ONTARIO ENERGY BOARD

FILE NO.:	**EB-2018-0218**	**Hydro One Sault Ste. Marie Inc. on Behalf of Hydro One Sault Ste. Marie LP**

VOLUME: **Technical Conference**

DATE: **January 15, 2019**

EB-2018-0218

THE ONTARIO ENERGY BOARD

Hydro One Sault Ste. Marie LP

Application for electricity transmission revenue requirement beginning January 1, 2019 and related matters

Hearing held at 2300 Yonge Street,
25th Floor, Toronto, Ontario,
on Tuesday, January 15, 2019,
commencing at 9:09 a.m.

TECHNICAL CONFERENCE

A P P E A R A N C E S

JAMES SIDLOFSKY	Board Counsel
FIONA O'CONNELL KEITH RITCHIE	Board Staff
DAVID HOVDE * MARK LOWRY * PETER HELLAND *	Pacific Economics Group (PEG) Midgard Consulting Inc.
MICHAEL ENGELBERG JEFF SMITH LINDA GIBBONS	Hydro One Sault Ste. Marie Inc. on behalf of Hydro One Sault Ste. Marie LP
SHELLEY GRICE	Association of Major Power Consumers of Ontario (AMPCO)
TOM LADANYI LARRY SCHWARTZ	Energy Probe Research Foundation
RICHARD STEPHENSON	Power Workers' Union (PWU)
MARK RUBENSTEIN JAY SHEPHERD	School Energy Coalition (SEC)
MARK GARNER BILL HARPER	Vulnerable Energy Consumers' Coalition (VECC)

* appearing by teleconference

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E X H I B I T S

U N D E R T A K I N G S

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U N D E R T A K I N G S

Tuesday, January 15, 2019

--- On commencing at 9:09 a.m.

MR. SIDLOFSKY: Good morning, and welcome to day 2 of the technical conference for Hydro One Sault Ste. Marie, OEB file number EB-2018-0218. We are going to proceed this morning by concluding questions on the transmission system plan. And that means Mr. Ladanyi will be finishing up with questions on behalf of Energy Probe.

Mr. Ladanyi.

HYDRO ONE SAULT STE. MARIE - PANEL 1, RESUMED

Steve Fenrick

Steven Vetsis

Kevin Lewis

Robert Otal

ISSUE C, TRANSMISSION SYSTEM PLAN

EXAMINATION BY MR. LADANYI:

MR. LADANYI: Thank you, good morning, panel. I hope you can see me. There's actually no good place to sit in this room, so sorry about this.

So if we can first turn to Energy Probe No. 2, and particularly answer D. The responses -- keep going down. Okay. And keep going down. Okay. C. Well, let's look at C for a second. So C says "please refer to School Energy Coalition number 10 in the attachments", and then in part D you say the only documents that were actually produced at those meetings -- and I won't go into details what the meetings are, I will leave that for the hearing -- were the attachments to Energy Probe No. 10.

Can we go to Energy Probe No. 10, please. Sorry, Energy Probe -- I mean, School Energy Coalition No. 10. I misspoke. SEC No. 10. In their attachment -- so they are actually a series of Excel spreadsheets. They were attached to the response.

MR. SMITH: Did you want us to open the Excel spreadsheet --

MR. LADANYI: Yes, well, I would like you to go to the Excel spreadsheets, and what I would like you to do, if you can find them, is that you select whichever one you'd like -- this is not a trick question at all -- and I would like you to explain to me how those Excel spreadsheets work, what exactly are we to take from those Excel spreadsheets, and how they were used. So you can select any one of them you like, I don't care, and you take us through it.

Is there anyone at the panel, by the way, who was present at those meetings? Can I start like that? So none of you were present. Are you at all familiar -- have you actually seen these spreadsheets before they were filed? Have you -- have you seen any of these spreadsheets before, or this is the first time you have seen them?

MR. OTAL: Yes, I have seen these spreadsheets before, but, yeah.

MR. LADANYI: Are you reasonably familiar with these spreadsheets that you can explain to me what I am to take out of these spreadsheets?

MR. OTAL: I will try my best to answer your questions.

MR. LADANYI: Okay. So why don't you take us through -- there are several sections in each spreadsheet. You explain to us how they were used in the meetings and what exactly do we take out of this information. Because this is a technical conference, and I think in my experience technical conference is the place where these kind of questions can be asked so we would not take up time during the hearing. So this is strictly a technical question; no challenge, no trick to this. I am just trying to understand how this works.

MR. OTAL: So if I could direct you back to the evidence, Exhibit B1, tab 1, schedule 1, just kind of to give you an overview of what is a challenge session.

MR. LADANYI: Sure.

MR. OTAL: So basically it's looking at various trade-off decisions, assessing which investments should be promoted or demoted based upon -- so, sorry, I am looking at Exhibit B1, tab 1, schedule 1, page 170 (sic) of 188, specifically line 12 in the evidence.

And so it's saying that as part of the challenge sessions we are going to look at trade-off decisions, assessing "which investments should be promoted or demoted based upon such parameters as the planners' level of comfort with the risk that remains unmitigated after the investment portfolio is assembled;" and looking at "the investments selected on the basis of non-risk considerations (by use of qualitative flags) relative to risk-based investments outside of the Plan portfolio."

At the completion of these sessions "staff will record the changes that are made to the investment portfolio, along with the rationales that support these changes and the impact on the contemplated investment portfolio driven by these changes."

MR. LADANYI: And go on. So how does this tie into the spreadsheets?

MR. OTAL: Do you have a specific question --

MR. LADANYI: Well, no, I would like to actually -- I would like to understand the spreadsheet. This is a technical conference, and this is an opportunity for you to explain to us what this evidence is, and I don't actually understand what this evidence is. I looked at it, and I can't make any sense of it, so please help me.

MR. OTAL: I can answer a specific question if you have a specific question on the part of the spreadsheet.

MR. LADANYI: It's going to take a long time if I'm going to have to ask you -- like, if I start asking questions about each item on the spreadsheet and which one you've got open, Northern Avenue transmission station T1 replacement.

MR. OTAL: Yes, so, I mean --

MR. LADANYI: So let's start like this, okay, what is -- James Warburton, who is he? Does he work for you or does he work for Hydro One?

MR. OTAL: James Warburton is an employee of METSCO Energy Solutions.

MR. LADANYI: Okay. So he was there, and at this

meeting was James Warburton taking notes? So this is his spreadsheet, is it? He had a laptop and he was taking this down?

MR. OTAL: He would have been populating the template.

MR. LADANYI: Okay. And the people in the room, were they -- did they have their own templates?

MR. OTAL: I can't answer that question. I was not present at the sessions.

MR. LADANYI: Okay, and let's go on then. Just a second. Don't go anywhere. We are doing well here.

So what does this parent/child AR number mean?

MR. SMITH: Just to be helpful, AR is actually a Hydro One accounting term. That's basically the -- it would be like a project ID in an accounting system. It's the same thing. So that's -- it's just kind of an identification number. It doesn't have any intelligence particularly in the number.

MR. LADANYI: But it doesn't actually have a number, so that would be like this 1-1-1-1 that I see in the yellow column?

MR. SMITH: The AR number is -- may or may not be set at the time of the challenge. Like, that's -- as I say, when it gets entered into the SAP accounting system an AR number is assigned to a project.

