. SHEPHERD: So what you're saying, in essence, is if the stuff that can really go wrong -- sorry, if the stuff that could really go wrong is really only $3 billion in actual costs, let's say, and then you've added on reserves and contingencies and stuff, and then you've got all these other things that are sort of within your control, like your own internal costs, then that $3 billion has to go very, very wrong to get you outside of the, let's say 8- to $10 billion range, right?

MR. REINER: I think that would be a fair -- based on the way we are structuring this project and getting to, you know, engineering complete before release quality estimate, the mock-up, the tool testing, all of that, our expectation is that our point estimate, plus whatever we still -- you know, there will still be a question at that time that we have not yet landed on around management reserve that we will clarify as well. We expect that there's going to be a high degree of certainty.

MR. SHEPHERD: All right.

MR. REINER: Now, there are still -- just maybe to add, there will be some unknowns that we are still going to encounter that could result in scope increases, because we are not able to assess every component in the power plant. So there are still components inside the reactor that we need to look at and potentially refurbish. We're drawing on operating experience from the other refurbishments and are projecting to see what we may encounter inside a Darlington unit, but there are still some of those unknowns, and they will be held in contingency.

MR. ROSE: Mr. Shepherd, in your question you said that, based on the fact that we haven't completed engineering, would we -- how can we be so confident in the contingency that we have, and I just wanted to clarify that. You're right, we haven't completed engineering, but there is a significant amount of engineering that has been done. Specifically for our largest job, the retube and feeder replacement, a significant amount of engineering has been done, and that job has progressed the farthest along from our level of certainty.

Some of the next bigger jobs, turbine generator, as an example, the engineering also has progressed quite a long -- quite a ways, and we also have, if, you know, getting back to our breakdown, we have some fixed-price contracts for the large components, the supply components of that job, so there is some degree of confidence in having those types of contracts in place as well.

MR. SHEPHERD: Well, the biggest and most risky of the components is the retube and feeder replacement, and I take your point, Mr. Reiner, that until you get inside the reactor you haven't really done the hard part of the engineering yet, because you have to look and see what you've got.

MR. REINER: Well, the engineering on that job is actually not the complicated part. Aside from -- I don't want to oversimplify it. The tooling is very complex, and that's progressing quite well. It's being done on a target-price model. But -- sorry, on a fixed-price model.

The --

MR. SHEPHERD: Let me just -- that was -- that's behind schedule but it's catching up; right?

MR. REINER: One of the tools is tracking behind -- there are 450 tools in total that are being built. One of the tools is behind schedule and catching up, yes.

MR. SHEPHERD: And that's risking your critical path right now, but you're hoping to get back.

MR. REINER: It is potentially risking the critical path. We have found a way to get that off the critical path --

MR. SHEPHERD: Ah.

MR. REINER: -- through other changes we've made, so it won't affect critical path, and we will get it back on track. But in terms of the engineering itself, a retubing of a reactor is essentially a like-for-like component replacement, so we're not redesigning the power plant.

There are obviously material specifications that have to be developed. They are done. Material orders have been placed. There are some changes in the metallurgy for some materials. That has been completed. The orders are ready to be placed. I think in most cases all long lead orders have been placed.

So the job itself, what creates the complexity in this job, is that you have 480 fuel channels, 960 end fittings, 960 feeder pipes. If it isn't executed in a very precise sequence or an issue arises that might require you to go back and rework, which was the case at Point Lepreau, you're having to do that 480 times. And if it takes you half a day to do that work, you multiply that by 480, you can see how the schedule overruns arise.

So it becomes a complicated job from the perspective of orchestrating the execution. What we've done to mitigate that is we've built the mock-up. We're going to rehearse all of this. We're going to test it all. We're going to test the actual installation of the components, so that before we go into the reactor we have a high degree of certainty what we captured in the schedule is actually achievable in real life.

MR. SHEPHERD: That's actually where I was going, so thank you. Because that sounds like what's going to drive this project in terms of its success or failure is not really going to be your commercial and contracting strategies, it's going to be your project management strategies. You're taking a project management approach, which is -- sometimes you manage a project, and you say: Let's use the 80/20 rule. Let's get as much right as possible and we'll fix what isn't -- what wasn't done right the first time.

In this case, you're saying: No, let's not do that. Let's absolutely make sure we get it right the first time on everything, right?

MR. REINER: That is -- so the operating experience that led to the decision to manage the project as we are, as you said, to build the mock-up, is really about getting productivity levels to a high level before the work starts on the reactor face.

Every prior refurbishment had a run-up curve on productivity. Tooling, for example, was used for the first time on a reactor face, and the bugs needed to be ironed out.

All of our tooling will be tested, the maintenance activities will be known, the operations will be known. There are going to be some fine-tuning and adjustments that will need to be made. We want that to be done in the time leading up to refurbishment on the mock-up, so that we enter at a high productivity level.

Going back to the contracting strategy just for a second, the project management approach is very critical -- and that's the owner oversight that we have implemented -- but there is an element in the contracting strategy that is critical as well, because we do want to incentivize the contractor to hit the schedule timelines and stick to those schedule timelines.

And that does become important, again because it's a very repetitive job. It becomes important for us that that's maintained, and that's why the incentive and disincentive structure is in there, on both schedule and cost.

MR. SHEPHERD: Excellent. That was very helpful.

Can we turn to you, Mr. Reed? And I would like to look at your report for a minute, if you don't mind. And I want to start with attachment A to your report, which is the scope of services.

And this is marked "confidential" but I don't think it's a confidential document in this proceeding, is it? No. Do you have that?

Madam Chair, I don't have a compendium. because I'm only going to refer to five documents. And in each case I'm going to refer to a lot of the documents, so it didn't make sense to put it in a compendium.

MR. REED: Mr. Shepherd, I heard you say attachment A. Did you mean attachment 7?

MR. SHEPHERD: No, sorry, this is the report, which is attachment 7-1, and I'm looking at attachment A to your report, which is the scope of services. I took it right from your September 2013 report. It's also filed separately in the evidence.

MR. KEIZER: This is the scope of service? Is that what --

MR. SHEPHERD: Yes.

MR. REED: I think I have it. Go ahead.

MR. SHEPHERD: I have a couple questions about this --

MS. HARE: One second, please. We're waiting for it to come up on the screen.

MR. SHEPHERD: I found it at the end of 7-1. Also at the end of the contract. If you go to page 977 of the PDF? D2-2-1, PDF, 977. Well, it's attached to attachment 7-0.

MR. KEIZER: What page are you going to refer to, Jay?

MR. SHEPHERD: It's only a two-page document.

MR. KEIZER: Oh, sorry. It's a schedule to the letter. Is that the...

MR. SHEPHERD: Yes, the schedule to the letter. That's right.

MR. KEIZER: Thank you.

MR. SHEPHERD: Excellent. So I just have a couple questions about this, Mr. Reed.

When we talked with Mr. Gould about his retainer, he made clear that this is an internal activity that OPG was doing as part of the normal course of managing the project. It wasn't really for regulatory purposes; it was so they would have somebody separate, looking at what they were doing and challenging what they were doing. We heard that discussed yesterday.

My understanding, Mr. Reed, about your project is it was not like that. You were retained by -- not by OPG, but by legal counsel to -- for OPG, to assist -- to provide an opinion and an analysis as part of the regulatory process, right?

MR. REED: No, that's not entirely correct. Our scope did include potentially providing an opinion for the regulatory process, but our engagement began with assisting counsel to advise with regard to commercial aspects of the strategy and the contracting strategy.

So if you take the very first bullets on that page A-1 that you've taken us to, we began with work that had nothing to do with the regulatory process or providing an opinion for that process.

MR. SHEPHERD: Okay. Well, you weren't -- you weren't telling counsel how to write their contracts, right? You were advising what the structure of the business relationship should be from a best-practices point of view, right?

MR. REED: We were advising counsel and the client with regard to the commercial strategy, the contract strategy, and the reasonableness of both.

MR. SHEPHERD: Okay. So my question was: Are you telling them what to put in the contract, what words to write, or are you telling them about the business relationship? You're not a lawyer, right?

MR. REED: That's correct. We're not drafting the contracts, but we are telling them our views with regard to structure of the contracts.

MR. SHEPHERD: And your -- at the time you were retained, it wasn't a blank page. They had a proposal that they wanted to go ahead with, they had a strategy, and they were asking you to give an opinion on their strategy, right?

MR. REED: There are five different opinions that we've provided for five different work packages, as well as an opinion on the overall commercial strategy. At the time we came in, they had a very early draft of the commercial strategy, which changed substantially after we were engaged. They did not have early drafts of the other contracting strategies, so those were developed as we went along.

MR. SHEPHERD: Should the Board assume that the commercial and contracting strategies are your work, or

OPG's work that you're providing an opinion on?

MR. REED: They are OPG's work that we're providing an opinion on to this Board, but we were certainly involved in providing our opinion as we went along as to how to improve that.

MR. SHEPHERD: All right. The second bullet here talks about reviewing their contract design strategy. I take it that -- and you did an opinion on the balance of plan, right?

MR. REED: Correct.

MR. SHEPHERD: But I take it you didn't provide an opinion on their specific strategy on the campus plan; is that right?

MR. REED: That's correct.

MR. SHEPHERD: And so the fact that that sort of got a little screwed up, not really your fault. They didn't ask you the way to do it.

MR. REED: We did not provide an opinion. We were not asked to look at the campus plan at all.

MR. SHEPHERD: All right. So Mr. Reiner, why was -- you had an expert in place in 2011, was it? Was it in 2011, Mr. Reed?

MR. REED: Yes.

MR. SHEPHERD: So you had an expert in place. Why didn't you ask for advice from the expert about the strategy in the campus plan?

MR. REINER: The campus-plan strategy is a pretty straightforward strategy. The campus plan is really all about facilities that are needed in order to accommodate station operations for another 35 years and the refurbishment project. So it gets into, in large part, buildings, office buildings. Some of those office buildings have maintenance shops associated with them, lunch rooms, change rooms. There is a complicated job, the D2O storage building, which needs to house heavy water. There were already contracts in place that were being utilized to execute that work, so we didn't see that as really an area that we would have, you know, sought that kind of assessment.

Now, we did, though, however -- you know, the contract that is used to do the campus-plan work has similar elements to these contracts. There are fixed-price elements to some of the jobs, there are target-price elements, so there are parallels. But we didn't see that as having the kind of impact, potentially, that a retube and feeder replacement job would have and not getting that right.

MR. SHEPHERD: Well, the key decision you made on the campus plan, as I understand it, was to go with existing contractors with whom you had existing agreements, right?

MR. REINER: That's correct, yes.

MR. SHEPHERD: And treat it as part of your sort of day-to-day projects that you do on a regular basis every year, as opposed to segregating and having it -- writing it up separately.

MR. REINER: It would be -- so the strategy was to utilize the projects organization in OPG that executes the capital-project portfolio that is part of the nuclear operations business and to use that organization and those processes and the contracts to execute that work.

MR. SHEPHERD: But you ultimately used a largely target price with some fixed-price components, the same as you're using with SNC-Aecon, for example?

MR. REINER: Similar to, yes. Yes, similar --

MR. SHEPHERD: And you started out with more fixed price and therefore less oversight by OPG and changed it as the problems arose to increase your oversight.

MR. REINER: It -- so the campus-plan projects were really the first projects being executed in this EPC model.

MR. SHEPHERD: Yes.

MR. REINER: And the initial approach for managing that EPC arrangement was a more hands-off approach.

MR. SHEPHERD: And that turned out to be wrong.

MR. REINER: And that turned out to be wrong, and that has been corrected and has been adjusted, and it is a learning that we've incorporated into the future project work.

MR. SHEPHERD: All right. Mr. Reed, back to you. Still on this page dealing with the scope of your services. One of the things, if you look at the bullet under "industry practices and strategy employed", you'll see that one of the things that you're asked to do is apply your knowledge of best practices for procurement for these types of projects, right?

MR. REED: Yes.

MR. SHEPHERD: And also to identify how contracting practices in Canada differ from the United States, right?

MR. REED: Yes.

MR. SHEPHERD: So I heard you yesterday say, and make a point, in fact, of saying, Lookit, there is no textbook here. There is no standard way of doing this right. It's on a case-by-case basis. Isn't that true?

MR. REED: It is a case-by-case basis. You have to develop a solution that's appropriate for the circumstances of each project.

MR. SHEPHERD: So when you talk about best practices, it is not like there is a gold standard somewhere. It is, in this situation this is a good way to react to this problem or this problem, right?

MR. REED: There is not a single solution, if that's what you mean by "gold standard". There are still best practices, and it depends, of course, on the nature of the project, the level of development, whether it's a new project or an existing refurbishment or upgrade of an existing facility. The expertise and capability set of the owner of the project is very important in selecting the right strategy and the experience they've had in other mega-projects or large projects. So --

MR. SHEPHERD: So for example, the problems that happened with the projects and modifications or projects and maintenance? Projects and modifications? What's it...

MR. ROSE: Projects and modifications.

MR. SHEPHERD: Projects and modifications group, those problems came about because they were inexperienced, you would say, they were inexperienced in handling projects of this size and complexity, and so it would have been better to have a group that had more experience and expertise in that area, right?

MR. REED: Right. We haven't conducted a review of why things went the way they did on the campus plan. That's Mr. Gould's area, and I'm sure he can answer that question better than me.

MR. SHEPHERD: Would that be a fair conclusion, Mr. Gould, that the problem with that area was really that the group that was running it simply didn't have the experience in running that kind of work?

MR. GOULD: What we say is there is no issue with the contract itself or the contract model itself. It was the management approach that was applied to it, as you stated in your question. You talked about an initial hands-off approach, and that's what we saw occurring on these early pilot projects.

MR. SHEPHERD: Wonderful. Back to you, Mr. Reed. One of the things that you've been very clear about, what you -- what your analysis is about, and if I can paraphrase what you said yesterday, you answered the question, are they doing it the right way, not the question, are they getting the right answer. Is that fair?

MR. REED: I can't tell you whether it's way or answer (sic) unless I know what the question is. If the question is, is this the appropriate contracting strategy, then the answer is, yes, they're getting the right answer, in my opinion --

MR. SHEPHERD: But that's about their approach. That's not about the results. You're not providing any opinion on their results, only the approach.

MR. REED: Not entirely correct. If you go to our statements in, for example, attachment 7-1.

MR. SHEPHERD: Okay.

MR. REED: At page 2 of that document, which is in (iii), tells you specifically the questions we are answering. The first is, are the commercial strategies selected by Ontario Power Generation reasonable, and the second is, are those commercial strategies being executed in a reasonable manner.

So we are engaging in a review of conduct, as well as form, and question 2 goes to conduct.

MR. SHEPHERD: Okay. So the distinction I was trying to make was between conduct and results. So you're not forming an opinion on whether they have selected the right contractor, whether they have got the right price or even the right pricing model. None of that. What you've said is they have gone about this the right way.

MR. REED: I think that, and that the decisions they have made have been within a range of reasonable behaviour. I think our exclusions are quite clear in section 5 of our report, but we have focused, as I said, on decisions that they made and whether those were within a range of reasonable behaviour.

MR. SHEPHERD: And that leads to the second question, and you've emphasized this a number of times, that your opinion is not that what they've done or what they're planning to do is optimal. What your opinion is, is it's within a reasonable range. That's quite different, right?

MR. REED: Yes, reasonable range and reasonableness is different than achieving optimality --

MR. SHEPHERD: And so there could be other ways of doing this? They could have chosen other ways of doing this that would also be within the reasonable range, true?

MR. REED: That's correct.

MR. SHEPHERD: Okay. I just want to talk briefly about the nature of risk management, because you talk about this in your report, and this is really central to these commercial and contracting strategies.

When you're managing risk -- and this may be for you, Mr. Reiner, if not -- or Mr. Reed, either of you -- when you're managing risk, there's really two things you can do. You can either reduce the probability that the risk actually happens, costs anybody anything, or you can shift the responsibility for paying for it to somebody else.

Those are basically the two methods you manage risk, right?

MR. REED: No. The third is managing the severity of the risk.

MR. SHEPHERD: Which is really part of -- when I said probability, I meant probability, severity, the combination; but you're right.

But that's about reducing the absolute cost of the risk versus changing who pays for it, right?

MR. REED: That's correct.

MR. SHEPHERD: All right. And with respect to reducing the absolute cost of the risk -- tell me whether this is right -- there's two main ways you can do that.

One is that you can increase your control or your visibility or your oversight, so that you can manage the risk or the severity of more tightly.

And the second is if you're not able to do that, you can motivate or incent somebody else to do that in your place, right?

Those are the ways you can cause the risk to be reduced?

It's not a trick question. It seems straightforward to me.

MR. REED: No. It actually is quite a bit more complicated than that. Probably an example is best.

You can increase oversight and management activity to help reduce likelihood and magnitude or severity of risk. You can transfer that risk, as you've said, and you can incent others to better manage the risk.

But you can also structure things so that from a decision analysis perspective, the risks that you're exposed to at any point in time are reduced. And we talked earlier -- you've raised the issue a number of times -- about gated decision-making.

Gated decision-making is a way of reducing the level of risk you're exposed to by taking individualized decision-making steps or decision analysis undertakings before the risk becomes too large. So you're not actually reducing the risk or reducing the frequency or likelihood of the risk, but you're reducing your exposure to it, by saying: I'm going to make a decision before I get too far down this path.

MR. SHEPHERD: Which ––

MR. REED: And continuing to make those decisions as new information becomes available.

MR. SHEPHERD: Which allows you, then, to respond to the risk and reduce –- before it gets too severe, and therefore reduce how much it costs, right?

MR. REED: Yes.

MR. SHEPHERD: So that's a method of reducing the absolute cost of the risk, going slow.

MR. REED: Reducing exposure to the risk, is how I would state it.

MR. SHEPHERD: All right. I'm right, am I not, that these commercial and contracting strategies are based mainly on the notion that control and risk are intimately related to each other, that to the extent that you have more risk, you need more control, and to the extent that you have more control, you're typically taking more risk; is that right?