MR. LADANYI: Now, I don't want to take a lot of time now, so if there is a hearing and if you actually have a person who is familiar with this, I will be asking, like, an hour question of -- like, an hour worth of questions at

a hearing, but I can say I think it's going to be painful, because these people are not familiar with the spreadsheet, and I will be asking -- I intend to ask, actually, not one you select but one that I select, which actually causes me more difficulties, but I will be happy to leave these questions for the hearing, and I am hoping that we will have an oral hearing on this matter.

MR. ENGELBERG: Perhaps it would make it a bit easier if you could pose your questions, whether the panel is able to answer them or not, but pose them in succession. It may be something that as a group can be answered now or can be answered as an undertaking. But I think what I am getting from the panel is that they don't really understand what your difficulties are with the spreadsheets, so if you could maybe in rapid-fire succession ask a number of your questions, that would be helpful.

MR. LADANYI: Actually, I did not intend to make this into a cross-examination type of session. What I intended to find out is how these work, because these sheets appear to be the only record of a group of sessions which are outlined in the response to Energy Probe No. 2 where key decisions were made about which project should go ahead and be prioritized regarding the transmission system plan. It appears to me that they have -- these sessions had a big effect on the final outcome of the final version of the plan, and I asked for records of the sessions to see how decisions were made, and this appears to be the only record.

So I don't know how to approach it now. I can take you to a different one and ask you a series of questions. I thought these were going to be very simple answers, honestly. I really didn't expect this was going to turn into a big problem.

MR. ENGELBERG: It would be helpful if you would put those questions on the record now. Unless they are in the nature of cross-examination, we wouldn't have a problem with them. So can you ask questions?

MR. LADANYI: They would be technical questions, because I think it's a long time to go over that. I would be happy to put them in writing and send them to you, but there could be as many as fifty questions. So you really have to be careful. Do you really want to go there?

I thought this was going to be very simply answered, honestly.

MR. SHEPHERD: It's Jay Shepherd; I wonder if I can jump in. Is there some reason why Hydro One can't provide somebody, obviously not here today, but by way of undertaking, for example, who can just give an explanation in more detail about how these spreadsheets are used and provide the details, so that somebody can walk through it, like a little sort of point by point? If you look at this, it means this, et cetera, to help out.

The spreadsheets are not easy to understand. I mean, obviously, if they were straightforward, somebody could explain them and clearly they aren't.

Is that possible? Would that be helpful, Tom?

MR. LADANYI: Yes, it would be very helpful.

MR. ENGELBERG: I think probably something like that could be done by way of undertaking. All I was asking was if you could give an idea for purposes of the undertaking, ask a half dozen of your questions, put them on the record so that the people who fulfil the undertaking will know what it is that you are looking for.

Do you have an objection to putting half a dozen or so questions on the record?

MR. LADANYI: I can try a few questions, but I don't know -- let's go to --

MR. ENGELBERG: You said you had fifty, but can you give us six of them?

MR. LADANYI: Well, fine. Let's go to copy -- to Sault Ste. Marie number 3 refurbishment, which is a spreadsheet, another spreadsheet that's attached.

So if you look at the box with a lot of text in it, that's sort of a -- I would say a beige colour. It says Sault 3 line is a 70 kilometre 115 kV line between MacKay station and Goulais transmission station, and it gives a description below that.

And if we go further down in that column, you will see there's some dollar numbers, and we now see that there's, let's say, $250,000, and $3 million, and $7 million, and $7 million and they appear to be capital expenditures, or at least -- maybe you can tell me what they are for different years.

What are these numbers and did the people in the room

have these numbers before them and how -- who provided these numbers. And I would like to know what significance these numbers had in the decision making in the room, because obviously important decisions were made that day and the day, I think, is given on that spreadsheet.

MR. OTAL: Okay. So this is -- again, you if have specific questions on specific cells, I am happy to go through that. So cells C72 through to C75 correlate with the evidence.

If you go to Exhibit 1, B1, tab 1, page 133 of 188, at the bottom of that page, we see the project costs that are associated with the Sault 3 115 kV line reconductoring. So all C72 through to C75 are displaying are those costs.

MR. LADANYI: Okay. Now if you go across --

MR. SHEPHERD: Sorry, Tom, can I interrupt?

MR. LADANYI: Please.

MR. SHEPHERD: You didn't answer the question. The question was did those costs -- did everybody have those costs coming into the room, were those costs developed during the room, were they some sort of compromise? The question was where did those costs come from.

MR. OTAL: They came right here from within the application.

MR. SHEPHERD: Okay. So you had the application first, and then you had these spreadsheets? Is that how it worked?

MR. OTAL: Yes. So these were the final estimates that would have been developed for these projects, and then

the purpose of the challenge session is to form that final prioritization, to really test these projects through this procedure, essentially.

MR. LADANYI: If I go across -- can you move the scroll across to the right? You will see it talks about -- it's got something called OM&A annual savings. And then we have nothing there or "REF". I don't actually know. Does that mean there's no annual savings as a result of this capital project? Is that what it means, or it means the savings are somewhere else?

MR. OTAL: So in this case, first of all, the OM&A savings would have been recorded in column I, not in column G.

MR. LADANYI: Okay.

MR. OTAL: And in this case, the OM&A annual savings would have not been known at the time of the challenge sessions, so therefore they were not entered.

MR. LADANYI: Thank you for that answer. And that really poses a lot of further questions that I can go with. How could these people make a decision -- now this is a cross-examination question and I don't want to go there. But how can they make a decision if they were not -- did not have all the numbers in front of them? How could they make a decision?

This is a capital investment. It clearly is a replace versus repair type of question, and they are choosing replace. But they don't seem to have information on the cost of additional maintenance, or maintenance savings.

How could they possibly make a decision?

MR. OTAL: So when we are doing this evaluation, it is being performed with all of the available information at the time, right. And, you know, again, if I direct you back to Exhibit B1, tab 1, schedule 1, page 48 of 188, figure 3.2 showing the asset management process, and all of those four stages, it's really leveraging whatever information is available at the time.

One thing we did state yesterday, right, several times, is we do not have a business case as part of this process, right. So we are still going to do the stress test, we are still going to do the challenge session with whatever data, whatever information we have at the time of hand. We may not have all the information, but we still have to stress test these projects being a prudent utility, right.

MR. SHEPHERD: Help me understand that. How are you stress testing something if you don't have the financial data on your trade-offs between operating and capital costs? What are you stress testing?

Maybe this goes to the heart of what Mr. Ladanyi is trying to ask, which is if you don't have financial information, if you are not making cost trade-offs in this process, then what trade-offs are you making?

MR. OTAL: So again, if I go back to the evidence, Exhibit B1, tab 1, schedule 1, page 70 of 188, line 12, as part of the challenge sessions, trade-off decisions assess which investments should be promoted or demoted based on,

A, the planners' level of comfort with the risk that remains unmitigated after the investment portfolio has been assembled. And when I am talking about the risk, that's going back through the previous pages of that exhibit, so everything from page 64 onwards to 69 that shows the various categories underpinning that risk, the risk score.

And then the second piece in this point on line 16, page 70 of 188:

> "The investment selected on the basis of non-risk considerations by use of qualitative flags relative to risk-based investments outside of the plan portfolio."

MR. SHEPHERD: I am not sure how that helps me. If -- are you saying this entire process doesn't try to optimize the cost of the portfolio, that the cost is not a relevant factor?

MR. OTAL: Risk is a relevant factor, right, the risk that the customer is facing --

MR. SHEPHERD: Risk. I get that. But is it entirely driven by risk and it doesn't matter what the cost is? Because that sounds like what you are saying, so if that's not what you are saying maybe you could clarify.

MR. OTAL: As noted yesterday during the discussions, we only look at the risk. And in this case the risk is looking at the reliability, the safety, and the environmental impacts. And when we are looking at reliability, that's value to the customer, that's making sure that we are meeting customer preferences, which is one

of the most critical things that every utility has to be able to look at when they are making decisions.

MR. SHEPHERD: So why do you even have the dollar figures in the spreadsheet?

MR. OTAL: The dollar figures represent the spending that is going to be associated with that investment.

MR. SHEPHERD: But that's not part of your challenge and prioritization process.

MR. OTAL: I have already stated what we consider in the challenge session.

MR. SHEPHERD: So if this project in particular cost a billion dollars, but it reduces risk, you are still going to do it, even if there's other options that don't get rid of quite as much risk but cost a lot less? Am I -- it sounds like you are saying something pretty crazy, and I want to make sure I give you an opportunity to clarify.

MR. LEWIS: So where the costs are important in these projects is we have stated yesterday that we operate within a planned envelope of spend year over year. So the dollars obviously have to be factored into the year-over-year envelope of spend. So as you mentioned, if a project costs -- or if a project costs I believe you said a billion dollars, that project is not feasible because it doesn't fit within the envelope of spend.

MR. SHEPHERD: Thank you.

MR. LADANYI: Mr. Lewis, thank you for that answer.

Actually, can you turn back to Energy Probe No. 2, page 2. And on page 2, we see the people who were

participants in the challenge sessions, and there is an individual listed as managing director of Hydro One Sault Ste. Marie. Are you that person?

MR. LEWIS: I am the managing director of Hydro One Sault Ste. Marie, yes.

MR. LADANYI: Were you at those sessions then? According to this document it appears that you were at those sessions.

MR. LEWIS: So if I can refer you to the response B, it states:

> "The challenge sessions were attended by members of HOSSM's engineering and field operating teams, members of Hydro One's regulatory and investment planning teams, and METSCO representatives who completed the asset condition assessment work."

It goes on to state:

> "Selection occurred on the basis of conversations between HOSSM, HONI, and METSCO staff leading the project."

And then it proceeds to list the individuals. My interpretation of that response is that I was involved in conversations surrounding the evaluation but I was not directly involved in the challenge sessions.

MR. LADANYI: Oh, thank you. So then, if I understand the process, challenge sessions were -- included some technical staff, not you, and you were management staff, so then the results of the challenge sessions and outcome of the challenge sessions was brought to you, and then you

signed off on it. Would that be right?

MR. LEWIS: I can't confirm that I signed off on it, as you state. But the end results would have been presented to me.

MR. LADANYI: May I ask how were these end results presented to you?

MR. LEWIS: In the final capital plan as presented in the evidence.

MR. LADANYI: So is the actual -- before I go there, did you make any changes when this was presented to you? You reviewed it, I presume, and then you said, oh, I think there's some concerns, or did you just say, this looks good to me, good to go?

MR. LEWIS: I recall that I did not make any changes, I relied on the expertise of the individuals involved in the challenge sessions.

MR. LADANYI: And the capital plan that was presented to you was in what format? It couldn't have been evidence, evidence must have been written later. Was it a document that summarized the capital plan; what was it?

MR. LEWIS: It was in the form of an Excel spreadsheet.

MR. LADANYI: Would it be possible for us to see this Excel spreadsheet? Can we have an undertaking, please?

MR. SIDLOFSKY: JT2.1.

UNDERTAKING NO. JT2.1: TO PROVIDE THE EXCEL SPREADSHEET SUMMARIZING THE CAPITAL PLAN

MR. LADANYI: Thank you. I am going to now go to

another area --

MR. SHEPHERD: Sorry, can I just -- I thought there was an undertaking to explain the spreadsheets earlier, was there not?

MR. LADANYI: Well, I thought that they were going to come and bring a witness at some point to answer the questions, or maybe we should clear it up before we move to another area.

MR. ENGELBERG: There hasn't been one yet, Mr. Shepherd, because what I asked was for some questions that would give an understanding to the panel as to what "an explanation of the spreadsheets" means.

MR. SHEPHERD: Okay. So you got some examples of things that were hard to understand. Are you able to now take those spreadsheets and give an explanation of how they were -- how they could be understood?

MR. ENGELBERG: Yes. Although if Mr. Ladanyi has further questions that would give a better understanding.

MR. LADANYI: I am concerned that we are going to take a lot of time this morning -- we could spend the rest of the morning on these spreadsheets.

MR. ENGELBERG: We are prepared to give the undertaking.

MR. LADANYI: And I am wondering whether this is a good use of the time, rather than having -- because these gentlemen appear to not to be familiar with it, and they are struggling, and I have been a witness in many hearings over the years for those who know me, so I know that you

don't want to be in a position where you're forced to answer questions on a subject that you're really not unfamiliar with, and I don't want to give them a hard time, so it would not be really right, and plus also I am concerned that we would not be getting the best quality evidence, so rather than struggling with them and taking up a lot of time, I am willing to allow Hydro One to bring forward a witness who is familiar with the spreadsheets who can explain to us how these spreadsheets work, who can take us right through it and deal with it directly.

MR. SHEPHERD: Well, sorry, that's fine, except that if -- we are not yet sure whether there's going to be a hearing, and even if there is a hearing, it's still useful to have the undertaking in advance, which gives us a starting point and may save some hearing time.

MR. ENGELBERG: What HOSSM is prepared to do now is to give an undertaking to provide a written explanation of how the spreadsheet was arrived at and what it signifies. If there are questions that arise from that we can look at that time into whether there needs to be a viva voce presentation of that evidence, but for now we will undertake to do it in writing.

MR. SHEPHERD: Excellent.

MR. SIDLOFSKY: Mr. Ladanyi?

MR. LADANYI: I would be satisfied with that as long as there is an understanding that we would have a detailed explanation of every cell on the spreadsheet and how they relate to each other, not just a general overview of the

spreadsheets. We really would like to have a detailed explanation, you know, information from this cell is then goes to that cell and so on, so that we can follow through with the spreadsheets and try to understand what happened during those sessions.

MR. ENGELBERG: You have that undertaking.

MR. SIDLOFSKY: So that will be JT2.2.

UNDERTAKING NO. JT2.2: TO PROVIDE A WRITTEN EXPLANATION OF HOW THE SPREADSHEET WAS ARRIVED AT AND WHAT IT SIGNIFIES

MR. LADANYI: Are we ready to move to another area now? I think we are finished with that, with the spreadsheets for now.

Can you turn to Energy Probe No. 12? So in Energy Probe No. 12, I ask about METSCO and what kind of work they did, and specifically asked in B about site visits and why there were site visits. And I have your answer here.

So let's start like this. There were site visits and they took place on May 7th to 11th. Were any of you part of the site visits?

MR. OTAL: I was part of the site visits.

MR. LADANYI: Could you explain to us what you did at those site visits? You arrived -- you flew to Sault Ste. Marie, somebody picked you up with a car and drove you to a transmission station. Is that how it went?