MR. REED: I agree with that.

MR. SHEPHERD: And so when we look at the various standards -- fixed-price, for example -- you have much less control and oversight, but in theory, at least -– and we'll come to the reality in a minute, but in theory you have less risk as well?

MR. REED: In theory, under a fixed price you have less risk, yes.

MR. SHEPHERD: I wonder if you could then go to page 1 of your report.

And this is actually a question for you, Mr. Reiner, because when you talked about the approvals, you talked about the process you're going through. And this is 7-1, D2-2-1, attachment 7, page 1. And I'm in the bottom paragraph there. It starts: "The project is following a standard megaproject progression."

Do you see that, Mr. Reiner?

MR. REINER: Yes.

MR. SHEPHERD: I looked at this and I thought this sounds like it describes exactly how you're running your project; is that a fair description of your project?

MR. REINER: At a high level, if you were to roll up all of the project activities and divide it into distinct phases, this would be the description of those phases, yes.

MR. SHEPHERD: And where you are right now is you're in the middle of 3, right?

MR. REINER: We're in the middle of 2.

MR. SHEPHERD: I thought you were in the process of doing the detailed scope and project schedule right now. Are you not?

MR. REINER: We are -- there are some projects in execution phase. So campus plan projects would be in execution phase.

But the Darlington refurbishment, the work that is going to take place in the units during the unit outages, we are in the definition phase. The definition phase includes the engineering work, the cost estimating. The execution phase starts -- the line that we've drawn for the execution phase, it starts at release-quality estimate, because after that point we'll start to ramp up the resources, we'll start to do the training to get ready for doing the work in the field.

MR. SHEPHERD: Understood. Most of your scope is done, though, right? In fact, you have had some extensive analysis of scope to make sure you nail it down pretty tightly?

MR. REINER: Yes. Scope definition gets done in the definition phase. We are a long ways down the path of defining scope. Much of it is very clearly defined. We know exactly what needs to be done, but some work is still needed in some areas in order to understand precisely what the scope of work is going to be.

MR. SHEPHERD: But you've already gone through two processes where you had ex -- not external, but external to your team review of scope, and tightening of the controls over scope, right?

MR. REINER: Yes. We've gone through review processes. Those are sort of checks along the way. But we're not yet completely finished, but will be as we get to the release-quality estimate. That's the target. We will have scope.

To the extent that there are certain areas that we're not going to know precisely, and those will get factored into our contingency, but in large part -- and that relates to areas of the plant that we just can't access.

MR. SHEPHERD: Okay. Can you turn to page 5? And this is for you, Mr. Reed.

You talk about the types of risk, the extrinsic risks, hurricanes and -- or political interference or any number of other things like that. And intrinsic risks like how you're running the project, right?

MR. REED: Yes.

MR. SHEPHERD: And extrinsic risks, they're not within your control, so what you have to do is you have to sort of proceed cautiously. The best way to manage extrinsic risks is through a cautious sort of "keep your eyes open to see what's coming" approach, right?

MR. REED: Certainly that's one of the aspects of why a gated decision-making process was best here. You try and minimize your exposure to it and you try and maximize your awareness of it.

MR. SHEPHERD: Okay. So it's about visibility and about caution. True? You proceed cautiously, making sure that nothing blindsides you?

MR. REED: As much as possible, yes.

MR. SHEPHERD: All right. And part of that in a project like this, which is sensitive -- it has political and public sensitivity -- part of that is trying to keep everybody onside all the way through the piece, right? Make sure the government is happy, make sure the public is happy, et cetera, right?

MR. REED: Stakeholder involvement is an important part. You can never make everybody happy, but stakeholder involvement is important.

MR. SHEPHERD: Am I right in understanding, Mr. Reiner, that the purpose of asking this Board to review your commercial and contracting strategies is precisely to manage this extrinsic risk? That is, the risk that they will later say: Wait a second, we don't like how you did this. So you're, in effect, gating the strategy through the Board in this application; isn't that right?

MR. REINER: We are trying to be as open and transparent as we can with how the project is being managed, approaches used. We're going to disclose what the release-quality estimate is.

And a part of that is to maintain alignment across stakeholders. That is certainly a part of that.

MR. SHEPHERD: Okay. That wasn't quite my question, though.

I've characterized the request to review your commercial and contracting strategies as a risk -- a management of an extrinsic risk; is that fair?

MR. REINER: We -- you could call it a management of a risk, but we recognize that at the end of the day, our --

the way our rates get adjusted is, as these assets make their way into rate base, that's where the decisions will get made.

With a project of this duration and this length we're talking about the first unit going into service in 2019, and from our perspective it's important that there is a good understanding on how we're executing this project so that when those final decisions get made they can be made in an informed way.

MR. SHEPHERD: It's -- and I'm trying not to stray into argument, and I'm actually trying to get sort of the sense from you of where this is. It's sort of a balance from the point of view of the Board, isn't it? On the one hand they don't get to see the whole picture all at once, as they would if they just looked at the whole thing at the end. They're getting bits and pieces along the way.

On the other hand, it's fair to you to give the Board an opportunity to red-flag something if they think they don't like it. Isn't that right?

MR. REINER: We'd certainly want to understand if there are areas that are of concern, and we would want to understand why they are of concern.

MR. SHEPHERD: How do you propose that the Board deal with the fact that they don't see the whole picture all at once?

MR. REINER: I think that's where sort of we're going back to, you know, when we talked about our finding that we're seeking from the Board on reasonableness of our approach. I think we're not -- you know, I mean, I can't comment on what -- you know, where the Board sits in terms of not being able to see the whole picture, being able to see a partial picture, but I would have to think it's helpful to understand what the approach is that's being utilized, and then to be able to see that as the project progresses and to see how the project is performing relative to those approaches.

MR. SHEPHERD: Fair comment. What I'm really after here is that you've been very specific about -- and thank you -- for what you're asking the Board to determine. So for example, you're not asking for approval of the contracts or the negotiations or the prices or contractor selection.

But it's true, isn't it, that in order to assess your commercial and contracting strategies the Board still has to consider all those things. It still has to understand what you're doing in the context of the $12.9 billion number, for example, true?

MR. REINER: It will have to consider that at the point in time where those assets make their way into rate base.

MR. SHEPHERD: Well, no, I'm asking now, how does the Board consider the commercial and contracting strategies without looking at all those other things around them as we know now, like the 12.9 billion, like the selection of their successor to AECL as the contractor, those sorts of things.

MR. REED: Maybe I can chime in here, because that's specifically a point I was trying to make yesterday.

MR. SHEPHERD: Okay.

MR. REED: The Board would be looking at the reasonableness of the company's decisions in the same context in which the company has had to make those decisions. The company doesn't know what the final project is going to cost. The company doesn't know what's going to happen during execution phase and even what the RQE is. But it does have to make decisions now, and it has for the last three years, as to what the right commercial strategy is and contracting strategy.

So in my view, a test of reasonableness is one that bases that evaluation on the circumstances that prevailed at the time those decisions were made. So by examining it now, the Board is able to put itself in the same shoes the company was in in having to make those decisions without knowing the consequences of those decisions, without knowing the results for sure.

But of course, that's the position the company was in, and in my view that's the best way to judge reasonableness, is by looking at the circumstances prevailing at the time.

MR. SHEPHERD: So in essence, you're avoiding the problem of hindsight by saying, well, we won't wait 'til later to look at it. We'll look at it now when there can't be hindsight, because you're doing it now. Is that fair?

MR. REED: That certainly helps to put away -- put aside the tendency to use hindsight, is by reviewing things

on an ongoing basis, yes.
MR. SHEPHERD: Okay.
MR. REED: And that's then the primary reason why other state commissions have adopted that approach.
MR. SHEPHERD: You've talked --
MS. HARE: Could I just interject for a second?
MR. SHEPHERD: Sure.
MS. HARE: Could you just, Mr. Reed, say what RQE stands for?
MR. REED: Yes, release quality estimate. Thank you.
MR. SHEPHERD: Let me turn -- you've looked at other projects that OPG has done, right?
MR. REED: Yes.
MR. SHEPHERD: Did you look at how they approached the Niagara tunnel project?
MR. REED: No.
MR. SHEPHERD: Why not?
MR. REED: That was not within our scope.
MR. SHEPHERD: That's their most recent big project, though, isn't it?
MR. REED: We focused on their operating experience with nuclear projects, not with hydro or other civil projects.
MR. SHEPHERD: Mr. Reiner, have you looked at how OPG managed the Niagara tunnel project and how it compares to what you're doing in this project?
MR. REINER: We have. We've looked at the Niagara tunnel project. We looked at the Lower Mattagami project.

There are similarities in contract structures. A key difference, though, between those projects and the approach we're using here is those projects are executed largely in an owner's engineer type environment, where the management of the project is also essentially contracted out. And that's what we have chosen not to do on this project --

MR. SHEPHERD: So Niagara tunnel, for example, is more like a turn-key project, as opposed to a target-price project?

MR. REINER: It's -- I don't want to comment on the pricing without knowing all the details, but the management of the project is -- OPG has contracted a firm to do the management of the work and the execution of the work.

MR. SHEPHERD: Is it -- did you have learnings from that project, the Niagara tunnel project, that you're applying in this project?

MR. REINER: We do, yes.

MR. SHEPHERD: Can you tell us -- summarize briefly what they were?

MR. REINER: I mean, as we were embarking on our contracting strategies, we actually met with the organization that negotiated the contracts. And we were looking for the arrangements that they implemented, and they were arrangements used in previous hydro projects to see how those apply, and you will see similarities. So there were some very direct learnings in that regard.

Now, that project is very, very different from the project we're implementing. Now, we also looked at the owner's engineer concept, which is essentially this, you know, you contract a firm to provide you that project management capability. We chose not to do that directly, but out of some of the learnings what we ended up implementing is what we call owner support services, so we do have an owner's engineer essentially contracted for the project. In fact, we have two of them contracted to the project. But we don't use them in that exact same capacity. They provide us technical support and project management advisory support, with the project management accountability still resting with us.

MR. SHEPHERD: So unlike Niagara tunnel, you don't have some external person managing the project. You're managing the project, but you have advisors who are -- like Modus, for example, but also others who are helping you make the management decisions.

MR. REINER: Yes.

MR. SHEPHERD: Okay. Mr. Reed, if you go to page 7 of your report, you talk about the various other ways to approach the commercial and contracting strategies. You list three. And I only want to talk about them briefly. You have talked about them already.

But I take it this is true that partnering, which is what you were originally going for, right, Mr. Reiner, is partnering?

MR. REINER: That was the initial attempt on the retube and feeder replacement.

MR. SHEPHERD: And partnering -- the big problem with partnering, if I understand it correctly, is that it's like doing a project at school, where you have a group project and everybody gets hurt by the people who slack off. Is that right?

MR. REED: Everyone is affected by -- in terms of profitability by the performance of all of the members of the joint venture.

MR. SHEPHERD: So nobody wants to be stuck with the slackers, and so either it evolves to, the owner takes all the risk, or people don't want to enter into it in the first place, right? Fair?

MR. REED: Those have been problems in the past with the use of a JV structure, joint-venture structure, yes.

MR. SHEPHERD: All right. But SNC-Aecon is a joint-venture structure, right?

MR. REINER: SNC and Aecon are in joint-venture partnership, yes.

MR. SHEPHERD: So don't they have those problems? And aren't those then your problems?

MR. REINER: No, there's a very -- there's a pretty clear delineation between SNC and Aecon. Aecon is the constructor. SNC provides the engineering and project management capability. So SNC have augmented their project management capability with a constructor, so to cover that EPC, that engineer, procure, construct model, that's what that partnership does.

MR. SHEPHERD: The second possibility is a turn-key approach, and the problem with the turn-key approach, if I understand your evidence the other day, is it's supposed to shift all the risk to the contractor, but it doesn't, in fact, because at a certain point the contractor either can't bear the risk or is unwilling to, and in the meantime you're paying a big premium for it, right?

MR. REINER: I'll let Mr. Reed answer that separately, but yes, that is one of the risks. And the other potential problem that we have with the turn-key approach is -- and it does relate back to the risk -- is when a decision gets made in that arrangement, by -- and the Lepreau is a good example. A decision to proceed with the project, even though it encountered, knowingly encountered a technical issue, under an assumption that it can be resolved later.

As the owner, you would want to see resolution to that issue immediately.

You take those kinds of risks in that arrangement, and also --

MR. SHEPHERD: Sorry. Because you don't get visibility --

MR. REINER: Because you don't get visibility; you've essentially given it all to someone else to manage on your behalf.

The other issue we see with the turn-key approach is the work is being done inside an operating power plant. So there are going to be all kinds of exceptions to what makes it okay for something to be potentially delayed or have an impact on the project, because there are systems that run through the power plant. Somebody may park their vehicle in the wrong place and impact the contractor's ability to get their vehicle in. And if you leave it on a turn-key approach to sort that out, we don't see that as getting us to the result we're looking for.

MR. SHEPHERD: Do you have anything to add to that, Mr. Reed?

MR. REED: No. I think those two categories, loss of control and a misperception of risk transfer, are the greatest concern that we see with turn-key contracts.

MR. SHEPHERD: In fact, in a turn-key contract like for something like this, by the time you have the finger-pointing as to whose fault everything is, you really haven't protected your risk; fair?

MR. REINER: I think that's fair.

MR. SHEPHERD: So you can only use turn-key as a practical matter. You can only use turn-key where the contractor clearly has control over their processes from start to finish.

So for example, building a turbine, you go to somebody who builds turbine for a living and say: Build us a turbine. They can take a fixed price for that, right?

MR. REINER: A turbine would essentially be a component, complicated component, but that could be -- a manufacturer could do that on a fixed-price basis, deliver a turbine.

MR. SHEPHERD: Because they know how much it costs them to build a turbine, so you went to Alstom and said: Build us a turbine. They said: It's X dollars.

MR. REINER: Yeah. Now, it's -- if we were buying a new turbine, yes. We're not buying a new turbine.

MR. SHEPHERD: Understood.

MR. REINER: We're refurbishing an existing one, which means it needs to be taken apart, it needs to be examined, decisions need to be made about components that need to be replaced and don't need to be replaced, and it needs to be put back together.

MR. SHEPHERD: But it's still largely within their control? It's within their area of expertise and area of physical control, right?

MR. REINER: It's within their area of expertise, but in terms of control, given the labour arrangements that these projects need to be executed under, what you essentially -- so in our market here, the work gets executed by trade unions.

So when you bring a contractor in to manage the work, they need to be adept in managing trade union labour. They need to have foremen. They need to know how the union halls work. They need to be negotiating with the trade unions.

That is not something that an original equipment manufacturer like an Alstom typically do. And that is the complexity that resulted in the high-risk premium. It's that management of the trade union labour.

MR. SHEPHERD: And then the third alternative you looked at is the project management organization.

And if I understand that right, that's not really about the legal relationship. It's rather about -- you're not going to let the contractor manage, but whether you use your own employees to manage or you use a third party to manage, but it's still you managing somebody else doing the work, right?

MR. REINER: Yes. It could be an employee or it could be through some of the other arrangements, these advisory arrangements that I've talked about.

MR. SHEPHERD: So for example, in a target pricing model where you're closely managing it, you can closely manage it with your own people or somebody else doing the close management on your behalf?

MR. REINER: I would say, from my perspective, I look at this on a sort of case-by-case basis. There are certain positions where I'd be looking to have somebody on staff. There are other areas where, depending on, again, what the role, the specific role is, where doing that through a contractual, a separate contractual arrangement gets the desired result. There isn't a need to have somebody on staff.

MR. SHEPHERD: All right. I have I think three other quick questions on this report, and then maybe the Board would like a break. The first is this.

At the bottom of page 7, Mr. Reed, you talk about the cost of replacement power at Point Lepreau, I think it is. Is this Point Lepreau? Yeah.

Mr. Reiner, you don't have a cost of replacement power as part of one of the costs of this project, right? That

12.9 doesn't include replacement power?
MR. REINER: It does not include replacement power.
MR. SHEPHERD: That's a big number, isn't it? The replacement power is $8 billion, maybe? Something in that range?
MR. REINER: I haven't done the mathematics on what it is, but it's essentially -- you can -- based on the schedule that we've laid out, you know, there are 960 megawatt units down three years at a time. Got to be replaced with something, yes.
MR. SHEPHERD: You have essentially three years of production loss from Darlington over that period?
MR. REINER: For each unit, yes.
MR. SHEPHERD: All right. So we can just do the math as to how much?
MR. REINER: Yeah. Mind you, you're gaining an additional 30 years as a result of that.
MR. SHEPHERD: Oh, yeah, but you're also calculating the cost of that 30 years. And it's not just 12.9 billion, right? It's 12.9 billion plus the billions of lost power during the construction phase, right?
MR. REINER: Can you repeat what the question was?
MR. SHEPHERD: Sure. When you calculate your LUEC, how much it costs you, your lifetime unit energy costs for the power that you're going to produce for those 30 years, you're only including the $12.9 billion cost as your original cost to deliver that?
MR. REINER: That's correct.

MR. SHEPHERD: You're not including the 8 billion, let's say, of lost power while you were doing it, are you?

MR. REINER: Yeah. And it wouldn't be 8 billion. You can look at our revenues.

But no, that is -- that is not included, so -- replacement power is not included in our LUEC calculations. That's correct.

MR. SHEPHERD: I want to talk about two other quick things. If you look at page 12, Mr. Reed -- and I'm not sure whether this is for you or for Mr. Reiner –- you see the second full paragraph starts out:

"Ontario Power Generation began meeting with the proponents in July 2011 and agreed to contract principles with both parties in mid-August."

Are those -- you've seen those contract principles, right, Mr. Reed?

MR. REED: I have.

MR. SHEPHERD: Is that document on the record somewhere?

MR. REINER: I don't believe we have filed that in evidence.

MR. SHEPHERD: Is it confidential?

MR. REINER: Maybe just one second. We'll just have a quick look if it's included, but I don't believe that is a confidential document.

MR. SHEPHERD: Would you be willing to file it?