MR. OTAL: Yes. I mean, I think it's explained in B. So we basically visited the stations and line circuits within the vicinity of Sault Ste. Marie, and basically for

the purposes of essentially collecting data to support the production of the METSCO ACA analysis.

MR. LADANYI: So you arrived at the site. What kind of data would you collect? Can you explain to me what you did on site?

You arrived now at the site, and then what? Did you take some measurements? Did you have some instruments with you? What did you do there? Did you test the oil, for example, in the transformers?

MR. OTAL: So if I can refer you back to the evidence in the METSCO ACA? report, page 29 of 96, section 4.2.1, basically we spent a total of five days in Sault Ste. Marie as part of two separate engagements.

The purpose was to validate HOSSM's data collection methodologies, calibrate the scale of asset degradation assessment framework against our experts' understanding to ranking asset condition parameters.

In the course of the work, we conducted independent visual inspections of multiple station and line assets in the Sault area, which it subsequently confirmed with the results of the HOSSM assessments.

We note that these calibration exercises were limited to visual inspection parameters, and did not include the review of technical testing results such as DGA, infrared scanning, or double insulation testing performed by HOSSM contractors.

MR. LADANYI: So essentially, you went to station. They said there were some corrosion on site of some

equipment. You looked at it and said, "It looks rusty to me." Is that basically it?

MR. OTAL: No.

MR. LADANYI: No?

MR. OTAL: We did our own up independent visual inspections at the substations at the sites that we visited. At no time were we given any proactive direction on oddities or any degradation issues. We made those assessments independently on our own.

MR. LADANYI: The data from these field visits -- and I presume you did not visit every site. You only visited a selection of sites. The data from these field visits, you did not actually use any of this in your report, is that right? You used the data you got from Hydro One Sault Ste. Marie?

MR. OTAL: Well, as I just noted, we confirmed basically that our results were aligned with the HOSSM assessments. So, yes, we used the HOSSM assessment results.

MR. LADANYI: How did you select which site to go to? You couldn't have gone everywhere. So how did you select the locations?

MR. OTAL: So as previously noted, we visited the assets that were within the vicinity of the Sault Ste. Marie area. So if I could refer you to Exhibit B1, tab 1, schedule 1, page 7 of 188, figure 1-1 shows the service territory map for HOSSM.

We visited the major substations that were within that

vicinity, and we went as far as the Mackay TS, in terms of the northern limit of that study.

MR. LADANYI: Thank you. Can I take you to page 44 of that report -- actually, the report is kind of confusing. It says page 45 of 96 at the bottom, but then it says 44 in the bottom right-hand corner. So I am not sure what to refer to. I presume it's 44 of the exhibit, and page 45 of the report.

And it deals with -- it says figure 6.12, data availability for SF 6 circuit breaker condition parameters.

Well, I've got the issue -- at the bottom, it says page 45 of 96. Do you see that?

MR. OTAL: Yes.

MR. LADANYI: Very good. Now, if you look at the right-hand column, it says percent of assets with data. What does that mean?

MR. OTAL: So that refers to -- if I am looking at a particular variable like age, for instance -- how many of the SF 6 circuit breakers that were evaluated had age. In this case, it's 100 percent of the SF 6 circuit breakers that were evaluated.

MR. LADANYI: So you would have known when they were installed from company records, is that right?

MR. OTAL: That is correct.

MR. LADANYI: Then we go all the way down, and we see 45 percent contact resistance tests. What does that mean?

MR. OTAL: It means that we would have only had -- we would have only had contact resistance testing results for

45 percent of the SF 6 circuit breakers that were evaluated.

MR. LADANYI: So this would be Hydro One Sault Ste. Marie, in their records, only had contact resistance tests for 45 percent. Would that be right, because you didn't actually test any?

MR. OTAL: So I would probably preface that by saying that we would have looked at the more recent information that would have told us -- that would have given us that contact resistance test information. I can't say whether they never did a contact resistance test. It is possible they did. But perhaps that information wasn't available in a format that would be readily integrate-able, or the vintage of that data would be too far back in time for it to be useful for the purposes of this analysis.

MR. LADANYI: So when you have a lack of test results, and let's say more than half of the assets do not have contact resistance tests, how do you use this information? Can you rely on it, or do you say this information is not reliable enough from a statistical review, or do you assume that 100 percent of the population is the same as the 45 percent that you have data on?

MR. OTAL: So if I could again refer back to the evidence, the METSCO ACA report, section 5.2, the data availability index or the DAI. So this is a measure of the availability of condition parameter data for a specific asset as they pertain to the construction of the health index score. And when I refer to the construction, I am

talking about the individual degradation factors and the either visual inspection or testing information that is going into those, feeding into those degradation factors in order to calculate the index score.

So we see the formula of that data availability index. We note at the bottom of this page -- sorry, this is page 36 of 96 -- that an asset with all condition parameter data available will have a DAI value of 100 percent independent of the asset's HI score.

In the case where the data availability index for an asset is zero percent, the asset is not considered captured within the sample population.

I would then also turn the page to page 37 of 96, and I am going to the bottom of section 5.2.1. The last sentence here:

> "While many opinions exist as to what percentage of assets with information on particular condition parameter is sufficient to include in the HI calculation, in most cases asset managers are best served by abandoning a condition parameter if it is available for less than 60 percent of the population in that asset class."

MR. LADANYI: Thank you for that answer.

Now, on the same page that I was at before, which is page 45 of 96, if you go to the table above, Figure 6.11, "SF6 circuit breaker condition parameter scoring table". Do you have that? And I see a line. It says "contact resistance tests". What does number 2 mean next to it?

What is that?

MR. OTAL: That is the weighting that is assigned to that particular degradation factor which corresponds to the relationship between that test and the overall probability of failure and condition assessment of that SF6 circuit breaker asset.

MR. LADANYI: So 2 is a low score or a high score?

MR. OTAL: Two would be a low weighting.

MR. LADANYI: Okay. And then what do we have ranking, A, B, C, D, and E in that column, what does that mean?

MR. OTAL: That really refers to the process in terms of how the input information that is feeding into that degradation factor is interpreted. So if it was a visual inspection, for instance, the field crew worker would enter in a value, anything from A to E. In this case it's a test result, so we would have definitions for each one of these parameters. A would be the best, E would be the worst, and then we translate that into a numerical grade which you see in the column to the right, 4, again, being the best, zero, again, being the worst. And this is all part of that degradation factor calculation that contributes to the overall calculation of the health index score.

MR. LADANYI: So a 4 is A; is that right? So 4 means A?

MR. OTAL: Correct.

MR. LADANYI: And 3 is B and so on. I actually had a question in the interrogatory about that and I was puzzled by your answer, but I won't take you there now.

So the column with the numerical grade is exactly the same as the ranking with the letters, but all it is, it translates the letter into numbers so you can do some numerical stuff with them.

MR. OTAL: That is correct.

MR. LADANYI: Okay. And what does number 8 in the max grade mean?

MR. OTAL: So that's the maximum grade that can be achieved for that particular degradation factor. And the way we calculate that is, so for contact resistance test it has a weight of 2. The highest grade it can receive is 4, so we multiply those two, and the maximum possible grade is going to be 8 for that degradation factor category.

MR. LADANYI: So you're multiplying that. And I'm actually -- I read your report and I couldn't figure it out, so you multiply what with what to get 8? You say multiply 2 times 4. Where does the 4 come from?

MR. OTAL: In the numerical grade column. Right? So 4 is the best possible grade that the contact resistance test can achieve, right, we just talked about that.

MR. LADANYI: Yeah.

MR. OTAL: Four times 2 is 8. That's the maximum grade that the contact resistance test can achieve.

MR. LADANYI: So when I look at the entire table, they all have a 4 in there, so they are all kind of the maximum -- so you are taking the weight times the 4, you are ignoring the other numbers, and you get a number. Okay.

Is there any table -- I now want to look through it --

where there is not a 4 in the first column?

MR. OTAL: Sorry, I just want to correct that for a second. We are not ignoring the other numbers, it's simply for the purpose of a maximum grade. And we use that to do the -- so you can see that your maximum possible grade out of all those factors then is 260, and we use that as the normalization, to calculate the health index between zero and 100.

MR. LADANYI: Okay. I am still very much puzzled by this. Now, when you look at overall condition line, and when you look at the column with the letters in it, it's A, B, C, D, E, and then we have 4, 3, 2, 1, 2, and when you look below that, time and travel tests, weigh 3, and we have the A, B, C, D, E, but then we have 4, 3, 2, 1, 3.

Can you explain to me why there is like a 1, 3 and a 1, 2 in those two respective columns?

MR. OTAL: It looks like that's a printing error.

MR. LADANYI: All right. So I --

MR. OTAL: It should be zeros.

MR. LADANYI: It should have been zeros. Which one should be zeros? Should be 1, zero and -- oh, I see, so it should have been 4, 3, 2, 1, 0. All right. And then we go to the last one at the bottom. It says 4, 3, 2, 1, 1. Is that possibly an error as well?

MR. OTAL: It looks like it was just a printing error.

MR. LADANYI: All right. Let's go to Energy Probe number 18. And here I have asked about explanation of the weight component. And I wanted to understand how the

weighting -- because weightings are obviously very important in this report; it's all about weightings -- how are they determined with a numerical example. And you take me to page 38 of the report. And I have looked at page 38, and I am more confused than ever.

Maybe you can take us to page 38 and explain to me how the weight component is determined.

MR. OTAL: So if I can direct you to page 39 of 96 of the METSCO asset condition assessment report.

MR. LADANYI: All right, I see that one -- that page, by the way, also has 38. So I wasn't sure which page 38 you were referring to, but we will go to 39, then.

MR. OTAL: So if I am just going to start kind of reading from the middle of the page:

> "Each of these parameters," and he is describing the degradation parameters above, "describe an aspect of a power transformer with a direct impact on the operational health of the asset. Lower scores for one or a combination of these condition parameters strongly indicate progressed degradation of the asset, hence their larger weights. Oil leaks, main tank corrosion, cooling equipment condition, and grounding are collected through visual inspection procedures, and they serve as indicators of total health, although these specific degradation factors are easily remediated, maintained, and have minimal impact on the operational health of the asset if dealt

with appropriately and in a timely fashion.

"Furthermore, bushing condition, degree of pole amortization," continuing into the next page here, 40 of 96, "and control box condition comprise the condition parameters that carry medium weights to the overall health index score of a power transformer."

MR. LADANYI: That's a very nice answer, but I still don't understand the weight column, like 8, and 1, and 10 and so on.

Is there something that explains how this is produced, this weighing? It appears to be a key component of this report is the weight, and the weights are assigned by somebody somewhere based on what appear -- it appears to me to be sort of possibly kind of subjective information.

But perhaps there is an objective way that this is assigned, and I would like to know what it is.

MR. OTAL: I think I just explained it previously. It's really how we look at that data point and how it correlates to the overall condition and failure probability of the asset, right.

So if we look at the DGA, the oil quality, the insulation factor, the moisture content, they are given very high weights because of their relative importance, because these are tests, they're not subjective, right, and they are quite detailed tests that are evaluating the chemical composition within that power transformer.

And understanding how a power transformer is degrading

and eventually reaches failure, we at METSCO understand these tests to be important, critical and such why we would assign a higher weight to those particular degradation factors.

MR. SHEPHERD: Can I just ask you to clarify? You're assigning more weight to them because they are objective or because they have a higher -- those factors have a higher impact on degradation?

MR. OTAL: I think in some ways it's going to be both, right. So when it's a test and it's giving us a numerical value, it's the quality of that value that's coming out. And it's also how that test is used to evaluate the overall integrity of that power transformer.

Now, when I look at this overall health index formula, it's quite comprehensive, right. We are taking a look at all of these different parameters. Visual inspection parameters are also important to capture, right.

But we also have the test results that are numerical results that are telling us the overall performance of that power transformer, and there's a lot of science that goes into that testing results.

So when we combine the testing results with the visual inspection results, now we are getting a really comprehensive picture of that power transformer.

MR. SHEPHERD: So you have some sort of internal document that analyzes why each factor would be more or less important, have a greater weight or a lesser weight?

I mean, it isn't just the person who is doing the

analysis that decides, oh, I am going to give this a 4 and this a 2, right? There's some standard, right?

MR. OTAL: So these weights ultimately, it's designed based on our expertise at METSCO, as well as our understanding of the data that's going into these health indices, the quality of that data.

MR. SHEPHERD: So the weights are different based on who's doing the analysis, or based on what particular piece of gear is being analyzed?

MR. OTAL: Well, there will be different degradation factors with different weights for different asset classes. Each asset class is going to have its own unique health index formula.

MR. SHEPHERD: Exactly. So there must be some sort of internal analysis at METSCO as to how you set those priorities -- a generic analysis, not related to Hydro One, but generally?

MR. OTAL: It would be based on our expertise and experience at METSCO.

MR. SHEPHERD: And so you collectively make a decision, or the individual who does the analysis makes the decision? Whose expertise are we talking about here? If there's collective expertise, there must be a document that expresses it, right?

MR. OTAL: So it would be all the people that were involved on this particular project, right, so all the representatives from METSCO who would be involved in this particular project.

MR. SHEPHERD: So they all work on every asset that you look at? And they have a meeting and decide let's -- this is what weight we are going to give to this, and this is what weight we are going to give to that?

MR. OTAL: I will say that each of these individuals that are referenced in the report are involved at some stage of the project.

MR. SHEPHERD: That's not responsive to the question. Is the weight established by one person, or by many people?

MR. OTAL: The weightings are established based on the collective experience at METSCO. We have many different specialists and experts on various asset classes.

MR. SHEPHERD: Okay. And so there's a document in which those are expressed, right? If they're a collective experience, you have to put that collective experience somewhere.

MR. OTAL: We don't have any document like that. It's based on our experience at METSCO.

MR. SHEPHERD: Okay. So then there's a meeting. How do you get the collective experience, if you don't have a document or you don't have a meeting where everybody puts their experience in, and you come up with one number? I don't get it.

MR. OTAL: So we have an understanding at METSCO on how these assets perform and what are the key factors that result in the degradation and eventual failure of these asset classes. This is collected over years, decades of experience, in terms of the operation and the performance

and the eventual failure of assets, and basically for each project we apply these experiences to the particular utility, the data that we are receiving from that utility, the quality of that data, in order to create their health index formulation and apply that to that particular utility.