MR. REINER: Yes, we would undertake to file that.

MR. MILLAR: J16.1.

UNDERTAKING NO. J16.1: TO FILE THE AUGUST 2011 CONTRACT PRINCIPLES DOCUMENT.

MR. SHEPHERD: Am I right that those contract principles are still -- essentially, with lots of details, are still driving how you're dealing with your contractors?

MR. REINER: I think those principles were primarily the principles that were established as part of the negotiation process. They are not the principles that define, post-contract award, what the relationship is and how we're going to manage the work with the proponent, because this was done at the outset of the procurement process. And as part of -- there were a number of contractors that submitted a response to our expression of interest. What we did is laid out a set of principles under which we would get to a conclusion in the contract. So they were -- so each proponent -- these principles went to each of the proponents that we took through the negotiations.

MR. SHEPHERD: Well, what this says is that you ended up with two bidders.

MR. REINER: Right.

MR. SHEPHERD: And you met with them, and it looks to me like you negotiated the principles with the two of them; is that right?

MR. REINER: There were slight variations between them, but they're essentially the same principles, because they were the guiding principles used in the negotiations.

MR. SHEPHERD: And the contract that you've signed with SNC-Aecon is consistent with those principles.

MR. REINER: I would say that it's consistent with those principles, yes.

MR. SHEPHERD: Madam Chair, this may be a good time for a break.

MS. HARE: Good. Thank you. Let's break until 11:20.

--- Recess taken at 10:58 a.m.

--- On resuming at 11:26 a.m.

MS. HARE: I understand we're going to go in camera now, so I will take the on-air off.

--- On commencing in camera at 11:26 a.m.

MS. HARE: We'll just give Ms. Binette a moment. I think she's checking to go make sure that it's really off.

Okay. Mr. Shepherd, please proceed.

MR. SHEPHERD: Thank you, Madam Chair.

Witnesses, can you turn up the spreadsheet attachment to JT3.17? I don't think this goes on the screen. I think you have hard copies of it, though.

And -- do you have that?

MR. REINER: One moment. Yes.

MR. SHEPHERD: On Tuesday you had a discussion with Mr. Elson about this, and again on Wednesday, I think, or maybe yesterday you had a discussion with Mr. Poch about this. I want to nail down a couple of aspects of how this works.

Am I right that there are a number of different ways you can have cost overruns? Right, in a project? So for example, you can have a cost overrun because of scope change?

MR. REINER: That's correct.

MR. SHEPHERD: And you pay for that?

MR. REINER: Yes.

MR. SHEPHERD: And you can have a cost overrun because the contractor fails to live up to their warranty commitment, and they pay for that?

MR. REINER: That's correct.

MR. SHEPHERD: And you can have cost overruns because of third-party events, like -- like a delay by the government, for example, and you pay for that?

MR. REINER: That's correct. We would.

MR. SHEPHERD: And basically, except for warranty issues where the contractor has not lived up to their bargain in the sense that they were supposed to do something and they didn't do it correctly, with that exception, you pay for all the cost overruns, right?

MR. REINER: There is a cost, but that's not precisely correct, because if there is a cost overrun or a schedule delay, the contractor also bears a cost.

MR. SHEPHERD: Okay. That's where I'm going.

The actual cost of the delay -- that you pay, right? The difference is that there's also a profit component; 30 percent is added on for overheads and profits. And they eat some of that if there is a cost overrun, right?

MR. REINER: Right. They start to repay some of that if there is a cost overrun.

MR. SHEPHERD: But the actual cost overrun itself, that's your responsibility? It's only the profit component that's at risk, right?

MR. REINER: We would continue to pay the actual cost. So hourly labour rates and materials, we would continue to pay that, but there would be no mark-ups or profits or overheads that the contractor would receive.

MR. SHEPHERD: Understood. Understood.

So if I understand how this works correctly, then, from the contractor's point of view the project is time and materials for the actual costs, and plus a profit -- an overhead component, which has a minimum and a maximum; is that fair?

MR. REINER: I don't think that the contractor would view it that way, because the incentive and disincentive structure would incentivize the contractor to actually perform better than the schedule. Because the costs –- so if you look at actual costs for a second, that's money out of the contractor's pocket as well. The contractor keeps none of that. So they will be --

MR. SHEPHERD: But none of it is at risk either?

MR. REINER: It's not at risk. That's purely paying the hourly salary of the people that are there doing the work.

But the contractor has a huge incentive to eat the target cost and schedule. So they wouldn't view it as a time and material; they would look at every opportunity to try to do better than the schedule.

MR. SHEPHERD: I'm not disagreeing that it's an incentive. I'm just trying to be clear on what the incentive and the risk is.

In this example you've given, where you have $1.8 billion of target price -- which is the time and materials component, right? In this example?

MR. REINER: That would be the cost of the execution of the job.

MR. SHEPHERD: Not including any overheads, not including any profits?

MR. REINER: That's correct.

MR. ROSE: That is correct.

MR. SHEPHERD: All right. So from the contractor's point of view, they have a contract in which they expect to pay -- they expect their costs to be 1.8 billion, all of which you'll pay, and in their worst case -- leaving aside the schedule disincentive for a second and just dealing with the cost disincentive -- in their worst case they get $280 million for overheads and profits? No matter how much they go over budget, they go $280 million of overheads and profits, right?

MR. ROSE: Yes, you are right, excluding schedule.

MR. SHEPHERD: And in their best case, they make $540 million?

MR. ROSE: That is correct.

MR. SHEPHERD: Okay. And if they have -- not only is -- do though blow their brains out on the cost, but also the schedule slips -- which costs you but doesn't necessarily cost them more, because that's already included in the cost disincentive -- then their worst case is $108 million for profit and overheads, which basically means they don't make any money, right?

MR. ROSE: Worst case if they blow the schedule, they are eligible for the cost element, the 260 million.

MR. SHEPHERD: Yes.

MR. ROSE: Plus up to -- so 432 million.

MR. SHEPHERD: Yes, so that means that there's 108 left. Their worst case, they go two years too long and they spend $4 billion, their worst case is you still have to pay them $108 million for profit and overheads, right?

MR. ROSE: They would receive $108 million to cover their profit and overheads.

MR. SHEPHERD: This starts with a 30 percent profit and overhead number. Is that some sort of external metric that is standard? Or where did that 30 percent come from?

MR. REINER: That's a negotiated number.

MR. SHEPHERD: Is that typical of the profit and overhead you've had in other contracts?

MR. REINER: Yes, it would be reflective of that.

MR. SHEPHERD: And Mr. Reed, have you given an opinion on this overhead amount?

MR. REED: We were involved in discussions at the time those negotiations were going on. We reviewed all of the terms of the contract, and gave our opinion that they were generally within the range of what we had seen before.

We did not offer a specific opinion on the 30 percent number.

MR. SHEPHERD: And Mr. Gould, have you given an opinion on the 30 percent number?

MR. GOULD: Not specifically relative to the 30 percent, no.

MR. SHEPHERD: And now you heard Mr. Poch the other day coin the phrase "fantasy profits" to talk about the additional profits that you're saying that the contractor is losing.

And if I understand this correctly, what you're saying is in that $4 billion example, they spend $4 billion, everything's gone very badly, they're still getting 108 million, they would normally expect to get 30 percent of $4 billion. But they're not getting that; they're only getting 108 million, right? That's essentially what you're saying?

MR. ROSE: That is correct.

MR. SHEPHERD: So the point of this is not to offload the risk of the overrun, if I understand correctly, because really you're still paying the costs of the overrun. What it -- what you're attempting to do is incent the contractor to reduce the probability or the severity of the overrun itself, right?

MR. REINER: Right. The intent is incentivize the contractor to achieve the target schedule and target price.

MR. SHEPHERD: And so that's in contrast to, and really, this is central to your whole strategy. Instead of trying to lay off the responsibility for paying for risks, you're saying we're going to take the responsibility for paying for the risks, but we're going to incent you to make sure they don't happen; is that fair?

MR. REINER: It's -- it's partly fair. We will incent the contractor to ensure they do everything that is within their power to manage the cost overrun. At the same time, OPG provides direct oversight of the job.

So we track a schedule and the cost on daily basis. So there is no surprise of a $2 billion cost overrun at the end of the project. There will be requirements to develop recovery schedules to get back on track.

MR. SHEPHERD: Do I understand correctly -- and I'm looking at this table thinking, where is the dividing line, and it looks to me like around 30 percent cost overrun. There is no more cost disincentive. If a contractor goes 30 percent over, they've already given you all their cost disincentive, and there is no more disincentive after that on cost.

MR. REINER: You know, this is why we didn't really like using this as an example to describe what the job might look like. This is a mathematical exercise that shows you how the contract works. And I think we were pretty clear in trying to define that.

What actually physically happened, if there is anything that would create a probability of a 30 percent cost overrun, we would deal with the issue. We would manage the issue to avoid the cost overrun from actually happening.

That's why this model is so important with OPG oversight being embedded in this with the standards we are asking the contractor to adhere to in terms of cost reporting, schedule reporting, supervision on the job, their practices for executing the job, qualification of people.

So you can't -- this is a mathematical exercise is all it is, that demonstrates how the mechanisms, if you were to plug them into a formula, would work.

MR. SHEPHERD: So that's really where I was going, and that is that this is not about how you structured the contract, primarily. This is really about how you manage the project. You're going to control the cost in this by keeping a very close eye on what's going on and acting quickly if something is going awry; is that --

MR. REINER: That is exactly part of the approach here, yes.

MR. SHEPHERD: Well, it seems to me that's the essence of the approach, isn't it?

MR. REINER: Well, it is -- it's the combination of ensuring the contractor works to the same objectives that we have. And that's what the -- and the objective is, meet the schedule and meet the price. So the contractor is incentivized to achieve that objective. Our objective is very clear, and so it's the combination of the two. It's our oversight and the benefit, the opportunity, and the pain the contractor feels when they also don't align with that objective.

MR. SHEPHERD: Now, if something is going awry, you can -- you can't actually tell the contractor do this differently, right? Under the contract, you can't tell them to do something differently, because then you take responsibility for the cost consequences of that, right?

MR. REINER: Well, that's correct. I mean, we could tell the contractor to do something differently, but that would then be a direction offered by OPG, and any of the risks associated with that specific direction would come back to OPG.

MR. SHEPHERD: So if something is going awry, all you can do is -- your method is, you need to know about it really early. And so that's -- this is structured to do that, right?

MR. REINER: We need to know about it early. The way we find out about it early is by being embedded with the contractor. But, you know, just to -- on this, we can give direction. You know, this isn't about not being able to give direction. And there are some examples that are very, very clear.

If there is anything that creates a safety issue, we will demand a stand-down on the job so that that issue gets rectified --

MR. SHEPHERD: Understood. But where I was going with this, Mr. Reiner, is that what you're more likely to do is say to the contractor, Here -- we see the problem. What's your solution? Because if it's your solution then you have to take the risk. If it's their solution they're still on the hook, right?

MR. REINER: Yes, and we would -- so we would ask them to develop a solution. We would ask them to demonstrate to us how that recovers the cost and the schedule, and then we would track the performance, and if we don't see the recovery we would ask them to address that issue, provide another solution.

MR. SHEPHERD: And the reason they're going to do that is because if they don't they have $260 million at risk, right?

MR. REINER: That's correct.

MR. SHEPHERD: You don't have -- and I'm asking this, and this is why I'm asking this in camera -- you don't have as a practical option saying to the contractor, We're kicking you off the job and getting somebody else, do you? Not really.

MR. REINER: No, we -- that is a practical option that is available to us. It most definitely is.

MR. SHEPHERD: Who would you use?

MR. REINER: Well, so the tooling is all owned by OPG. The people that we have managing this job, they actually ran the job for AECL at Point Lepreau. So self-managing the job is something that is achievable for us. It's not something we would propose to do.

MR. SHEPHERD: I thought that's what you were doing. I thought you --

MR. REINER: No, I mean, in terms of -- so if we got rid of the contractor, for example. We're managing the project and overseeing the project, but let's say we got to a scenario where it went so bad that we had to kick the contractor off, off-site. We could keep the job going.

MR. SHEPHERD: And the option -- your option then isn't to call up some other contractor and say, Come in and finish the job, it's really to use your own people and maybe to use contractors in smaller components but really to do it yourself.

MR. REINER: I mean, there's a variety of options. We could call in another contractor.

MR. SHEPHERD: But there aren't any. That's my point.

MR. REINER: What do you mean, "there aren't any"?

MR. SHEPHERD: You only ended up with two bids, and really, one of them couldn't actually do the job, right?

MR. REINER: But there's nothing -- so at this stage -- so when we bid the project we were looking for the development of tools and the engineering work and the execution of the work. If we were into this scenario, the tool development is done, all of the engineering work is done. We're now into the construction portion of the job.

The construction portion of the job is largely foremen and trades labour and the management of that, which is what Aecon brings to the job. We didn't go out looking specifically for a constructor; we went out looking for an engineer/procurer/construct contractor. If we were in this situation and all we needed was a constructor, we could go to the market and get a constructor.

MR. SHEPHERD: But then you would have to do everything else, and you have people would could do that, but you'd probably have to augment your staff to do that.

MR. REINER: We may have to augment our staff in order to do that. I mean, that's something we would have to assess, but that --

MR. SHEPHERD: So --

MR. REINER: -- yeah.

MR. SHEPHERD: So SNC-Aecon would know going through this piece that if there is a big problem you can solve it, but it's very painful for you to solve it by getting rid of them, really.

MR. REINER: It would be painful, and it certainly wouldn't be the desirable outcome, which is why we were very careful in selecting who we selected to actually do this job.

MR. SHEPHERD: Well, that's -- and actually, before we go out of in camera maybe I can ask that too. All of the other projects that you looked at, Mr. Reed, for CANDU reactors included AECL, didn't it?

MR. REED: Yes, AECL has been involved in at least an engineering capacity for all of them, sometimes in a larger capacity.

MR. SHEPHERD: Yeah, in many of them they actually do the job, right?

MR. REED: Yes.

MR. SHEPHERD: Is that a common element in the costs overruns we've seen in the nuclear projects?

MR. REED: AECL's involvement is a common element, but, for example, AECL was involved in Wolsong in a major role, a leading role. There were not substantial cost overruns there. They're also currently involved in the refurbishment in Argentina. I've forgotten the name of that unit at the moment. I'm sorry? Embalse, yes. And that project is trending pretty well.

So I don't see them as being the root cause, if that's your question.

MR. SHEPHERD: Okay. Just before we go out of in camera I do want to ask two brief questions about the point estimate. So what is the point estimate right now, the total?

MR. REINER: I'll ask Mr. Rose to --

MR. SHEPHERD: I would have thought it would be top of mind.

MR. ROSE: It's 9.2 is the top of my number, but I just want to give you the precise number.

MR. SHEPHERD: Why don't we go with 9.2, which I -- sounds right to me.

MR. ROSE: Yes. 9.2.

MR. SHEPHERD: Thank you. The --

MS. HARE: I'm sorry.

MR. SHEPHERD: No, go ahead.

MS. HARE: So we're talking about logistics and what would happen... okay. Sorry.

MR. SHEPHERD: So if the point estimate is 9.2, I take it, then, that -- and that's an overnight number, right?

MR. ROSE: That is an overnight number. That is correct.

MR. SHEPHERD: That's in 2013 dollars?
MR. ROSE: That is in 2013 dollars.
MR. SHEPHERD: So that means that your uncertainty band around that is $800 million more; it could cost you $800 million more. And it could cost you -- we don't know what the bottom end is right now? You've got a new bottom end, but we don't know what it is, right?
MR. ROSE: So our certainty band, we are carrying $2.1 billion worth of contingency within that 9.2 point estimate. On top of the 9.2, there is another $800 million in management reserve to get to the $10 billion.
MR. SHEPHERD: Get to the 10. So your actual point estimate if you have no contingency is 7.1?
MR. ROSE: Approximately 7.1; that is correct.
MR. SHEPHERD: But you expect to spend the contingency?
MR. ROSE: The contingency is for the uncertainty that we currently understand in the job. Some of that will be spent. Our goal would be to spend as little of it as possible, but the expectation is that we will spend some of it.
MR. SHEPHERD: When you do a point estimate, you include the contingency, which is your analysis of what the probable amount is that you will spend; isn't that right?
MR. ROSE: Our contingency is based on two components, as I said while we're out of camera. The uncertainty relating to the current classification of the estimate that we have, as well as discrete risk, so the residual carrying

amounts for discrete risks.

MR. SHEPHERD: Thank you.

Madam Chair, those are all my questions in camera.

MS. HARE: Thank you. Our conferring was about whether or not there is anything else to be done in camera. So we may interrupt you, Mr. Shepherd.

Mr. Crocker, will you have any cross-examination in camera?

MR. CROCKER: No.

MS. HARE: No. Board Member Duff does, and we were thinking that it might be more efficient to just continue in camera, then. So we'll interrupt you for a little bit.

Ms. Duff?

QUESTIONS BY THE BOARD:

MS. DUFF: Thank you. I'm going to be referring to the confidential version of the business case summary, Exhibit D2-2-1, attachment 5. And I'm specifically looking at pages 36 and 37.

Trying to understand the numbers behind the 50, 70 and 90 percent confidence intervals, just so I understand your process, how did you arrive -- on page 37, how did you arrive at the actual dollar amounts in each one of the boxes under those columns?

MR. ROSE: So we would have taken our point estimate prior to contingency. We would have assessed the level of -- the classification of the estimate. So if it's a class 4 or a class 3 estimate, there would be a range of uncertainty, so basically a lower and upper bound against a point estimate. We would have assessed the -- there is some contingent work.

So the first is cost estimate uncertainty, the estimate uncertainty related to -- around that point estimate, as well as the third item; it relates to the same similar item.

So you can have price variation and just the general uncertainty of the scope, the productivity rates of actually executing that work.

MS. DUFF: As a result of your commercial and contracting strategies, how did those affect the actual dollar amounts? Like, what risks were you able to mitigate through those contracting strategies, in each one of these categories?

Is that an appropriate question or -- that concept?

MR. ROSE: I'm not certain how to answer that from a commercial strategy perspective. I will answer from a setting the target price perspective.

MS. DUFF: Okay.

MR. ROSE: Which I think is related. So our target price for the re-tube and feeder replacement job will include an amount for risk contingencies that we believe are best controllable by the R&FR vendor. So today at a class 4 estimate, we will take the R&FR estimate and we will add a level -- sorry, re-tube and feeder replacement. We will add a level of uncertainty to that, contingency to that, based on the fact that it's class 4. The price isn't as definitive as it would be at class 3 or class 2.

We would also assess the risks we believe to be added on top of that work.

Our job then is to, with the contractor, challenge the contractor to understand the nature of those risks that they are carrying contingency for, and look for the best way to mitigate that contingency. So mitigate that risk in order to lower the target price.

So as an example, the re-tube and feeder replacement vendor may say: Having appropriate radiation protection –– what we call green men -- available on the job, if you don't have appropriate green men on the job it will slow us down, so therefore we're going to carry an appropriate contingency.

MS. DUFF: In particular I was looking at the discrete risk items. And in terms of the dollar amounts associated with the contingencies that you've assigned here, they are the highest; would you agree?

MR. ROSE: They are the highest, yes.

MS. DUFF: By that category of risk. And also that the band was quite narrow. Between the 50 percent and the 90 percent confidence interval, we only have a range of about $60 million. I thought that was -- I considered that narrow.

What do you say about that?

MR. ROSE: I wouldn't disagree with that. I think some of that is on the maturity of the risk development. I think we will get more mature as we go on. For example, again, my radiation protection, that may be a discrete risk where the three points that we're carrying in that range are tight.

MS. DUFF: Do the discrete risk items relate back to your risk register?

MR. ROSE: Yes.

MS. DUFF: And those are the items that are not contained in any of the other four categories, as I understood it.

MR. ROSE: That's right. So the uncertainty band -- we always look for overlap, because it's easy for a contractor in developing their risk register to suggest I'm at class 4 and -- but I want to carry risk for me getting the price wrong.

That is already carried in the uncertainty band related to the class 4 estimate, and we would make sure that isn't included in the discrete risk.

But the example I gave you where there is a specific event that could occur, that there is ways to mitigate that risk, our goal is it to go after those, understand how do we -- one, can we eliminate that risk?

In the example of having sufficient green men on the job, maybe the answer is for OPG to have a green man crew committed to that job, assigned to that job to eliminate that risk. And therefore the contractor wouldn't carry any contingency and we would lower the target price accordingly.

There may be other things where the contractor is best to carry that risk, and we would want them to include it in the target price.

MS. DUFF: So within the discrete risk items, there is some mitigation through your contracting strategies?

MR. ROSE: Absolutely, and --

MS. DUFF: Do you have a percentage in that particular category that you -- because it --

MR. ROSE: Not now, but I -- I can't give you a percentage, but I will tell you that over the last number of months –– and I think some of this is referenced in the Modus reports -- the R&FR vendor had 600 discrete risks.

We've actually focused with them to understand the nature of those discrete risks, and quite a lot of them we said: Those are business-as-usual risks that you are carrying in your estimate and actually just doing the work. And get down to the true discrete risks that we can figure out what is the best manner to manage.

MS. DUFF: I would have thought the discrete risk items would be in the hundreds.

MR. ROSE: That's one vendor. There were 600, and we've got him down to in the 60s, so less than 100 of specific discrete risks.

We are going through that with all the contractors, and we will have that done and complete prior to our QE.

MS. DUFF: As it stands now, when you sum up all those discrete risks and the contingencies you've totalled, it's management's input that it's $665 million is what you need to be 90 percent confident?

MR. ROSE: That's correct. And that is based on our assessment. And much of these contracts as we get the contracts awarded and they go through their own development of their risk register, this will be re-informed as we go forward.

But our goal is to manage that and minimize that.

MS. DUFF: Thank you. To turn the page to the graph on page 38, I was looking at these lines here. Now, I don't know if it's the colours, but it looks like three of the risk categories are to the left of the $10 billion cost estimate that you've come up with.

So in particular, the cost estimate uncertainty is under the 10 billion as a total? Is that how I read this? The contingency work is to the left of the $10 billion amount? Is that how I interpret this?

MR. ROSE: Yes, this is -- this says if I take any one of these lines, the cost-estimate uncertainty, it is -- it is -- I think it's a progressive --

MS. DUFF: Well, in particular -- I'll get to the point --

MS. HARE: Ms. Duff, I hate to cut you off, but, you know, you said page 38 of the document. Could you just for the record say which document you're looking at?

MS. DUFF: I'm still looking at the business case, Exhibit D2-2-1, attachment 5 in the unredacted version.

MS. HARE: Thank you.

MS. DUFF: I was trying to relate this to your comment, and it was actually an interrogatory response, ED 005. We don't have to turn it up, but it was the point that this concept of a 98.6 percent confidence, that the 90 percent confidence is appropriate.

Can I identify that 98.6 from this graph by looking at the line to the far right?

MR. ROSE: Unfortunately, you cannot on this one, because what we really need to show you is the one that has the -- all of them together.

MS. DUFF: Okay. So perhaps in words could you describe what the 98.6 percent is?

MR. ROSE: Absolutely. So the -- let's just take the black S curve that you have here and assume that was the all-in. So at 90 percent, probability of 90 percent, that would be our point estimate, 9.2 billion. Where it crosses the $10 billion line would be at 98 percent, 99 percent.

MS. DUFF: That -- yes.

MR. ROSE: Yes. So that is what that is meaning.

MS. DUFF: So it's not that the individual -- so it's the...

MR. ROSE: We run the Monte Carlo --

MS. DUFF: Yes.

MR. ROSE: -- so we take -- we run a Monte Carlo of everything and run the S curve, so the P90 says we have a 90 percent probability with all the risks that are inherent to this job, plus the fixed prices in this job, and it would be less than 9.2 billion. That same Monte Carlo, that S curve crosses over the 10 billion mark at about 98, 99 percent.

MS. DUFF: And risks that are outside of the five categories, such as the scope change or, you know, an environmental disaster, for those two risks, that's not foreseen or quantified in terms of the analysis that you've done in these two pages?

MR. ROSE: Actually, if you go back to page 37 again --

MS. DUFF: Yes.

MR. ROSE: -- there is a line item called "contingent work", and we have identified some work where there is pending inspections --

MS. DUFF: Yes.

MR. ROSE: -- or regulatory uncertainty for scope that is not defined.

MS. DUFF: Actually, that was one of my questions. I wanted to know where you had the contingencies for environmental assessments where the inspection did not pass and the cost to contain that and also some regulatory risk. So it's within category number 2.

MR. ROSE: Category 2 is the stuff -- the scope that we know that there is -- that we, depending on inspections or specific results of regulatory -- we talked, I believe it was yesterday, but it may have been on the technical conference, about additional fire protection work that the CNSC was asking us to evaluate. We would carry a contingency for contingent work if we were asked to do more work than we had in our base planned.

MS. DUFF: So the spill that you already had, have you already spent money for that contingency? Have you already had to disburse funds in that category?

MR. REINER: The environmental assessment required us to take some mitigating measures, and we have started to spend money to address those.

MS. DUFF: What is the process for disbursing funds related to contingencies and then also for the management reserve? What approvals do you need and who makes those decisions?

MR. ROSE: So each project comes through what we call a gated review board. And I know Mr. Shepherd alluded to the gated process. We actually have two layers of our gated process. We have the program level, where we, through different points of view, add up the entire cost estimate of the project and take it to our board of directors. That's a program-level gated process.

Within our project management model we actually have an internal gated process where each of our projects come through a series of gates. So as an example, our water and sewer project is currently in the execution phase within the overall definition phase of the program.

So sorry, did -- I was going to get to the point of -- so when that water and sewer project as an example would come through our gated process, we have money that's set aside at the program. They will be asking for money to go on to the next phase of the project. They would also be identifying what their risks are for that next phase of the project. We would assess those risks and agree on amount of contingency to allow them to manage those risks, and we would release that from the program to the project.

MS. DUFF: That was right along the lines of what I was getting at. So the five categories, the -- you have some boundaries, some -- the 2.1 billion contingency is broken up into packages, and is that based on each program or is -- a package, or is it these risk categories? Like, what's the -- how are you slicing this up?

MR. ROSE: Some of it is -- it's a mix. It's -- some of it is by the project. So the cost-estimate uncertainty and the labour/material price uncertainty are based on specific scopes of work that are in one of our five major bundles or in with our campus-plan projects. So each of those projects would carry an uncertainty amount.

The discrete risks may be specific to a project or manage that at a program level. We may say the program level that there is a general contingency for discovery work. When we get into the unit there may be discoveries that we would carry a general contingency for, not allocated to a project, but when that discovery happened on a project they would come back to the gate review board and we would release that funds to them.

MS. DUFF: So a scenario where your discrete risk items are at 800 million, you've now exceeded the 90 percent of the 665. Can you go into the contingencies that have been allocated on this chart, some cart of allocation, and utilize that without any kind of approval or going back to your board of directors in which the business case was based?

MR. ROSE: So if we were to do that we would first assess what is the -- so when someone comes and asks for a contingency of a specific purpose, I want to understand what are the remaining risks on that job so that we don't get ourselves into that deficit situation.

So if all else stayed the same, but -- let's simplify this. This is one single project. All these risks are laid out. This project came in and said my discrete risks are going to cost me a billion dollars, but all the other risks are remaining the same, we're going to now forecast that we're over, and if we cannot mitigate that -- well, certainly we inform our board that we're over, but if we cannot mitigate that, we would have to ask for additional funds to continue.

MR. REINER: Maybe I can jump in here for a second. So we do have -- inside the company there is what's called an operational authority register that grants financial authorities to levels in the organization. So that's the mechanism we currently use to determine what level of authorization do people have to actually spend money. So that's one element that weighs into this, and that sort of dictates at what level is Board approval required, at what level is CEO-level approval, my level approval, project manager-level approval for the project.

We're going to take that model and we're going to look specifically at how we would allocate contingencies and then what authorities would be required to actually spend money related to contingencies.

So we'll give project managers an ability to spend some contingency for -- to manage discrete risks, for example. We'll hold a large part of it at the program level, which would be my accountability. And then there will be CEO level as well, where I would need to go to the CEO to tap into use of those funds.

MS. DUFF: So just wondering, what are the triggers in which you would go back to the Board? Because the contingency risk has exceeded the 2.1 billion or based on what you've spent to date and you've reforecast for what's remaining? I'm just trying to understand, is that because you're reporting to them annually, your nuclear oversight committee, that they would be aware of that? Is it only until you have to get permission, or is it that you're reporting on a regular basis with respect to the forecast of this?

MR. REINER: Yeah, we are reporting on a regular basis, so there is monthly reporting that's done internally, and that would go up to the CEO level. At the board level it's quarterly reporting. So they would have an awareness through that reporting on where the financials are at.

MS. DUFF: I have some questions regarding the marginal and full-cost analysis, but I think we can go off camera. So I'll delay that til later. Thank you very much.

MR. SHEPHERD: Madam Chair, before we go out of in camera, can I ask a follow-up question?

MS. HARE: Yes, you may.

CONTINUED CROSS-EXAMINATION BY MR. SHEPHERD:

MR. SHEPHERD: There are a category of risks, I think, Mr. Reiner or Mr. Rose, normally referred to as low-probability, high-impact events, like a tornado or things like that. And that whole category of risk is not quantified in your analysis, is it?

MR. ROSE: We -- we do have -- we have some of those. We've actually done some workshops where we've actually looked at event in the industry, such as the -- I think it was Arkansas where there was a turbine generator dropped, and resulted in a fatality.

So we asked those -- that is -- you know, arguably that's -- there's a low probability of that, but we do ask those questions: What is the probability? What are we doing about it?

But when you get to things like earthquakes, it's very difficult to -- for us to model that.

MR. SHEPHERD: I understand. And so those things, like something like a computer virus, for example, is in that category, right? You could have a big problem in your station because of a computer virus, but -- you protected against it, but it could still happen? Those aren't valued in your -- you don't have a number for those?

MR. ROSE: Other than carrying our management reserve for unknown unknowns, that would be the only amount for --

MR. SHEPHERD: So everything in that category is -- of low-probability, high-impact events that is not listed in these discrete risks is in that 800 million?

MR. ROSE: So everything that we know about and can quantify and can put a probability on to it is in the contingency. The things we don't know about and can't quantify would be in the management reserve. That's correct.

MR. SHEPHERD: Thank you. That's what I wanted to ask.

MS. HARE: I know this is unusual, Mr. Keizer, but we're kind of thinking that we might as well get the in-camera portion dealt with. Do you have any redirect at this point that would be in camera?

MR. KEIZER: I don't at this point, no.

MS. HARE: Okay. Fine. Thank you.

Then we'll go back on the public record.

--- On resuming public session at 12:08 p.m.

MS. HARE: Mr. Shepherd, please continue.

MR. SHEPHERD: Madam Chair, one of the things that happens when you're right near the end is that you have to do clean-up, and so I have a series of sort of discrete questions, areas based on the transcripts from the last three days that I want to follow up on.

The first being from Tuesday, transcript 13, page 172.

MS. HARE: Mr. Shepherd, I just noticed people are walking in. Why don't we give them a minute to settle down?

MR. SHEPHERD: I didn't anticipate being that fascinating that they would --

[Laughter]
MS. HARE: I think we're ready.
MR. SHEPHERD: Thank you.
So we're at page 172 on Tuesday. And this is a discussion you were having, Mr. Reiner, with Mr. Elson about the Long Term Energy Plan principle that -- basically holding your contractors accountable.
Do you recall that?
MR. REINER: Yes.
MR. SHEPHERD: And what -- I was listening to that and my -- Mr. Elson is basically trying to say the government is telling you: Get a firm cap; don't take any risk above the cap.
And I understood you to be saying -- and tell me whether I'm characterizing this correctly --- that's simply not what the real world is like. That's never going to happen. If that were what they intended, that's not possible.
MR. REINER: If that's what you read, what I meant is that's not what the government has asked us to do and that's not how we interpret that principle, that the only way to achieve that outcome is to seek a cap.
MR. SHEPHERD: In fact, if you tried to seek a cap with the few exceptions you've talked about, it's basically not realistic; is that fair?
MR. REINER: Even if it were realistic, it wouldn't be good value for money. You'd pay an enormous amount of money, I think, to try to cap everything.

MR. SHEPHERD: Okay. Am I right in understanding that the principles that are set out in the Long Term Energy Plan for how you manage this project, how you approach it, they didn't just come to you out of the blue from the government, right? That was part of a discussion you had with the government about what is appropriate; is that true?

MR. REINER: Are you referring to sort of what we've kind of captured in the -- in our contract management approach and --

MR. SHEPHERD: No, I'm asking -- you have the seven principles that the government set out in the Long Term Energy Plan. They didn't just spring that on you. That was a discussion, you knew about it, you, in essence, agreed to it before they put it in the plan; isn't that right?

MR. REINER: So these principles were developed through the consultation process that the government ran in getting to the Long Term Energy Plan. OPG was part of that consultation process, but it was an outcome of that that led to these principles.

MR. SHEPHERD: I guess my point is that you didn't disagree with them when you saw them.

MR. REINER: We didn't disagree with them. They're sensible principles.

MR. SHEPHERD: Okay. My next question is with respect to the transcript on Wednesday, transcript 14 on page 4.

In this, Mr. Rose, you talk about how you reached your cost estimates; do you see that, sort of the bottom half of the page?

MR. ROSE: Correct.

MR. SHEPHERD: And you talk about the reasons why this cost estimate, why this cost estimating process is rigorous, and you go through several points as to what makes it rigorous.

Is this different from how OPG has estimated the cost in past projects? Which of these things are what you didn't do before? If any?

MR. ROSE: This is difficult for me to answer because I wasn't involved in some of the past projects.

We talked quite a bit about the Pickering A return-to-service project and the 200-ish million dollars. I believe that the -- ultimately the OPG took to our board of directors a $900 million project after they had done detailed engineering.

So that would be consistent with the practice that we are applying on this project. The practices that we are applying are industry best practices.

MR. SHEPHERD: So these -- I counted five points that you made here. These points as to how you do a good cost estimate, they would be how you did, how OPG did the 900 million for Pickering?

MR. ROSE: I can't -- I was not involved in developing that estimate. I can't unilaterally say that they've applied all of these, but I do know that the detailed engineering was done, as an example, prior to setting that price. That is clearly an example of what we are doing on the refurbishment program.

MR. SHEPHERD: Here's why I'm asking the question. I looked at this summary that you gave, which is very useful, and it looks exactly like how you've always done cost estimating, how most well-run organizations do cost estimating; they go through these specific steps.

And so I didn't see anything different here than the past. I'm asking you whether there is something new that you did that is different than normal OPG management practice?

MR. REINER: Maybe I can interject. This is essentially a best-practice list, and I think that's what you're referring to, and why wouldn't we apply best practices all the time.

And what we are much more rigorous in on this project -- than some of the past experiences, and so the Pickering return-to-service would have been one of those. We had a discussion in this hearing about the early estimates of the Pickering return-to-service. Those estimates were done without an understanding of what the scope of work is.

So I would say in that particular case, there is one of these principles that wasn't utilized. It was utilized for Pickering Unit 1, because the project was stopped until engineering was completed and scope was understood and a new estimate was brought forward.

So this method here was applied for that project.

MR. SHEPHERD: Okay. Do you know offhand whether this method was used for the Niagara tunnel project?

MR. REINER: I couldn't comment on that.

MR. SHEPHERD: I'm going to ask you to undertake –- and when I say "you" I mean OPG you -- to advise in what way the estimate for the Niagara tunnel project was done if differently than this description, if at all.

MR. REINER: Okay.

MR. KEIZER: That's fine.

MR. MILLAR: J16.2.