MR. SHEPHERD: So the person who writes a particular report on a particular asset or who does an assessment of a particular asset knows the number that everybody agrees at METSCO is the right number for this particular test?

MR. OTAL: Well, I will say that the people, again, that were involved with this particular project all have collective expertise on the assets that were evaluated in order to understand, they all have that expertise and experience in terms of how these assets degrade over time, what are the key failure modes, what are the modes of degradation, what should be the weights of those degradations, in order to produce that overall health index score.

MR. SHEPHERD: They just all know the right numbers?

MR. OTAL: We have the expertise, the engineering expertise, in terms of how these assets degrade.

MR. SHEPHERD: Okay, thanks.

MR. LADANYI: If I can go on with you, still on the same table, power transformers. I am assuming that Hydro One Sault Ste. Marie has a lot of old transformers and that some of these transformers would have PCB oil, polychlorinated biphenyl oil, which is now considered to be

hazardous, in them; is that right? Can somebody confirm that?

Did you want to take an undertaking? This is taking a long time.

MR. OTAL: I cannot confirm or deny the existence of PCBs in the power transformers that we studied for this evaluation.

MR. LADANYI: May we have an undertaking, please?

MR. ENGELBERG: Is the information available? Because if it isn't, an undertaking won't be of any value.

MR. OTAL: We wouldn't have that data.

MR. LADANYI: May I make a comment here, please? So the reason why I am asking this is because the weighting for oil leaks is shown as 1, and I would think that that would be a high risk factor if there was an environmental concern about leaking oil that is contaminated with PCBs, and I thought that any utility that has transformers would have good information on it.

So perhaps the panel doesn't -- the witness panel is not aware of it, but I am sure there is some information within Hydro One Sault Ste. Marie regarding which transformers have or had PCB oil in it.

MR. OTAL: Well, I would add that the PCBs were not considered in this particular health index, and that is why it has received such a low weight. So the PCBs was not considered for the purposes of this health index, but again, I cannot -- we do not have any data that confirms PCBs in the power transformers.

MR. SHEPHERD: Mr. Ladanyi is asking whether Hydro One might have that data. If Hydro One has that data then Hydro One could provide the undertaking.

MR. ENGELBERG: Hydro One Sault Ste. Marie will undertake to see if that information is available.

MR. SIDLOFSKY: JT2.3.

UNDERTAKING NO. JT2.3: TO INQUIRE WHETHER INFORMATION IS AVAILABLE ABOUT THE PRESENCE OF PCB OIL IN SAULT STE. MARIE'S POWER TRANSFORMERS

MR. LADANYI: Still on the same table, when I look at these condition categories in the left-hand column, they don't seem to be independent variables, so to speak. I mean, if there is, for example, a main tank corrosion, there's also an oil leak, so they are not independent, they seem to be somewhat related.

Is the idea that what's in the first column that they are separate categories that don't overlap or they can actually overlap in some way?

MR. OTAL: The oil leaks can occur at many different parts of a power transformer, not just at the main tank of the transformer. We could see oil leaks at the gaskets, at many other parts of the power transformer. So it really is considered as an independent degradation factor.

MR. LADANYI: So the reason oil leaks have 1, a rating weight of 1, is because, what, you don't have good information on the oil leaks or oil leaks are not important or they are not a high risk? There is a reason why there is a 1 there.

MR. OTAL: I think I answered that question earlier, that "oil leaks are easily remediated or maintained and have a minimal impact on the operational health of the asset if dealt with appropriately and in a timely fashion," which is stated on page 39 of 96, at the bottom of the METSCO ACA report.

MR. LADANYI: So METSCO knows -- METSCO staff knows, oh, it's an oil leak; we'll give it a 1. Is that how it works? Whether it's a big leak or a little leak, it's just a 1?

MR. OTAL: No. I think we have stated why, in this particular case, the oil leak has received that particular score. It's based on, again, the ability to be able to remediate through the maintenance practices specifically performed by HOSSM.

MR. LADANYI: So the fact that leaks can be fixed easily, that is the main reason why oil leaks have 1?

MR. OTAL: Based on HOSSM's processes, and our understanding of those processes and how they are used to address oil leaks, that is correct.

MR. LADANYI: Okay. When I go down to moisture content, that has a 10. That means -- what does that mean? That moisture content is difficult to deal with, or it is very important or -- what is it? Why does have it a 10?

MR. OTAL: It means that moisture content is a very important test that does contribute -- it has a very high contribution to the overall performance of the power transformer.

MR. LADANYI: But the main tank corrosion is not as significant as moisture content?

MR. OTAL: That is correct.

MR. LADANYI: But wouldn't the main tank corrosion be caused by moisture content?

MR. OTAL: These are, again, two separate variables. Moisture content is determined through a test. Main tank corrosion is coming from a visual inspection.

MR. LADANYI: Then going down to grounding, isn't grounding a very important essential condition for a transformer, that it be properly grounded?

MR. OTAL: Again, what we are stating with grounding, and it's lower weight relative to the other degradation factors, is that it's a condition that can be remediated through HOSSM's particular maintenance and inspection practices.

MR. LADANYI: So what you are saying is the staff can easily go to a site and check if the equipment is properly grounded and then if it's not, ground it?

MR. OTAL: That is correct. The appropriate repairs can be undertaken to remediate that particular problem.

MR. LADANYI: Let's go up in that table to oil quality. It has a 10, and then next to it has a ranking A, C and E and 4, 2 and zero. And it's the only one on that table that does not have a B and a D. Can you tell me why it doesn't have a B and a D?

MR. OTAL: That's really dependent on the input data that is supplying that parameter. So in some cases, we

might have a test where the results from that test are much more granular and can support five different categories. We have tests that only have three levels of granularity, or tests that are binary in nature and it's only two levels of granularity.

MR. LADANYI: So that column really tells me about Granularity. But what you are taking out of that column is only A, which is you make it into a 4 in the numerical column and use it to multiply across. Would that be how it works?

MR. OTAL: Well, I think I already explained how the 4 is used. We are saying that if it receives an A or a 4, it means that it has the best overall condition from an oil quality perspective.

MR. LADANYI: So the fact that there is no B and a D, are we to draw any conclusions from that? What are we to conclude from that?

MR. OTAL: I don't think there's any conclusions from that. It's just based on the formatting of the test that is being performed for oil quality. Not every test necessarily has to have five points of data. It could be three points, it could be two points; it depends on the nature of the test.

In this particular case, there's only a need for three different factors for oil quality.

MR. LADANYI: So a reader of this document should not be concerned that oil quality only has three, if you like, degrees --

MR. OTAL: Not at all. No concerns, not at all.

MR. LADANYI: Not at all. So it really is not a very significant item. Okay, thank you for that.

I have a lot of other questions on this report, but I am going to save them for the hearing, if we ever have a hearing, because I think we should move on to other issues, unless any other parties have any other questions on this.

So we can move on to another subject, I am finished now.

MR. SIDLOFSKY: Mr. Ladanyi, I think you are the last person with questions on the TSP. So when you are talking about moving over to other areas, are you talking about moving away from the TSP, or do you have other areas?

MR. LADANYI: Yes, I am suggesting that we can move away from TSP, unless any other parties -- then we would go on to deal with the PSE report.

MR. SIDLOFSKY: Okay. I think what we will do then is take our morning break now. It's 10:25. I would like to break until 10:45, and we will begin with Dr. Schwartz and his questions.

Now, for at least some of those questions, we are going to be going in camera because Dr. Schwartz has questions about a confidential item.

So when we come back on the public broadcast, that will be after Dr. Schwartz's confidential questions. Thank you.

MR. ENGELBERG: Mr. Sidlofsky, I would like to ask if Mr. Otal is free to go now.

MR. SIDLOFSKY: I believe so. I think we are finished with the system transmission plan. Thank you, sir.

MR. ENGELBERG: Thank you.

--- Recess taken at 10:25 a.m.

--- On commencing in camera at 10:50 a.m.

MR. SIDLOFSKY: We are back, and we are in an in camera session to deal with Dr. Schwartz's questions about the PSE material. We have David Hovde on the line from Pacific Economics Group. The line is otherwise closed, and we are not broadcasting. We will resume the open session once the confidential questions are addressed.

Dr. Schwartz.

EXAMINATION BY DR. SCHWARTZ:

DR. SCHWARTZ: Thank you very much. Thank you, staff and members of the panel.

I believe you all have -- all those who need it have a copy of the issues that we have proposed to discuss in relation to the TFP study that PSE undertook.

MR. SIDLOFSKY: Dr. Schwartz, sorry to interrupt you again. I am just going to give an exhibit number to that material that you provided to Hydro One and to Mr. Shepherd as someone who has executed the Board's form of declaration and undertaking. That will be Exhibit No. KTX2.1. It's a confidential exhibit.

EXHIBIT NO. KTX2.1: MATERIAL PROVIDED BY DR. SCHWARTZ (CONFIDENTIAL)

DR. SCHWARTZ: Could you repeat that, please? KTX?

MR. SIDLOFSKY: 2.1.

DR. SCHWARTZ: 2.1. Thank you.

MR. SIDLOFSKY: Thank you.

DR. SCHWARTZ: Just to be sure that I can be heard. Fine.

So I take it, Dr. Fenrick, I will be asking my questions to you more or less exclusively; that is, you are the one to answer these questions?

MR. FENRICK: Yes, although it's Mr. Fenrick, not Dr.

DR. SCHWARTZ: Mr. Fenrick? That's fine. You can call me Mr. Schwartz. Someone once said, okay, I will call you Mr. Fenrick, you can call me Dr. Schwartz. I never did that.

So I guess the first question -- and I will be referring at some point to your report and to some of the interrogatory responses related to these issues. I guess the first question is about the sample that PSE has used for its TFP growth calculations. I call it the TFP sample, and I take it that that sample includes Hydro One transmission?

MR. FENRICK: Yes, that's true, it does include Hydro One transmission --

DR. SCHWARTZ: Okay. Fine. So is -- let me ask you one question and give an example. I mean, the other companies are U.S. utilities, all of them. as far as I can tell.

MR. FENRICK: Correct.

DR. SCHWARTZ: Yeah, okay. So what is the justification for including Hydro One transmission when all

the other companies in this sample are U.S. utilities? Let me expand on that. I mean, I am going to do a sample. I am interested in the height of men in the room. So I will take a sample, and of all the men in the room I will get an average height, and then someone comes along and says, well, your sample size isn't large enough, it's not a representative sample of men. And so I say, well, there aren't any other men here, so on the basis of that I ask one of the ladies in this room to participate, and she gives a height, and I add it into my data. And someone will say, well, you started off wanting to study men's height, and you didn't have a large enough sample and you brought in a woman to get her height, so doesn't that change things?

So I guess my question is, what is the justification for including Hydro One if it is important that all the relevant conditions in Canada and U.S. have to be broadly comparable?

MR. FENRICK: So we include the U.S. utilities in the TFP sample as essentially a proxy for the industry transmission TFP to determine the productivity for the transmission industry at large. If we had a whole host of Ontario transmission utilities, that would be perhaps a more appropriate sample. but given that Hydro One Networks essentially dominates the transmission industry here in Ontario we are taking the U.S. utilities and using that sample as a proxy.

We also included Hydro One in that industry sample to

align with what was done in fourth-generation IR proceeding, which was EB-2010-0379, where all of the distributors -- that was an electric distribution study -- where all the distributors were included in the TFP sample to calculate the productivity trend that then flowed into the X factor.

So we didn't make any exclusions. We included all the U.S. as well as Hydro One in that sample when we calculated the TFP. If we were to exclude Hydro One, which could be a reasonable exercise to exclude them from and make it a fully external measurement, if we were to exclude Hydro One, the TFP estimate would likely decline, given that Hydro One Networks has had better productivity over this time than the U.S. sample at large.

DR. SCHWARTZ: Well, if I could just add, I am not asking you to tell me about precedence, per se. I mean, that's all on the record. I will be speaking to you in general this morning about, you know, what it means for an economist to deal with statistics and conclusions and sampling and those sorts of things. The fact that it was done in some way in some other case may be relevant, but that's a different forum, I think, to decide that.

I am aware of a case in which we participated -- I believe it was an OPG -- in which there was some discussion about whether -- I have forgotten now the issue. Everything else was U.S., but somehow I think OPG or an affiliate was included in the sample. I won't even give the case number, because I don't remember all the facts. I

just remember that that was an issue then, and I believe it's an issue here.

So to think of your -- so including Hydro One in your sample, you have a total of 48 companies in your TFP sample?

MR. FENRICK: That's correct.

DR. SCHWARTZ: Forty-eight? Is there an implicit assumption, going back to my example of men and women's heights, that the conditions that give rise to productivity concerns in the United States may or may not be the same as those in Canada and that when we include Hydro One or indeed any other Canadian -- a small number of Canadian samples, I mean, it may be legitimate in one sense, but then questions can be raised because there may be valid reasons for differences between Canada and the United States.

So would you see that possibility as kind of a limitation on your results derived from a sample of 48?

MR. FENRICK: Given that there's differences between -- potential differences between Canada and the U.S. --

DR. SCHWARTZ: Of all of the things that might influence productivity growth in Canada and the United States, some of them may be different, may be different on both sides, on either side of the border. So when you put them together in a sample isn't it much like bringing women into a -- heights into a study of men's heights because you don't have a large enough sample of men?

MR. FENRICK: Well, I would say these are all electric transmission utilities, so they are all in the exact same industry as Hydro One, you know, so it's all electric transmission utilities. Could there potentially be differences between Canada and the U.S.? Yes, absolutely, that's certainly a possibility.

But we are using the U.S. industry and the data, given that it's the best possible data to develop what the transmission industry TFP trend has been, we are using that as a proxy for Ontario TFP trends to determine what the X factor would be.

I think that's by far the best possible solution out of any other solution. I don't think -- you certainly don't want to look at Hydro One transmission's TFP trend to determine that X factor, because you want an external measure of productivity, otherwise you are putting Hydro One's performance over time into the incentive regulation formula, and that would be -- that would violate incentive regulation principles.

So given the realities of the data and what we have, this is by far the best approach to determine that X factor for the transmission industry --

DR. SCHWARTZ: I am sorry, I am not taking issue with the fact that you have used U.S. companies, but I think it's important, and we will explore maybe some of the differences.

Also, I think you were too quick on that. I know why we don't use Hydro One by itself, because the Board has

issued a report saying that it was wants an industry-wide sample and a long-term historical trend based on that sample, so Hydro One by itself would not be sufficient and the Board probably wouldn't take it, but let's leave that.