UNDERTAKING NO. J16.2: TO ADVISE IN WHAT WAY THE ESTIMATE FOR THE NIAGARA TUNNEL PROJECT WAS DONE IF DIFFERENTLY THAN FOR PICKERING UNIT 1, IF AT ALL.

MR. SHEPHERD: Thank you. The next area I want to ask you about is page 10 of that same transcript. And Mr. Reiner, you talk about looking at the various models that are out there. Here's what I didn't see anywhere that I -- and this may be for you, Mr. Reiner, or may be for you, Mr. Reed. What I didn't see anywhere in the evidence is somebody go through past projects, either your projects or projects by other people, and say here's what the strategy is that they used, here's what went wrong, and here's why, in hindsight, here's why the strategy wasn't as good as it could have been and what caused the way it went wrong.

And I -- I mean, there's some bits and pieces of this in your report, Mr. Reed, but I didn't see an analysis where you say, okay, here's the various projects, here's what happened. Is that just something I missed?

MR. REED: Well, I'll start. The first opinion that we provided, which is attachment 7-1 to D2-2-1 --

MR. SHEPHERD: Yes.

MR. REED: -- pages 4, 5, 6, 7, and 8, provide that at a high level. That's based upon actually a review of lots and lots of documents, many of which are footnoted in here, and a review of the company's operating experience or op ex database on other projects.

So, no, we didn't replicate everything from the operating experience database, nor did we provide the sources and articles that provided the basis for our opinion. But we do have five pages that discuss that point.

MR. SHEPHERD: Well, so here's an example. If you look at page 5 of your report -- and I don't think you need to bring this up -- the -- you talk about Wolsong, but I don't see anywhere in your report that it says why Wolsong was successful and others were not, except one comment:

> "We believe certain differences in the labour and nuclear services market account for at least a portion of the success at Wolsong."

But I don't see anything where it says, OPG, you can learn from Wolsong that this works, so do this. That's not in there anywhere, right?

MR. REED: It's not in our report. It is something we discussed with OPG, and it is something that we conducted as part of our analysis, and I'm happy to explain those comments if you would like to go through them. I mean, that's the kind of thing we would expect to come out in discovery and cross-examination. But it is an analysis that we did based upon the information available from Wolsong, and, for example, that specific point, it goes to labour contracting practices and the role of the trade unions in South Korea versus North America.

MR. SHEPHERD: Sorry, thought you meant --

MR. REINER: Wolsong is a member of the CANDU owners' group, and as a member they have provided thousands of pages of operating experience to the CANDU owners' group, and OPG as a member has access to that, and we actually do have direct access to operating experience that's been provided by Wolsong.

MR. SHEPHERD: See, the reason why I ask the question is you're asking the Board to decide this is a good way to go, these commercial and contracting strategies are a good way to go, and I would have thought, and I would have expected to see in the evidence, a list: Here's a project that happened, here's the strategy they used, here's why it went bad or good, and -- and so that the Board could see at the end of the day, Ah, now we understand why you're doing what you're doing.

MR. REINER: So maybe I can point you a couple of directions. If you go to our -- and I'll just pull one up as an example -- the contracting strategy for retube and feeder replacement, D2-2-1, attachment 2, there is an appendix. The appendix identifies a number of reference documents. Those reference documents list a number of projects that were analyzed as part of getting to this strategy. The analysis is not all in here because, as Mr. Reed identified, we have a database, an operating experience database. It's a lengthy database, and that is where that information is captured.

So everything that you talk about here, what worked, what didn't work, has all been documented and has been captured for the identified projects.

MR. SHEPHERD: Okay. Thank you.

MS. LONG: Sorry, Mr. Shepherd, I'm going to jump in here, just 'cause we are doing a little bit of clean-up.

One of my concerns, Mr. Reiner, is when I -- and this is a bit unfair to you, but you're the last panel, so you are going to have to probably answer questions with respect to what other people have said.

But one of the things we discussed in the Niagara tunnel issue was whether or not there had been lessons learned and a completion report done on that, and you answered a bit that you had looked at that, but when I look at the transcript -- and if you want to go there, it's day 2, and it's page 39. And Mr. Crocker asked some questions.

Do we want to pull that up, just -- I want to be fair to the witness. So that's day 2, June 13th, page 39, starting at line 11. Do you have that, Mr. Reiner?

MR. REINER: Yes.

MS. LONG: Can you just let me know when you've got it? Okay.

MR. REINER: Yes, yeah, I see --

MS. LONG: So Mr. Crocker asked the question, has there been a project completion report, and Mr. Young replied -- and I'm paraphrasing -- that the work is technically not complete, so, no, there had not been, and Mr. Crocker then on line 20 said:

"Have you begun to work on the lessons-learned part of that report yet?"

He said:

"There is some work done on lessons learned. Can you tell me in light of that whether you know or have decided what contributed most to the success or failure of the project?"

Mr. Young said:

"That work has not been complete in terms of lessons-learned work, and I can't tell you."

Then on the next page there is a bit of discussion where Mr. Young says that the amended design build agreement target price contract structure ultimately worked, so that's obviously a lesson learned. But then on the next page, at 9 and 10, they get into a discussion about whether or not OPG has identified:

"Where did we see the problem? Should these have been foreseen? Have you drawn conclusions about this?"

And Mr. Young said:

"There is no final conclusion at this point. The project is not complete, so conclusions have not been drawn."

And I guess I'm just wondering from a perspective as you ask this Board to consider contracting strategy with respect to another mega-project, I want to make sure that the two ends are talking to each other and that nuclear is talking to hydroelectric about lessons learned. I appreciate there may not be a final report, but we want to have some confidence that in a project that went over budget and had some issues that those are top of mind as you go forward on a contracting strategy for this project.

MR. REINER: They are top of mind. And we do talk internally even without having a formal closure report written. And, now, the tunnel project is a little unique, in that -- in regards to the event that caused the delays in the project, but we have had a lot of dialogue as we entered into the contracting strategies with Mr. Young, with that organization, around contracting models, because they had far more experience with other hydro projects on that and other lessons learned as part of that process.

We in fact -- both Mr. Rose and I actually went up to the Lower Mattagami project. That project had just encountered an issue. They had a failure of a critical structure that had the potential to set the schedule back significantly, and there were recovery efforts underway, and we went up there personally to have a look at how the project responded to that, what sorts of learnings came out of that. So this does happen.

We've also -- another example I would give you -- now, this kind of goes outside of OPG, but through sort of the CANDU partnership. We provide expertise, and we draw on expertise from other nuclear operators to share those lessons learned, and it comes from both Bruce Power and Point Lepreau, so there is a lot of dialogue that does actively share lessons learned. We don't just rely on a report being written.

When we go external, I mean, we have -- unless we have a specific connection, we do have to rely on reports. Now, in some cases we don't. We've been down to the Union Station rehabilitation, because that actually has some unique parallels. You're doing new construction inside an existing facility. So we've been down there, and we've had a look at the challenges that they're encountering, and we've captured lessons learned and incorporated those. So that is an active part of our process.

MS. LONG: Okay. Well, that's good to hear. I mean, I know Mr. Shepherd is going to ask you more about other nuclear projects, but it seems to me that this is a project that you should be able to leverage experience from. And while over-break is not the unforeseen that you're going to see here, it could be a lesson learned.

MR. REINER: Most definitely. I agree with that.

MR. SHEPHERD: Can I ask a follow-up on that?

You've talked to the people who are involved in the Niagara tunnel project, right?

MR. REINER: Yes. I mean, I know Mr. Young personally.

MR. SHEPHERD: So based on those discussions, what were the flaws in the commercial and contracting strategy for that project, if any flaws, that resulted in the overrun?

MR. REINER: I think --

MS. HARE: Just let me stop you, Mr. Reiner. Are you comfortable answering this? Or is this now getting into an area that's...

MR. REINER: That's actually a good question. I shouldn't be the one that's answering that.

MS. HARE: I guess I'm waiting for Mr. Keizer to --

MR. SHEPHERD: Madam Chair, it's not intended to be a trap. I'm actually trying to find the --

MS. HARE: I know, but I wanted to hear also –- I mean, Mr. Reiner works on the nuclear side, so he has indicated he has talked to Mr. Young. But does that mean he is familiar enough to answer? That's my only interjection.

MR. KEIZER: And I would suggest that we have concerns with being able to answer it, given the fact that his focus is on the Darlington project, not the Niagara project.

MS. LONG: But did they talk about contracting strategies? Like, I thought, Mr. Reiner, that you had said you had spoken to him with respect to contracting strategies.

MR. REINER: Yes.

MS. LONG: So you might not be able to opine, obviously. But I would have thought there would be some conversation about contracting strategies.

MR. REINER: It actually went much deeper than just conversation. I hired onto my team a person that was an integral player in the negotiation of the Beck Tunnel contract. That person actually was responsible for overseeing and being part of the negotiating team of the re-tube and feeder replacement project.

So we actually utilized a resource that was directly involved, and transplanted them into my organization and made direct use of that experience.

MR. SHEPHERD: What I'm trying to go for here is: Is there some big lesson learned that had you took from Niagara tunnel about contracting and commercial strategies? Is there some big lesson learned that you can share with the Board as to something that, now that you've seen what happened there and realize what the result is, you're going to make sure you don't do that? Or do do that?

MR. REINER: Okay. So maybe -- again, recognizing that I'm not the hydro expert, but what I extract from that.

So that project encountered a significant risk -- or it encountered an unforeseen problem, largely unforeseen because the -- let me put it a little bit differently.

In order to avoid these large kinds of unforeseen issues, the learnings for us and the steps that we are taking is to try to understand as much as we possibly can about the scope of work we are executing. So through inspections, through whatever mechanism we have, and I explained the example of, you know, we haven't looked inside a calandria in a -- we haven't ever opened a calandria in a Darlington unit.

So there is an uncertainty. That might be a parallel to the tunnel. You encounter something, you hadn't seen it before, and something pops up. How do you assure yourself that it's manageable, and how do you give yourself knowledge about what you might encounter?

So what we've done through our risk process is try to capture as much as we can about unknowns that may come along, and capture them, assess them, take mitigating actions to see what can we do in order to anticipate the problem, in order to ensure we have got costs included to deal with the mitigating action, in order to ensure we have schedule allowances to correct that kind of a problem.

So those would be direct learnings coming out of that.

MR. SHEPHERD: Okay. I think I understand.

Would your mock-up be one example of something, sort of a response that you are protecting against, against that type of problem?

MR. REINER: That is exactly a response to a problem that came out of lessons learned. And it's probably visibly -- and possibly also in terms of dollars would probably be the most discrete large item where you could directly point to learnings from other projects that have resulted in a different approach with the mock-up.

MR. SHEPHERD: In essence, this is, if I can boil it down -- and it sounds trite, but it's not intended to be –- is spend a little more money early to make sure you really understand what you're getting yourself into, and then you won't spend as much money later when things hit you by surprise; fair?

MR. REINER: I think you've captured it fairly, yes.

MR. SHEPHERD: Can I turn to page 31 of the transcript of day 14 from Wednesday?

And this is a discussion you had, Mr. Reiner, with Mr. Elson about calculating new numbers for LUEC. Do you recall that?

MR. REINER: That was on page 31?

MR. SHEPHERD: Yes.

MR. REINER: Yes.

MR. SHEPHERD: LUEC is actually calculated on a spreadsheet, right?

MR. REINER: There is a -- I don't know the detailed model and how it's -- you could probably calculate a LUEC on a spreadsheet, but there is a model that is utilized to do the LUEC calculations.

MR. SHEPHERD: All right. So rather than ask you to do a bunch of calculations, can we just have the spreadsheet? You filed it already, the calculation, right? Can we have the spreadsheet behind that calculation?

MR. REINER: I don't believe there is a spreadsheet. I think it's a model, meaning there's a computer tool to actually do that.

MR. SHEPHERD: But the tool is Excel, right?

MR. REINER: I don't know if it is. I don't know what the tool is. If it is Excel, it's not just basic Excel. It's likely got some Visual Basic coding in it.

MR. SHEPHERD: So I'm asking you: Can you take a look and see if it is an Excel spreadsheet? If it is, can you please provide it?

MR. KEIZER: I guess I struggle to finally understand why we need to run scenarios or -- financial scenarios or why you need the spreadsheet.

MR. SHEPHERD: Because the cost of this power is going to be largely dependent on the risks that are being taken in the project, and in order to model those risks, we need to have the model.

MR. KEIZER: Just a moment. I think later on in the transcript, the Panel ruled that re-running financial scenarios for the project is outside the scope of this proceeding.

In this proceeding, OPG is seeking to close approximately 230 million in rate base, and it's basically giving the rate base analysis. I'm not sure why you would need to run financial scenarios in the context of contracting strategies.

MR. SHEPHERD: Madam Chair, this is why I asked the questions earlier about how you should be looking at the commercial and contracting strategies. And we got the witnesses clearly saying you have to look at them in the context of the entire piece of information about how much it's costing and how complicated it is, et cetera.

The whole point of asking for your approval now is to put you in the position of OPG and ask you to see whether their decisions are reasonable. And if you don't have access to the same information they have, you can't do that.

That's why I ask those questions.

MS. HARE: Can I ask you, how does what you're asking now relate to what Mr. Keizer just read in terms of a previous decision? The two things are not connected, are they?

MR. SHEPHERD: I don't think so, but I'm responding to --

MR. KEIZER: I'm trying to struggle to understand the purpose of what you're going to put -- the Excel spreadsheet or the model at this stage. I don't understand what the use of it is in terms of this proceeding.

We're not here to he evaluate the numbers. We're here to evaluate the approach with respect to the contracts.

MR. SHEPHERD: Can I give an example, Madam Chair?

MS. HARE: Yes, please.

MR. SHEPHERD: The project has been approved by the government on the basis that the LUEC, the lifetime unit energy cost, is a particular range. Or presumably they've taken that into account.

If it turns out that some of the risks talked about in this proceeding take it well outside of that range, then one possible solution is stop work; don't do it.

You have to look at whether the contracting strategies and the commercial approach allows you to do that at a reasonable cost. Otherwise they're not good strategies.

On the other hand, if that can't possibly happen, if the LUEC's never going to get outside of that range, then you don't have to look at that.

MR. KEIZER: But it seems to me if you're looking at the LUEC and whether or not you're going to proceed with the project, and what the government said it should or shouldn't do with respect to this project, that is along the lines of looking at supply mix and the nature of the LTEP. And if you're looking at the decision with respect to what's the cost implications if you decide not to proceed with this project, because, somehow, based on you running a scenario, you could establish it as being a different cost. That relates to unwinding the contracts, and those costs are, you know, what you've agreed with your contractors and how you actually deal with those, not with respect to what the LUEC is. LUEC's not going to show you that. So I have a hard time understanding why it's needed for the purpose of this proceeding.

MS. HARE: Give us a minute, please.

We've made a big decision. Our big decision is that we'll just defer the answer until afternoon lunch. So if you've got another area to move to, Mr. Shepherd, that would be helpful.

MR. SHEPHERD: Thank you. Madam Chair, just to be clear, my client is not going to challenge the decision to go ahead with Darlington. We're only concerned with whether the off-ramps are sufficient, given the nature of the risks. This is about the risk associated with the project becoming uneconomic. That's all.

MS. HARE: I'll tell you, our concern is we're not sure what we're going to do with the information after you run your scenarios. Maybe --

MR. KEIZER: If I could, in terms of off-ramps, I think by way of undertaking we have produced contractual clauses with respect to termination for convenience and other things, and we've talked about off-ramps in the context of the LTEP. So I'm not -- along those lines, I don't think the LUEC will show you those things or reflect those costs, and even if a number was generated, I don't know how anyone could comment on it unless we decided to cross-examine Mr. Shepherd in respect to that number.

MS. HARE: Well, let's pick this up over lunch. And the other thing I wasn't clear about was the response to whether it's an Excel spreadsheet or some other model. If it's a model that Mr. Shepherd might not be able to use, then this might all be a moot point.

So maybe over the break -- oh, Mr. Rose, you do know what kind of model it is?

MR. ROSE: We don't run the model. The model is not ours. It's run by our corporate investment group, and it is not a simple Excel spreadsheet. There is a number of inputs and Monte Carlo and public analysis that a team of folks do in preparing a response to that type of question about the LUEC.

MS. HARE: Knowing that, Mr. Shepherd, do you still want to --

MR. SHEPHERD: That still sounds like an Excel spreadsheet. Everything he described, I have Excel spreadsheets in my office.

MS. HARE: Okay.

MR. SHEPHERD: It would be useful to find out. I mean, maybe we can talk at the lunch break about what the nature of it is, and if it's something that is not useful to me then I'll tell you.

MS. HARE: Okay. Thank you. Let's leave it at that then, that you'll talk over lunch.

MR. SHEPHERD: Thank you, Madam Chair.

I have just a couple of areas in the transcript. The first is the fourteenth day, transcript 14, page 65. And there is another reference in page 78, but I think 65 is the one that I'm looking at, which is, you're being asked some questions, Mr. Rose, about environment assessment costs.

And I was -- I was unclear about this, and so I want to make sure I understand. Are there environmental assessment or environmental remediation or other such costs that are related to the Darlington Refurbishment Project that are not included in your estimate, not included in your budget, they're somewhere else in the organization?

MR. REINER: There are going to be future costs associated with implementing programs that we have been asked to implement under the environmental assessment. Those costs would be contained inside the nuclear operation's budgets and business plans.

MR. SHEPHERD: So they're not in your 10 billion?

MR. REINER: Those are not in our 10 billion.

MR. SHEPHERD: Do you know how much that is?

MR. REINER: I don't know offhand, but we don't anticipate those as being large costs, because what was in our costs is the analysis that led to approval of the environmental assessment. These ongoing programs are all about reassessing and determining whether anything has changed in regards to the analysis that was done now and the measurements, and they were related to things like effluent and impact on fish larvae, so they would be future studies to just determine, has anything changed from the time that the environmental assessment was approved to the time the plant is fully back into operation. So it would be individuals, it would be labour, cost for individuals. They're not major capital investments.

MR. SHEPHERD: There's no hundreds of millions of dollars here --

MR. REINER: There's no hundreds of millions of dollars, no.

MR. SHEPHERD: Now, similarly to the environmental assessment and environmental study costs, are there other costs that is are caused by you doing the Darlington refurbishment that are not in the refurbishment bucket, they're in some other bucket, some other budget?

MR. REINER: Well, this is a somewhat obvious one, but if we're going to refurbish the plant, it's going to be around for another 30 years, and there's obviously costs associated with operating that plant, fuelling that plant, so it would just be a continuation of the nuclear business plan.

MR. SHEPHERD: I'm talking about costs in the capital development phase -- the capital phase that are caused by the fact that you're refurbishing but are not included in the refurbishment budget?

MR. REINER: There are -- there would be some items that would be tied to the CNSC regulatory relicensing requirement, so as part of refurbishing the plant what we do is we ensure that critical components get replaced, the plant is fit to return to service, as part of maintaining an operating licence. There are things that the station will need to do. And when the Canadian Nuclear Safety Commission looks at this, you know, they don't differentiate necessarily between what do you do in a refurbishment project, what do you do as part of normal operations. You need to apply for an operating licence, and in order to achieve that there are a set of requirements, so there would be some costs associated with that that lie in the nuclear operations budget, but again, we're not talking about hundreds of millions of dollars kinds of things. They would be things that would already be captured in the operations budgets.

MR. SHEPHERD: During the project, when you have to -- because you have three units operating and one unit under refurbishment at the beginning, at least, if you have to say to the operating side, Change this, turn this system off for six hours while we work on this, that's an extra cost for them. Is that part of the refurbishment or part of their operating costs?

MR. REINER: If we needed them to take some specific action -- now, if it is a direct project-related activity where we say, Send us some operations staff. We need them to execute the following for the project, their costs will get allocated to the project. Those costs will get charged to the project.

Where there are already staff in place that are doing operations activities already being paid for and we need something done specific for refurbishment, that -- they would do that. An example might be, there are common systems that run through the refurbishment unit. There may need to be an isolation of some system that the station is currently relying on for operations. We would expect the stations to address that.

MR. SHEPHERD: And that would be in their budgets because it's not incremental.

MR. REINER: It's not incremental. It would be in their budget.

MR. SHEPHERD: And so Mr. Rose, you gave the example of the green man, which I love. Great example. And you would get those from your operations group, right, and bring them in, but then they would, if they're already on staff, they wouldn't count as extra cost.

MR. ROSE: Those folks that we would -- the green man that we would bring in, we would actually have dedicated green man assigned to each of the contractors paid for within the refurbishment budget.

MR. SHEPHERD: Okay. Good. I understand.

The last question in the transcripts is from yesterday, transcript 15, pages 7 to 9, there was a discussion about -- that you had with Mr. Stephenson, Mr. Reiner, and I guess Mr. Gould, about the role of Modus in this project.

Do you recall that?

MR. REINER: Yes.

MR. SHEPHERD: And my understanding is that you were brought in specifically to be critical. You weren't brought in to say everything was fine; you were brought in to be critical, right?

MR. GOULD: We were brought in to evaluate the project as it is. And we see as a big component of our job attempting to characterize risks as they develop, but we also see an important part of our job -- especially for the board of directors and for the nuclear oversight committee -- that they understand -- if things are going well they also need to see that. That is a component of the overall project.

And so, like I said yesterday, we see ourselves here for the project, we see ourselves understanding the project, looking at the risks of the project, and defining the project and characterizing the project for those stakeholders to review, through the prism of our experience.

MR. SHEPHERD: Can you look at the top of page 9 of the transcript?

Mr. Reiner, you talked about the role of Modus, and you indicated that when you get recommendations from Modus you log them in a system, right? A project management system?

MR. REINER: That's correct.

MR. SHEPHERD: And then you talk about them with Modus, to determine what's the reason for it, do you agree with it, et cetera, right?

MR. REINER: There is discussion with Modus, and it's to ensure that there is a common understanding of what the issue is that's been identified.

MR. SHEPHERD: And if you disagree, then you say: We disagree. We don't think that your criticism is correct. Here is why we're right.

MR. REINER: Yeah, and it doesn't just become a: Here's why we're right, and then we document OPG is right and on we go.

[Laughter]

MR. SHEPHERD: That would be nice, right?

[Laughter]

MR. REINER: It would be nice.

Modus has an accountability to the nuclear oversight committee, and they need to be convinced that if we have a different approach that deals with an issue differently than what they've identified, they need to be satisfied that it would actually address the issue that's been identified.

MR. GOULD: Let me add to that, because this is an interactive process in looking at our recommendations. And we made it very clear from the very outset that the project team is under no obligation to accept our recommendations. It would probably be beneficial for them to consider them, but they have no obligation to actually accept them.

What we have set up with the project team is an interactive process where we are looking at evaluating and assessing the depth of the recommendations, the veracity of the recommendations. And in the convincing part, they do not close off an action in their responses to our recommendations until we're satisfied it should be closed off.

MR. SHEPHERD: The reason I ask the question is because it sounds like the process is you make a recommendation, you talk to management, and understand -- you understand each other, and then you write your report; is that right?

MR. REINER: No, it -- I'll let Mr. Gould answer as well. But no, it's actually quite the opposite.

The report is written; it's presented. After the report has been presented, the management team on the refurbishment project sits with the Modus team. They go through all of the issues in the report and they discuss the issues.

So coming out of that may be a different conclusion coming from Modus. That would then get reported up to the nuclear oversight committee as part of their normal tracking process of where actions are at, or specific remediation measures we have taken.

So it happens the other way around.

MR. SHEPHERD: What I'm trying to get at is when I read the formal reports -- are you talking about the formal reports?

MR. REINER: Yes.

MR. SHEPHERD: So when I read the formal reports, it looked like they had already built in a whole lot of feedback from your team, already in the report.

MR. REINER: The way the Modus arrangement works, it's a little different than an audit, where, you know, an audit team will come in, they'll ask for a bunch of information, they're locked in a room, they do an assessment, they write a report.

The Modus team is actually very integrated into the work. So they will attend meetings. They have the opportunity to challenge things that they hear in the meeting. So they actually see the direct results of actions that we take in managing the project.

So when you see, for example, things like management has taken the action to embed engineering, so -- we don't just wait for Modus to identify issues. We have many mechanisms and tools available to identify issues, and we will respond on our own course and the Modus team will actually see that. And they'll say: Here is what we're seeing management do, and it -- you know, it either addresses the gap or doesn't address the gap.

MR. SHEPHERD: From your perspective, then, when we see a criticism or a challenge from Modus in their report, that's not the first time you've seen that, because they were probably in the meeting where you were discussing what to do and they probably talked about it then at the time and said: Whoa, hang on a second. We might have a problem with that. Let's talk about it. Right?

MR. REINER: As part of the ongoing dialogue, I mean, certainly, from a project management perspective, we'd have the opportunity to see what the concerns might be and what the issues might be.

But I think the way -- and Mr. Gould can speak to this. The report that goes to the nuclear oversight committee and what gets presented at the EVP level -- or now at my level because I've got a couple of organizations under me, so this wouldn't be for the project directly. There is a dialogue that occurs before the report goes to the nuclear oversight committee.

That dialogue occurs not to make adjustments; it occurs as a courtesy, that you may want to be prepared. These are the items that are going to be discussed.

MR. SHEPHERD: Is it true -- and maybe this is for you, Mr. Gould -- is it true that when your reports are delivered to the nuclear oversight committee, you are trying as much as possible to deliver not just the problems, but also the solutions that either have been implemented or are going to be implemented by the team? Right?

MR. GOULD: Yes. We're trying to characterize the project as it is. And I think I described, both in testimony yesterday and at the technical conference, we see what we prepare on paper here as a progression of the project. You know, one leads to the next.

So we look back to the prior reports to make sure that we're closing off issues so that people understand, both management and the nuclear oversight committee members understand that management has looked at issues and closed them off or addressed them in whatever manner they've addressed them.

MR. SHEPHERD: So, Mr. Reiner, when the nuclear oversight committee gets one of these reports, they're not going to say to you that you better go fix this, because you're already fixing it by the time they see it, right? Generally?

MR. REINER: If it's a significant gap, we would have seen it and we would be fixing it, but there have been cases where Modus will identify something and we haven't fixed it. And it could be a topic of discussion, where I would need to talk to the nuclear oversight committee and tell them why I don't believe it's an issue.

And that does happen.

MR. SHEPHERD: Thank you.

Madam Chair, I have just one more set of questions, which may actually end up being an undertaking. And so I may want to start it now, but if it's going to be on the record then it would be better to do after lunch. But if that's okay with you, I'll ask the question and see whether I can do it on the record or not.

MS. HARE: You can start, but keep in mind it's five to one.

MR. SHEPHERD: Indeed. What I'm looking at is Exhibit D2, tab 2, schedule 2. I think this is from the update. Yes, this is from the update on page 6. And this is at page 11 of the Board Staff compendium, for ease of reference.

And the question is a simple one, really. Each of these items are being closed to rate base. The amounts that you have listed on these two right-hand columns, you're proposing to close to rate base even though they're part of projects, right?

MR. ROSE: We're seeking to add to rate base the two amounts in the originally filed Exhibit D2-2-1.

MR. SHEPHERD: Oh, no, I understand that. I heard that discussion yesterday, but that's simply a matter of it's not material enough to get the numbers exactly right.

But really what you're saying is that these things in the last two columns, they will actually become used or useful in 2014 and 2015?

MR. ROSE: These are the in-service amounts that become used or useful in 2014 and 2015.

MR. ROSE: These are the in-service amounts that will become used or useful in 2014 and 2015.

MR. SHEPHERD: Okay. And do we have in the evidence somewhere a list of exactly what components of those projects in that column actually are going to be in-service and why they don't -- they relate to operations as opposed to the refurbishment project?

MR. ROSE: We took an undertaking in the technical conference under, I believe it's JT3.5 --

MR. SHEPHERD: Yes.

MR. ROSE: -- where we documented that basis for used or useful, as well as, we described the amounts that were going into service in each of those years by project.

MR. SHEPHERD: So you say JT3.5 has those answers?

MR. ROSE: That is correct.

MR. SHEPHERD: Okay. Then that's all I need to know. Thank you, and that's my questions, Madam --

MS. HARE: Is your cross completed?

MR. SHEPHERD: My cross is completed.

MS. HARE: We will take a break until, let's say five after two, because I think the agreement was that there would be some discussion about that model, and so we'll come back at five after two.

--- Luncheon recess taken at 12:57 p.m.

--- On resuming at 2:13 p.m.

PRELIMINARY MATTERS:

MS. HARE: Mr. Keizer, before you start, there's the matter of confidentiality that I wanted to address.

There are, we believe, six redacted transcripts that still require a Board decision as to confidentiality. And we think there are about 16 undertakings for which OPG seeks confidential treatment.

We would like to suggest a schedule of OPG putting in their submission by July 22nd as to why the various materials are confidential. Submissions can then be filed by July 24th on the confidentiality treatment, with OPG's reply on July 28th.

Next, if that's acceptable --

MR. KEIZER: That's acceptable to OPG.

MS. HARE: And then we had the issue of the model.

MR. KEIZER: Yes, and we did do some investigatory work over the break, and did confirm that it has a high degree of complexity. I have discussed that with Mr. Shepherd, and Mr. Shepherd understands that it probably will not suit his purposes. And so he is withdrawing his undertaking, I think.

MS. HARE: Is that correct, Mr. Shepherd?

MR. SHEPHERD: I am, Madam Chair. I have been convinced that the complexity of the model is beyond what's going to be useful during the arguments.

MS. HARE: Thank you.

Are there other procedural matters, then?

MR. KEIZER: We have none, Madam Chair.

MR. MILLAR: Madam Chair, there does seem to be a humming or something with the sound system.

MS. HARE: Yes, I do hear that as well.

MR. MILLAR: I wonder -- perhaps you might turn the system off and then back on, and see if that helps.

Maybe it's already fixed.

MS. HARE: It appears it's gone. Is it to do with your microphone, Mr. Crocker? What happens when you turn it back on?

It's no good. I wonder if maybe you should change seats.

MR. KEIZER: Maybe we should take it as a sign.

[Laughter]

MR. CROCKER: No hum?

MS. HARE: No hum, and your mic is on. So that's good. So please proceed, Mr. Crocker. We understand you have about 45 minutes.

CROSS-EXAMINATION BY MR. CROCKER:

MR. CROCKER: Timing always depends more on the panel than it does on me. We have three narrow areas and shouldn't take very much.

MS. HARE: All right. So 45-ish?

MR. CROCKER: Ish. I think it's too late in this hearing to joke about time. I think everybody, as you have indicated, is hearing-fatigued.

I want to start with an area that Mr. Millar canvassed at the end of his cross-examination yesterday, and it begins at the bottom of page 166 of the transcript. I don't know that it's that important to turn it up, but that's the reference, where he talked about the schedule of refurbishments and the expected end-of-life of the facilities.

What I do think should be turned up is the business plan of November 14, 2013. We have given it. I can't read the reference because the date's stamped over the reference. It's D2, tab 2, schedule 1, I think, attachment 5, and we're at page 39.

MS. HARE: I think this is confidential.

MR. CROCKER: I should add two caveats before I start.

Although we have tried to monitor things by reading transcripts, the three of us who are involved with this, and listening periodically, if we are repeating something, I invite the Panel to tell me that. I'm sure you would anyway.

And secondly, if we are doing something with -- getting into something which is confidential, we would also like to be advised. I don't think this is confidential.

MS. HARE: What we see on the screen is marked "confidential and commercially sensitive."

MR. CROCKER: But I don't think it was confidential for the purposes of this hearing.

MR. KEIZER: It's the public business case, yes.

MS. HARE: It's okay? Thank you.

MR. CROCKER: The table in the middle of the page talks about the scheduling of the refurbishments; correct? Okay.

And as I understand it, what you have said is, in this comparison that you provide, that at 235,000 effective -- what's the expression that you use?

MR. ROSE: Effective full-power hours.

MR. CROCKER: Yes, EFPH, effective full-power hours.

The first alternative is the preferred alternative? That's correct? That's 30 whatever the units of measure is better than the others?

MR. ROSE: That is correct. What that says is that the alternative of -- assuming we can get 235,000 effective full-power hours out of the units, the alternative of lapping the first unit as compared to all overlapping all four units is $30 million better net present value.

MR. CROCKER: Okay. And presently you are approved for 210,000 hours; correct?

MR. REINER: 210,000.

MR. CROCKER: What did I say? 210,000, yes.

And if you are not approved beyond that, then the first alternative is no longer the preferable one? It clearly is -- will cost you more than the others; correct?

MR. ROSE: If we are not approved to go to 235, albeit we have increasing confidence that we will be able to, but yeah, not approved. If we're not approved to go to 235,000, we would have to re-evaluate how -- what is the duration that we're approved to go to, and what will be the best optimal schedule for us to put in place at that point in time.

MR. CROCKER: Right. And you indicated that -- at line 20 on page 168 of the transcript, Mr. Reiner, yesterday, in answer to one of the Mr. Millar's questions, that there are some anomalies related to Unit 3, which is going to make it more difficult to get to 235; correct?

MR. REINER: That is correct. So in the schedule as it currently stands -- this was a very recent decision on our part -- we switched the second unit in the sequence of outages. So it would be Unit 2, Unit 3, Unit 1, Unit 4.

MR. CROCKER: Right, and you've said that before.

MR. REINER: Yeah.

MR. CROCKER: Let's go to the top of the page. You indicate, and it's clear, that you're approved for 210,000.

Can you tell me when you expect each of the units to reach that number of EFPH?

MR. ROSE: That information is actually provided in the Staff's compendium, page 23.

MR. CROCKER: Thank you. Could you repeat it?

MR. ROSE: It's Exhibit KT15.2, page 23.

MR. CROCKER: Okay Thank you. And --

MR. ROSE: Unit 2 at 210,000 effective full-power hours in quarter 2 2019; Unit 1, in quarter 2 2019; Unit 3, quarter 4 2019; and Unit 4 in quarter 2 2020.

MR. CROCKER: Thank you.

MR. ROSE: You're welcome.

MR. CROCKER: Going back to what Mr. Reiner said, as discussed at the bottom of page 168 of the transcript, you say:

"We've made a decision recently based on results of the fuel channel life management project that has had us change the order of the units."

And at page 172, at line 8 you say you would be essentially looking at advancing some of those overlaps and increasing the overlap time period. That has to do with the scheduling you describe in that table.

I wonder when those decisions were made? These are fairly significant decisions. This is a significant piece of the project. And I wondered when those decisions were made?

MR. REINER: Just in regards to the second reference, I think that was a discussion about options we would consider in --

MR. CROCKER: I may have said --

MR. REINER: -- order to avoid idle time, so there were -- there were no --

MR. CROCKER: Can I interrupt you? I may have said page 1 -- I think I said page 172, and I meant page 171, at line 8, which may change your answer.

MR. REINER: Okay.

MS. HARE: Can you maybe repeat the question, though, Mr. Crocker?

MR. CROCKER: Yeah. Yeah. At the bottom of page 168, Mr. Reiner, in answer to a question from Mr. Millar, talks about changes that they've made to the scheduling and the order in which the units were to be refurbished. And my question was, when was that decision made? And there was a further discussion of that at line 8, on page 171, further discussion of changes of approach to the refurbishing, when he talks about advancing some of those overlaps that -- overlaps in terms of when the units are going to be refurbished and increasing that overlap time period. And he says in a couple of lines below that it could in fact be lower cost.

I wondered -- my question was, when were those decisions made?

MR. REINER: Okay. So there is really only one decision that has been made, and it's in regards to switching the unit order, so having Unit 3 be the second refurbishment unit. That decision was made, I believe it was around about May of this year. It was not that long ago. So that's a very recent decision, and that's why it isn't reflected yet in our business case. It will be in the next update of the business case.

Aside from that there has been no other decision. So the schedule -- the schedule would still stand with the overlaps as currently shown. Any decision to change that would be an outcome of the fuel channel life extension project, and we would have the final data point that we need for that during the Unit 2 refurbishment, and that would then tell us whether there is a risk of idle time and whether we would have to increase overlap.

So there is no decision that has been made there.

MR. CROCKER: I wonder why -- the changing of the units is a fairly fundamental decision, and I wonder why it's being made at this relatively late stage in the game.

MR. REINER: So that decision is a direct outcome of the condition of the fuel channels. So it's not a decision that you make without having the technical basis to go with that. That's a decision that the chief nuclear engineer of the company made. It's a direct result of inspection data and analysis, and an indication that Unit 3 will -- unit-3 fuel channels will reach the end of their life before the unit-1 fuel channels will.

So it's just, it's really not a decision as much as it is a -- it's an anomaly that exists in the fuel channels that has only come to our attention very recently.

MR. CROCKER: Is the discussion that you had at line 8, although I understand it's to some extent speculative, is it another alternative?

MR. REINER: What page are on you? Is that 172?

MR. CROCKER: Yeah, 171. Did I say 172 again? I meant 171, at line 8.

MR. REINER: I'm just sort of reading the lead-up to that, and I believe the lead-up to that was a discussion around what would happen if the units don't get to the desired fuel channel life. If they don't get to our desired fuel channel life, then we end up in a situation where we've got to balance the potential impacts of advancing the start of a refurbishment with the cost impact to the company of having units sit idle.

And we would look for opportunities to change the overlaps. And we would assess that if that needed -- if that is a situation we find ourselves in.

MR. CROCKER: Okay. That's not -- that potential isn't a surprise to you. That's a potential which has existed for, I would imagine, a long time. And I wondered why that approach isn't one of the alternatives that is -- was discussed as widely as the other three that you compare on page 39 of the business plan.

MR. REINER: So right now the way -- so the way the schedule stood in that -- in that business case, that is the optimum schedule. If you do an analysis of idle time and lost revenues, that is actually an optimum schedule. And so it becomes -- it has become the base case. Doing a switch of the two units wouldn't change that. So it would still be an optimum schedule.

Now, if as the fuel channel life management project progresses it gives us different information than we have today, then we would make adjustments. But based on what we know today, outside of that switching of the two units, this is still an optimum schedule for us.

MR. CROCKER: Why then are you -- to follow through, I understand what you're telling me, but why only now are you looking at increasing the overlaps? That's the comment that you make at line 8 and 9 of page 71, and which, as you indicate at line 11 and 12, may lower some costs. Why wouldn't you start with that proposition if the cost -- if the cost of doing it is lower?

MR. REINER: There would need to be a real good assessment of potential risk versus cost. And so in theory, running all four units simultaneously means you can get this done in three years' time. And if all you looked at was, you know, the cost to the project, that might be an optimum, but whether or not you could actually execute four refurbishments simultaneously would be a different question.

So there are a number of factors that weigh into that. So by increasing the overlaps, you know, there is a potential for reducing cost, because we would essentially be returning the units back to service at the end of refurbishment earlier and avoiding some of that downtime that might result if we didn't -- if we needed to make that kind of an adjustment.

So it's -- you know, this is -- as part of our business case updates, what we typically do is, based on what we currently know at this stage about fuel channel life, we revisit the schedule to see what is the optimum schedule. And those other options, you know, of increasing overlaps, they become options we would assess if we needed to make an adjustment. At this stage the only adjustment is the switching of the two units.

MR. CROCKER: But you haven't answered my question. The question was, you are putting alternatives to the Board, and you are ask -- and the Board is going to be approving your going-forward plan, and you didn't analyze what appears to be a lower-cost option, and you didn't put that before the Board, other than in your answers to cross-examination by Mr. Millar, as you did for the other three. And I just wondered why.

MR. REINER: I may be repetitive here, and I apologize. Let me just try to understand what you're looking for.

You would have expected to see in this business case options that adjusted overlaps, and did a bunch of analysis like that.

MR. CROCKER: Yes.

MR. REINER: There was analysis done that looked at the schedule optimization. It looked at a number of different scenarios.

The overwhelming cost factor that drives the schedule is the idle time on the units. So the lost production from the units is the overriding factor. There are variation in project costs associated with adjusting that schedule, but it's overwhelmed by lost production.

So that analysis resulted in the schedule that was put into this business case. The original schedule -- and it was adjusted from our 2009 filing to our 2013 filing because the original schedule, what we knew about fuel channel life at the time had us overlap all four units. When we learned that the fuel channels can actually run for longer, we had a couple of options available to us. We could have deferred everything by about a year, a year and a half, roughly. Or we could have made the decision we made, which was unlap the first two units.

The reason we selected that option -- and this was discussed with the Board -- it became an optimum from the perspective of we've avoided -- we've optimized production from three units. That didn't necessarily optimize production for that first unit, but it mitigated risk for -- to ensure that we can actually succeed on the first unit by allowing us to focus on one unit and get through one unit, and have an opportunity to apply all of the lessons learned on that unit to the subsequent units.

And so given we've now got an optimum schedule, that schedule will carry forward in future business cases, and it will only get adjusted as we learn more about the life of the units.

MR. CROCKER: Is the -- this is the last question I'll have on the point and I'll move on. Is the discussion that you just described, the analysis that you just described which led you to where we are at this point, is that an analysis that or a discussion that's available to us, that we could see?

MR. REINER: There is -- there is a discussion about this on page 16 of that business case. I'm not sure if that might satisfy what you're looking for here. Page 16 and page 17.

MR. CROCKER: No, I'm aware of that. It doesn't discuss the kind of -- it doesn't include the kind of discussion which you've just described that you had with the Board, I suggest. The -- what's on page 16 and 17 doesn't discuss that.

MR. REINER: So our –- again, I want to understand what you're looking for. Are you looking for the analysis that led to the start date of the refurbishment and then that overlap schedule?

MR. CROCKER: No. I'm interested in knowing the discussion that you had with -- which you suggested to me included the option of the lower cost, greater overlapping, which you didn't pursue, and you pursued the other three.

MR. REINER: I -- can I just maybe state something? In the transcript here it says, you know, it could, in fact, be a lower cost. What I mean by that is there is a potential it may be a lower cost. There isn't a lower-cost option out there that we didn't pursue.

So I think the point I was trying to make, by adjusting the overlaps it doesn't necessarily increase the cost of the project. It may decrease the cost of the project.

But there is no -- we looked at an optimum cost versus lost production scenario, and lost production overrides the cost in large part, but we looked at sort of an optimum scenario and also a scenario that we saw as being the most feasible in terms of executing the project.

And that was an outcome of analysis. But I think in regards to this discussion, I didn't mean to imply that there is a lower-cost option out there that hasn't been looked at.

MR. CROCKER: Can I take it from that that there isn't, then, an alternative four which includes that overlapping with a cost applied to it that we could compare?

MR. REINER: There isn't one, no.

MR. CROCKER: I wonder whether we could turn, then, to page 38 of the same business plan.

And you say in the -- in this, the second-to-last large paragraph on the page, about halfway down:

> "On the other hand, operational life is forsaken when units are shut down for refurbishment before they reach the limited component end-of-life.

Because end-of-life dates of the four Darlington units would occur within approximately a one- to two-year span, it is necessary to stagger the start dates..."

Et cetera. Which of the units have operational life that is forsaken?

MR. ROSE: Unit 2. So if we assume that Unit 2 -- looking again at the Staff compendium, KT15.2, page 23 -- if we start Unit 2's refurbishment in October 2016 under the 210,000 effective full-power hours, it's in fact being taken out of service two-and-a-half years earlier than it needed to from an end-of-life perspective.

If you look at 235, it's being taken out almost six years earlier from an end-of-life perspective under those two scenarios.

And if you carry on page 23 and you look at either case, 210 or 235, you'll see the end-of-lives are within one year.

So we couldn't get wait until they get to the end-of-life and have four refurbishments on top of one another. What would end up happening is that you would have units sitting idle until we could start the refurbishment of those units.

So when we developed the original schedule, starting in 2016, we did an economic consideration of the optimal economic value, considering forsaken life, refurbishing before they actually reach their end-of-life, and idle time, lost revenue.

That's the basis for the 2016 start date.

MR. CROCKER: And have you determined what that lost revenue might -- will be?

MR. ROSE: In the analysis we did, the -- we did a comparison, an economic analysis of what's the point of maximum economic value, considering forsaken life and idle time. So it does -- the analysis would consider both parts of that.

MR. CROCKER: Is a write-off of assets part of that analysis?

MR. ROSE: I don't believe so.

MR. CROCKER: Okay. If we could go to the Modus report of August 13, 2013, page 17. The fourth bullet on that page you say:

> "OPG decided to shift the OPS and maintenance costs for each unit's operators to the Darlington refurbishment project while under refurbishment, which further added to the overhead costs."

And my question is -- questions are, is the full amount of the operations and maintenance costs carried through the refurbishment as per normal operations?

MR. ROSE: The operations and staff required that would be used to operate the plant while it's in the refurbishment's control, so for each unit as per our schedule are included in the Darlington refurbishment's project estimate.

MR. CROCKER: And is it the same number of people that would be required to operate it were it not being refurbished?

MR. ROSE: Not necessarily. We've done evaluation of what it is that we require, which -- what are the numbers of operators that we require to do the maintenance, to sustain the asset, to deal with permitry issues for the work that's being done under the refurbishment, and that is included in our estimate.

MR. CROCKER: And is it -- are these costs constant throughout? Do they...

MR. ROSE: They are not constant throughout. They are different at different points. There are certain points in our overall schedule that will have two units under refurbishment. And the staff levels move with those levels, with the number of units being in a refurbishment state, and as well, they fluctuate based on the type of work you do and the phase of the project that you're in. When you shut the unit down, they're shut down, there's more operators doing that and doing the defuelling, and then there's more operators involved when you commission the plant at the end of that refurbishment. And the way that the units overlap considers that.

So there is an attempt to resource level to the extent we possibly can, so while one unit is being commissioned you complete that phase before you start to take the other unit out of service.

MR. CROCKER: And are these the same people who operate the units when they are operational rather than when they're being refurbished?

MR. ROSE: In some cases, yes, we will move people from operations. So when we look at the operations business plan over the refurbishment period, their numbers will be reduced, their need is reduced, because they're operating three or two units. In turn, our needs are increased while we're operating one or two units, so both -- there's some -- when you add those two together they resemble the size of the organization. If in some cases, depending on the type of operator required, it may actually exceed the needs of a normal four-unit organization.

MR. CROCKER: And the description that you gave to me about how these people are used, that's what you have done in order to maximize the efficiency of these people through this period, is it? Or have you done more?

MR. ROSE: Well, certainly we've -- again, back to my point of the overlap, there is a resource optimization there. If you again were to commission one unit and shut down the next unit at the same time, you would -- that's an operator-heavy time frame. So we've ensured that our schedule doesn't do that.

MR. CROCKER: Okay. Thank you.

I just have one further brief area. If page 18 of that same Modus report could be turned up, please. The report which you have footnoted at footnote 17, at the technical conference I asked whether that could be provided, and I think Mr. Reiner indicated -- one of you indicated that the variance and explanation of overall program scope growth, which is the first line after the bullets on that page which is discussed in that report, we could find that in a business plan. I can't remember which business plan you said, Mr. Reiner.

We looked, and what we found was sort of a general discussion, and we were looking for something in more detail than that. And so I would like to reiterate my request, please, to have that report, for an undertaking to provide that report, please.

MR. GOULD: Mr. Crocker, maybe I can help. There was an attachment to our very next report, was that spreadsheet. I believe Mr. Shepherd had some cross-examination about it. And that is a comparison of those two business plans, to my knowledge. So it's this coloured sheet. So I think that's already in evidence.

MR. CROCKER: But that's not the full report.

MR. GOULD: I thought you were just asking for a comparison of the numbers. This is a comparison of the numbers.

MR. CROCKER: No -- well, that may be fine, and I'm not the one who's going to be analyzing the report, and the person who is going to be analyzing the report is asking me to ask you whether the full report is available, that the summary in the business plan didn't provide him with the information he wanted for the purposes of argument. So that's --

MR. GOULD: That's not my -- I was just trying to help.

MR. CROCKER: I know, I know.

MR. GOULD: So...

MR. KEIZER: Well, maybe we should ask what the nature of the report is. I mean, obviously the sheet that's -- spreadsheet that's been provided is quite detailed. I don't know what form the report takes or how it actually boils up to the spreadsheet.

MR. ROSE: So I can try and respond to that as well. The nature of the report is summarized in the Modus report, page 18 of 76. It's -- I believe that the report that is being referenced in the Modus, from memory, was likely something that I was involved in preparing, because we do the variance plan or plan analysis, was not much different than this. It was a table.

What we also referenced in, I think in the technical conference was on page 34 of the business case, the confidential version of the business case. We actually have the breakout of the different elements and the business case, the estimates at different points in time, including the November 2009, which is referenced here, as well as the November 2013.

MR. CROCKER: With all of that then there should be no problem with providing the report.

MR. REINER: Can I -- just for clarification, can you just repeat which report it is that you're looking for?

MR. CROCKER: The -- well, it's the report that you have footnoted on page 18 at footnote 17, unless there is a more recent version. And if there is a more recent version, I would like that one.

MR. REINER: We can undertake to provide that.

MR. MILLAR: J16.3.

UNDERTAKING NO. JX16.3: TO PROVIDE THE MOST RECENT VERSION OF THE MODUS REPORT.

MR. REINER: The information was all here, though that might suffice, but, no, we can undertake to provide that.

MS. HARE: And is that report confidential?

MR. ROSE: It will be confidential, because it will have point estimates of the contract values in it.

MR. CROCKER: We'll treat it that way.

MS. HARE: Okay. So just add that to the list of what you're going to address --

MR. KEIZER: We'll add that to the list of undertaking responses.

MS. HARE: Thank you.

MR. CROCKER: Thank you, Madam Chair, thank you, panel. I have nothing further.

MS. HARE: Thank you.

MR. KEIZER: Could that be marked as a JTX until we otherwise, or --

MS. HARE: Sure.

MR. KEIZER: -- JX or whatever the number is?

MS. HARE: Yes. The Panel does have some questions, starting with Ms. Long.

CONTINUED QUESTIONS BY THE BOARD:

MS. LONG: Mr. Reiner, I'm looking at the May 13th, 2013 Modus report, which was somewhat critical of how things were progressing. And I'm wondering if you can explain to me in a general sense how it is that Modus, who had been retained before and was monitoring your performance, how it is that we came to get a report like we did -- like you did on May 13th, 2014?

MR. REINER: There is an overall work plan that Modus laid out as part of the work that they are doing for the nuclear oversight committee, and that work plan looks across time and what specific areas of the project that they will dive into, that they will do a deep dive into and report on. And they align that with the phase and status of work on the project.

So this report and the critical elements in this report are really around some of the campus plan projects. One of their focus areas for that report was specifically to take a look at the campus plan projects.

MS. LONG: I guess you're drawing the distinction that this was a deep dive, as opposed to other reports.

I guess I'm looking for an assurance that the next time they do a deep dive they're not going to find similar type problems. I know that you've put things in place in order to address some of the issues that they raised, but it seems to me if OPG is taking on a larger project management responsibility, I guess, with respect to this project, I wouldn't want to see another report doing a deep dive that identified more problems.

So I guess what I'm asking you is: Do you feel confident you have procedures in place that, should Modus dive into something deep again, they wouldn't produce a similar type report?

MR. REINER: I will start by saying my expectations are exactly the same as yours, that I wouldn't expect to see this kind of report.

That being said, it would also not necessarily surprise me that they would identify gaps. This particular report had some gaps that were of significant concern and we took some significant corrective actions, and that was really largely around having two different organizations manage projects in two different ways. And we're establishing some standards across those two organizations.

And so certainly that's my accountability, to do that and make sure that happens, that we don't find another result like this.

But Modus will continue to do deep dives. That's what they're here for. They will continue to try to find potential problems before they become real problems.

But certainly with the lessons learned out of this that we've applied -- and I will say, just to draw a distinct of distinction between the two organizations that are executing work, the refurbishment organization, which was really focused on the definition work leading up to breaker open and what happens post-breaker open, had already incorporated a lot of the practices that Modus identified need to be applied to the campus plan projects that are being done by this other organization.

So we had, in fact, already done many of the things. And I believe that was highlighted in Mr. Gould's report.

So for us now, it becomes ensuring we've got that consistency and we've made the changes across both of the organizations.

MS. LONG: You had a discussion today with Mr. Shepherd, and he put to you that, really, the success of this project will depend on project management. And I think that you agreed with him. And I think earlier in the week you said that you had the right team in place and that you were confident in that.

This Panel has heard a lot of evidence about some challenges, I think, that OPG faces with respect to business transformation, prescriptive, I guess, union contracts. We've heard about your pension plan, which allows people to retire at, let's say, a somewhat early age.

So as I'm looking at the next 10 years for this project, do you feel confident that there aren't any impediments to you having the right team in place in order to see this project through, you know, consistent with the contract strategy that you've put before us?

MR. REINER: That is clearly a challenge for us, given the duration of the project, the points that you highlighted.

We -- inside the company, the demographics currently, the way they sit, we have a lot of very senior people exiting, potentially exiting the organization over a very short period of time.

So to address these issues, we do have a fairly robust succession and development planning process in place. The types of steps that we are starting to take to adjust for these risks is we're now looking far deeper in the organization for potential succession candidates for senior roles. We're implementing things, for example, like -- and you may have seen this in the nuclear operations panel, things like deputy director, deputy vice-president-type positions, so we can bring a more junior person into a role and have an opportunity to mentor and transfer knowledge.

So that's being built into our process.

We're also enhancing some of our -- we're looking at different strategies that allow us to tap into external expertise and have access to external expertise.

So the example that is in place already, these owner support services agreements that I have talked about that are essentially like an owners-engineer-type arrangement, where we have access to engineering capability and project management capability. We are also looking at extending that into construction management.

So those are all pieces that we are putting into place.

When it comes to union agreements, I think that one, we are nearly through. We have got an agreement in place with the Society of Professional Employees. That takes us to the end of the refurbishment time period. And it's an arrangement that, to the union's satisfaction, deals with how positions would get posted, how people would get moved in and out of positions. So that's in place.

And we're in process of working on a similar agreement with the Power Workers' Union. We expect to have that done shortly.

So those are pieces that are actually coming together quite well. So there are –- and this is -– these are issues that are in our risk register as well. We have corporate groups that are supporting us in this effort.

But definitely something that is clearly being managed active.

MS. LONG: My final question -- and again, it's to you, Mr. Reiner -- is with respect to when I take a look at your contracting strategy, you used words like when you approached contractors to take on this work. And we heard when we heard about Niagara tunnel, the comment was made that OPG was lucky to have Strabag continue with the project.

Do those sentiments indicate that there is a problem with the balance of power in contracting with respect to OPG and contractors?

I think I'm a little unclear on that, because those comments concerned me, but then I heard, I think, that you felt that there was ample compensation with respect to contracts, that you were able to negotiate a good deal.

So can you help me out with that?

MR. REINER: Yeah. With -- and in regards to the tunnel comment, I believe that might have been around the early phase –- the first phase of that project was a fixed-price phase. The project ran into a lot of difficulty and got to the point where the contractor, essentially, was prepared to walk away, because of the risk that was potentially going to be imposed by the contractor.

So that's a learning that has factored into our strategies, which is why we sort of showed the relationship of cross-pricing structures and oversight and project definition.

When it comes to the contracts themselves -- so the re-tube and feeder replacement contract, which is the largest, when we started that process there were seven interested parties. And we started through an expression of interest rather than going into a formal proposal. And seven parties replied. We took them through a process of -- an evaluation process to narrow the field, because we did not want to take all seven of them through a request for proposal.

We narrowed that field down to three that we were prepared to take through a competitive bid process. It did collapse to two, because one of the entities was Atomic Energy of Canada. We took two forward through that competitive bid process, and we did get good bids from each, and to keep that competitive tension alive what we did is we actually negotiated with both parties simultaneously. We conducted two negotiations, to a point where we requested a final offer from both parties, and we made a decision based on sort of a combination of final offer, their technical capability, what they were putting forth in terms of methodology, their project-management strengths, and it was a robust commercial process.

We had the same in most cases. The exception I would say is where we needed to sole-source with Alstom, so it wasn't the competitive process, there was a sole-source process, but we did establish pricing benchmarks to be able to evaluate the price that we were getting, and essentially we had -- we have a lot of knowledge about the price of components and what they cost us today. We were able to lock those prices into the contract.

So even though there wasn't a competitive process, we were able to still get, from my perspective, good prices in those -- in that contract that was sole-sourced. But there has been a healthy competitive process across the projects.

MS. LONG: Thank you. Those are my questions.

MS. HARE: Thank you. Ms. Duff?

MS. DUFF: Thank you. I have a number of questions regarding the business-case summary, so it's Exhibit D2-2-1, attachment 5. And my questions are focused on pages 41 and 42. This section is entitled "annual support and overhead cost", and at the last sentence of the first paragraph, they're talking about centrally held costs, such as insurance premiums, pension adjustments, and interest on other post-employment benefit obligations which are allocated to the Darlington station.

And just to summarize, I think that first paragraph is talking about business-as-usual conditions and costs that are allocated to the nuclear station today. Is that agreed?

MR. REINER: Yes, I believe that's correct. Yes.
MS. DUFF: And in the second paragraph it's now talking about, should the nuclear fleet -- should I continue?

"Should the nuclear field shrink, losses of economies of scale will result and in effect have increased in the cost of providing nuclear and corporate support services to the remaining stations."

So I'm just -- as -- so with the nuclear refurbishment project, by the time this project is complete -- and I think you said it was in the year 2025? It's approximately ten years from now?
MR. REINER: Yes, that's correct.
MS. DUFF: So at that time Pickering will no longer be operating and Darlington will be the only nuclear generating station operating?
MR. REINER: That's correct.
MS. DUFF: Am I to understand that the remaining Darlington station will then have more costs allocated to it? I'm trying to understand what the relevance of this is to the refurbishment project.
MR. ROSE: So I'll start off with answering the last part of that. The relevance to the Darlington refurbishment is that we calculate the LUEC, we calculate the ongoing operation costs for the Darlington post-refurbishment, so for the 30 years. So this includes in the LUEC is the annual cost of Darlington, which would

include both the nuclear support costs and the corporate support costs.

MS. DUFF: So in this assessment -- and now I guess we're going on to the third paragraph -- well, it does state that "because it is assumed", and I quote:

> "Because it is assumed that the Pickering units will have already been shut down at the time the Darlington station will be in a post-refurbishment period, Darlington's share of the nuclear support costs and corporate support costs will come under upward pressure due to losses of economies of scale."

So what have you -- and the next sentence starts "therefore, in this assessment". So that's where I was looking for some explanation of what has been added to the financial analysis of this project and what was the purpose of allocating more corporate costs to this project analysis, if I -- please explain.

MR. ROSE: So the only -- the purpose for being conservative is to ensure that we don't -- we don't artificially lower the LUEC. So this actually -- the conservative -- we actually put a cost higher than what today's current run rate is. So it's a conservative position.

The goal would be, as the business plans get set for these years post-refurbishment, that these costs are reduced, lower than this, and there's an upside on the LUEC there.

MS. DUFF: The corporate support -- and I guess we turn the page to page 42. So to quantify that, is it the financial analysis for this project has been allocated an additional 235 million per year? Is that correct? So I'm looking at table C6, "corporate support and adjustments", so there's an incremental cost being allocated of 235 million per year as a result of this conservative assessment?

MR. ROSE: I don't believe that's incremental. I think that is the amount that is assigned to Darlington, but I should take an undertaking to verify that portion.

MS. DUFF: I'm concerned -- or -- that my point that I was trying to understand was what is being assigned to Darlington and the nuclear fleet that operates versus this particular project, because this project doesn't have any --

MR. ROSE: Just let me be clear about this, because it is the LUEC -- again, this business case looks at the 30-year life of Darlington after refurbishment. So it's assigning dollars on an annual basis for the operations of Darlington.

So the LUEC is made up of two components: The cost of refurbishment itself, which is about a third of the costs, and then the costs of operation maintenance for the next 30 years.

So this is the part of that analysis of the costs of operating the -- of maintaining the operations of the plant for the additional 30 years. It includes direct costs of operations of the plant, as well as the amounts from the corporation that are allocated to the plant.

MR. REINER: Let me try to add to that as well. So this doesn't increase the project cost at all. I think what this tries to identify is that with only a Darlington station operating and a reduced amount of megawatts being produced by OPG, costs associated with pension and post-employment benefits, for example, for the people that have already retired are now going to be borne by a smaller number of megawatts, and Darlington's share of that will increase in its operating life post-refurbishment. And that's where that increased cost that Mr. Rose has talked about is shown. It's captured in the LUEC in that post-refurbishment time period.

MS. DUFF: And just to be clear, I was surprised the 235 -- 235 million was that low.

MR. ROSE: I'm just reading this, getting -- refreshing myself. I believe this is the incremental amount. It does say in the previous paragraph "the incremental view of Darlington's cost", in consideration of the fact that we have a smaller nuclear fleet.

So this has been added to ensure that we don't undermine that point, that there is some conservatism in this. You know, I think the challenges in putting together this business case without business transformation completely being done, we didn't want to be overly optimistic, so there is some conservatism in those operation costs.

MS. DUFF: Yes, I think conservatism is a good thing.

MR. ROSE: Yes.

MS. DUFF: On page 44 you have a pie chart, figure C4, in which the corporate overhead costs that are the component is 4 percent. That seems quite low to me. Is that because it's directly related to the 235 million per year? In which case, over a $12.9 billion project, it is 4 percent.

MR. REINER: This pie chart, there are actually two components to -- that you would consider as support and overhead to get allocated; it's that's station support, as well as corporate overhead.

So station support would include those corporate nuclear costs, engineering, all of the nuclear-related functions that now would only be aimed at Darlington because there is no longer a Pickering.

The corporate component would be corporate human resources, corporate public relations. It would be Darlington's share of that.

The corporate centre in itself, through business transformation, is declining. I think that decline has been captured here, and this would be Darlington's share and there will be a piece of that that gets spread across the OPG fleet.

So it's really those two slices that you'd be looking at to see what is the support cost that gets allocated.

MS. DUFF: To be fair, the quantification of that 235 million, that's not a number that you're deriving, or your team in coming up with the financial analysis of this project?

MR. ROSE: That is fair. My -- when we prepared this business case, my focus, my team's focus is on the cost of the refurbishment project itself. We rely on the corporate investment group, the inputs from our business plan, and additional analysis to provide inputs into the other parts of the LUEC.

And as this chart on figure C4 represents, a third, 37 percent of the total LUEC, is representative of the refurbishment cost. That's what we are managing.

The other two-thirds of this pie are the ongoing operations costs that are used for the purposes of setting this LUEC.

Obviously, as business transformation and other initiatives, and ongoing business planning and as the organization reinvents itself -- if that is the right term to use -- the actual costs of this will continue to get moved, to move around, and we will see the impact of that on our LUEC.

MS. DUFF: Thank you. That's very clear. I don't think I need an undertaking for additional information.

I have a few questions regarding the commercial and contracting strategies. We've had a lot of discussion over the last few days, but with the board of directors approving the business case, in D2-2, tab 2, 1, attachment 5, have they implicitly approved your commercial and contracting strategies, in your opinion, from a management's perspective?

MR. REINER: Not necessarily. Let me just make sure I'm clear here. The approval of the business case wouldn't necessarily have resulted in approval of the commercial and contracting strategy, because we do -- we do, as part of the process of executing the contracting strategy, separately report to the board, and have done as we progress through the re-tube and feeder replacement project, for example, when we initiated that procurement.

The strategy as it's documented in the evidence was actually presented to the board. Approval was granted. We proceeded the negotiations on that basis, and the result was a contract. That contract was brought forward to the board of directors and approval to execute the contract was granted.

So there are separate approvals that align with the procurement process.

MS. DUFF: Thank you for that explanation. So it has been approved, but not as a byproduct of the business case summary?

MR. REINER: Right.

MS. DUFF: And the Minister of Energy, who in the Long Term Energy Plan asked you, as one of the principals, to look at contracting strategies, do you feel that you have received their approval regarding the course that you're taking?

MR. REINER: Yeah. We provide regular updates to the Ministry. And we present each time, as we progress through the contracting process, for example -- prior to making any commitments, updates were provided to the Ministry so they had an opportunity to do their own assessment and determine whether or not they're comfortable with OPG proceeding.

And we do regular business plan updates, and separately, just updates on the refurbishment project.

And they do also have their independent oversight embedded in the project, that provides reports back.

MS. DUFF: And in October 2015 when you do have your release-quality estimate, will you be seeking reaffirmation of your contracting strategies because you'll just be that further along in the process? And you'll have a number of contracts established that you don't have today?

MR. REINER: Yes. And at that point, actually, that does become a fairly critical point for us, because we would then be transitioning into the execution phase. And so we would definitely be seeking concurrence from our shareholder to proceed.

And that would be, you know, an off-ramp opportunity, if that release-quality estimate said something that significantly alters the economics of this project.

MS. DUFF: I'm just going to propose to you: Wouldn't that be a better time to ask for this Board, the Ontario Energy Board's approval, or deeming that your commercial and contracting strategies are reasonable, when that release-quality estimate is available?

What's the advantage to doing it now, in this proceeding?

MR. REINER: You know, I think the advantage of doing it now -- if there was a concern we would want to know what that concern is, and we would look to see how we would respond to that concern before we got to the release-quality estimate.

If there was a concern and we're already at the release-quality estimate, and we've already secured all of the contracts and we've executed the commercial strategy, we're already at a point where, you know, things are essentially cast in stone -- well, they're not cast in stone. I mean, there's flexibility in the contracts; there are off-ramps. But we would not -- we would not make a significant alteration to our approach.

MS. DUFF: There are a few options here. The issue is on the issues List. This Panel could find that the contracting strategies are reasonable, in which case I don't think you'd alter the course of actions that you're handling today.

MR. REINER: That's correct.

MS. DUFF: If this Panel were to find they are not reasonable, perhaps you would then defer into the situation you've just described?

MR. REINER: We would want to understand why that decision of not reasonable was being made, and we would assess that and then assess what the impacts are on the work that we've done.

And if there was no decision, we would proceed at risk, so to speak.

MS. DUFF: Thank you. I have -- changing the topic slightly, the Modus reports that have -- was filed as part of the July 2nd update, were you a part of the decision to not file those reports that were available when the prefiled evidence was filed in September 2013?

I was just wondering, why were they filed in July of this year?

MR. REINER: So the primary driver for filing them in July in the update was that the Modus 4 report identified some potential issues associated with the contracting approach that was being utilized on the campus plan projects.

And the model, the contracting model is similar, as we had discussed, as is being used on the refurbishment project. So it's information that we felt, given what we were asking for here in regards to a finding of reasonableness on the commercial strategy, that that was information that needed to be presented.

Back in September, the reports that we had, those were reflected in our evidence, the information that was in those reports. There are thousands and thousands of pages of documents that we have for this project, and when we write the evidence and look at the supporting documentation, that's where the decisions get made on what gets filed, what doesn't get filed.

But to us, there wasn't anything in those Modus reports that wasn't already reflected in the case that we were presenting.

MS. DUFF: The cost -- I mean, the services that you are receiving from Modus and the reports that are tangible evidence, the costs for those, are they in any way being reflected in the cost of service application for recovery in this proceeding?

I mean, is there a portion of them that's been capitalized and therefore reflected in the rate base additions for 2014-15?

MR. ROSE: Well, we have not -- we have not, obviously, asked for any change to our revenue requirement, but the in-service amounts related to the assets have changed, you know, as document in the Modus report.

So for example, the auxiliary heating system is one of the projects that Modus reports on.

MS. DUFF: I should clarify. I was talking about the cost for the consultant itself and the services that are providing --

MR. ROSE: Well, my --

MS. DUFF: -- what is the accounting treatment that you're affording that?

MR. ROSE: My apologies.

[Laughter]

The costs of Modus are project costs that are not going in-service. They're not attributable to these assets that are going in-service. They're a cost related to the overall project as a whole and would carry with our project costs and in essence go in-service with the project at Unit 2 in 2019.

MS. DUFF: Thank you. And my final question is actually to Mr. Gould. In one of your reports you were referring to the culture change that was required, OPG and its management. So they've never executed contracting strategies like this before. This is the first time that we've used this format, this -- with these guiding principles.

In your opinion, in your experience, how has OPG responded to your comments, and are they equipped to really address your concerns that you originally stated?

MR. GOULD: So first let me start with the concern and then move on to the two things you asked. So we raised the concern in our initial report in August. We identified that from our knowledge of OPG's past projects in comparison that many of those were much more centre-led by OPG than this, that the EPC approach was a bit of a -- was a departure, particularly in the areas of engineering and procurement.

And so we highlighted that, and we have subsequent -- and we also identified in that August report and subsequent reports to that that to carry out the management plan -- the contracting management plan that they have, they will need a strong team. They will need a strong execution team.

So what we have seen over the past year since providing those comments is an increased focus on both the team itself and the qualities within the team, as well as the processes, procedures, and readiness for that team to perform on the refurbishment side, and we have seen that the -- as the contracting strategy is maturing, we're also seeing that the team is maturing with it, with a better understanding of the work that has to be done.

The areas where we see that they need to strengthen their approach are in -- we have seen this in the retube and feeder replacement project, quite notably in that project, where you have a very strong team, and that team is doing excellent vetting of the contractor's planning.

What we have recommended is that the other projects that are a little bit farther behind, that are coming behind that project in maturity, that they replicate many of the efforts that are being used on that project, so that we see the same the quality of vetting, the same quality of development, that we're seeing in that project.

MS. DUFF: So as each project is maturing there are lessons learned within the overall scope of all the activities, and that culture change -- I'm just trying to paraphrase what you were saying -- that culture change is evolving, and you can see tangible evidence of that.

MR. GOULD: Yes, I think that's a very fair way of saying that.

MS. DUFF: Now, regarding my Panel Member Ms. Long question regarding succession planning with a project that extends to 2024, assuming nobody is working on the project that's over 50, in your experience -- and this is -- I did want to talk to you about your experience that you have with other projects with such a long time frame -- what are some of the recommendations that you have for OPG regarding that? And...

MR. GOULD: We have made some, and we have looked at pieces of their succession planning and the way that the team is coming together. Obviously, most of our focus has been on Unit 2. But we have made some recommendations around increasing the flexibility of some of their hiring policies, ensuring that there are -- there is some flexibility for bringing in external contractors.

Typically in projects of this type there are very few people, very few people in -- really in the world community that have extreme knowledge of and capability in this. I think that OPG is fortunate to have a number of those that have very specific knowledge of this particular project already in -- on their team. Mr. Reiner referred to some of those team members earlier.

There needs to be some flexibility, in our view, to adapt to what is normally used on a project. Projects are different, essentially different, from core business functions, and the way that utilities typically deal with major capital projects, large capital projects, from a hiring perspective is also different.

You may not want to take on the long-term pension liabilities and other things that go with long-term employees for -- in a project setting, as an example.

So we have, and we will continue to highlight, the need for both the team to grow, gel, and expand and have that succession over time.

MS. DUFF: Thank you. Those are my questions.

MS. HARE: Thank you.

Mr. Keizer, do you have redirect?

MR. KEIZER: No, Madam Chair, I have no redirect.

MS. HARE: Thank you. Thank you very much, witnesses, for your testimony. Thank you, OPG. This now concludes our oral phase of the hearing. We would like in particular to thank the OPG staff that put up the exhibits for us on the screen. That is particularly helpful. And so we appreciate that very much. And thank you to the court reporters, who as always have done an excellent job.

So that concludes our hearing. Thank you.

--- Whereupon the hearing concluded at 3:31 p.m.