Okay. So we can end this, and you will, I guess, confirm then that there were 47 U.S. utilities in your -- in PSE's TFP sample.

MR. FENRICK: Yes, I can confirm.

DR. SCHWARTZ: Fine, and that's the number I have been working with.

I would like to turn briefly -- I don't know if you will need to see it; I am sure you know it -- to your table 3 in the PSE's report, it's on page 10. That's the table there -- no, you went too far. Table 10, if you can put it on the screen, yeah, that's table 2. Table 3 is the next table. That's it. Yeah, okay that's the table I referred to.

Now, I'd like you to confirm that the growth rates, what you call the average annual growth rate of the industry TFP index in that table, which is minus 1.71 percent for your study period, 2004 to 2016, is simply the arithmetic average of the logarithmic growth rates of that index, as that index is reported. And the issue here is that you haven't reported the logarithmic growth rates, or the growth rates on which those averages are based.

So would you confirm that minus 1.71, which you show as the average annual growth rate, is indeed the simple arithmetic average of the logarithmic growth rates of that

index that you have calculated?

MR. FENRICK: Yes, that's correct. That's how it's calculated.

DR. SCHWARTZ: That's fine, because it's not clear there. And I would like to pursue this business about logarithmic growth rates with you for a moment because I am reasonably certain that aside from you and me, nobody in this room knows what a logarithmic growth rate is.

MR. FENRICK: I cannot confirm that.

DR. SCHWARTZ: I won't take a poll. Would you confirm, as I have indicated, one of my questions is -- or disconfirm, or just perhaps subject to check, that instead of the logarithmic change that the simple arithmetic average of the percentage, of the annual percentage changes in table 3, not the logarithmic changes, is minus 1.67 percent for your study period?

MR. FENRICK: Yes. I looked at that last night, since you were nice enough to provide this, and I confirmed that number.

DR. SCHWARTZ: Thank you. So you would agree with me then that when you go to simple arithmetic average of annual percentage changes in your index, you get a larger number than what you've got minus 1.71 percent?

MR. FENRICK: Correct. If you go to arithmetic average, it goes up by --

DR. SCHWARTZ: Well, not the -- it's the arithmetic average of simple annual changes in the index, not the logarithmic changes in the index.

MR. FENRICK: Yes, I believe I said...

DR. SCHWARTZ: Yes, I think you did. Okay.

MR. FENRICK: Right, it goes up by four basis points --

DR. SCHWARTZ: Yes, I agree with that. I am not so much concerned with the quantums in the...

MR. FENRICK: Let me just say on that point -- it might be helpful. That's how the fourth-generation IR also calculated was using the logarithmic changes and percent changes. So I was being consistent and followed precedent here in Ontario.

DR. SCHWARTZ: As I said, I am not really interested in precedent here. I am trying to understand the numbers that you -- that PSE has produced, and how they might square with more familiar understandings of what a percentage change in a growth rate is.

Would you, I guess -- let us imagine that an index is 100 in the base year, and in the next year it ends at 110. So you would, I think, agree with me that that's a 10 percent increase in that year in the index?

MR. FENRICK: Using the arithmetic --

DR. SCHWARTZ: No, well, the percentage -- I said the percentage change in the index is 10 percent because the index has moved from 100 to 110. So the percentage change in that index is clearly 10 percent. Is that right?

MR. FENRICK: Using the arithmetic method, it is 10 percent. If you use the logarithmic method, I believe it's likely less than that.

DR. SCHWARTZ: That's right, and that's my next question. So if we did some changes in an index and you only reported the logarithmic change, you would be reporting a change of 9.53 percent in logarithmic terms, whereas the simple annual percentage change in the index was 10 percent.

If you want a calculator, you can do it, or you can accept my calculation of your -- subject to check.

MR. FENRICK: Let me take that subject to check. I am not going to do the natural login my head.

DR. SCHWARTZ: I believe the natural logarithmic of 10 percent is 9.53 percent, subject to check.

MR. FENRICK: Subject to check.

DR. SCHWARTZ: Okay. Now, that's a difference of about 50-basis points, almost. Would you say that's significant, in your professional opinion?

MR. FENRICK: I would say that in my professional opinion, the 9.53 percent would be a more accurate depiction of the actual growth rate --

DR. SCHWARTZ: We don't know what this is a growth rate of. I am just asking you if people generally do not know what a logarithmic growth rate is, they might be inclined to assume that it is simply the annual percentage change in the index. That annual percentage change in the index, as you have agreed, is 10 percent in my hypothetical --

MR. FENRICK: I don't believe -- I said the arithmetic average comes to 10 percent. I didn't agree...

DR. SCHWARTZ: We didn't compute. There is no averaging in this. It's just a calculation from one level to another level. I am not averaging anything.

MR. FENRICK: I just want to clarify. I didn't agree that the average increase -- sorry, the increase was 10 percent. I said if you calculated arithmetically, the increase is 10 percent.

DR. SCHWARTZ: I don't know what you mean by calculating arithmetically. The percentage change in concept is a very basic concept, and I think everybody in the room knows how to calculate a percentage increase in a number that starts off with 100 and ends up with 110. That's ten percent, right? I am not averaging anything.

MR. FENRICK: You are saying it as though it's plain and common sense. But let's take your example a little further.

So you start with a base of 100, you go to 110, and you're saying that's a 10 percent growth rate --

DR. SCHWARTZ: Do you dispute that?

MR. FENRICK: May I finish?

DR. SCHWARTZ: Yes.

MR. FENRICK: Okay. So you start at 100, you go to 110. Now, if you go down using the arithmetic method by 10 percent, what number are you at?

DR. SCHWARTZ: A 10 percent decline in the index leads to a logarithmic decline of minus 10.54 percent.

MR. FENRICK: So if you go up -- you start at 100 and you go up 10 percent using the arithmetic method, and then

you go down 10 percent...

DR. SCHWARTZ: 90.

MR. FENRICK: No. You are at 100. You go up 10 percent using the arithmetic method at 110. Now you go down ten percent --

DR. SCHWARTZ: Which is to 90.

MR. FENRICK: Sir, may I please?

DR. SCHWARTZ: Sorry, go ahead. You're right.

MR. ENGELBERG: Dr. Schwartz, please let him finish before you interrupt.

DR. SCHWARTZ: Okay, all right.

MR. FENRICK: So let me try one more time. You start at 100. You go up to 110 and using the arithmetic method, that's 10 percent. If you then use the arithmetic method and go down 10 percent, you are not at 100. And this is the problem with the arithmetic average. You are at 100 point something.

And so it's not symmetric, based on if you are going up or down. Whereas using the logarithmic method, that is symmetric. If you go up 9.53 percent in your example, and you go back down 9.53 percent, you are at the same spot.

So it's symmetric based on whether you're going up or down, because it's not using that base year as the denominator, which the arithmetic method does. Instead it is combining the base year along with the next year in the calculation.

And so this is why, in the fourth-generation IR and just traditionally when you are doing TFP indexes and

looking at the annual growth rates, you doing it logarithmically because that's more mathematically accurate.

DR. SCHWARTZ: I believe what you said misstated the issue. If the base year is 100 and then it falls to 90, I say that's a 10 percent simple decline and that the logarithmic equivalent of that 10 percent decline is minus 10.54.

Now can you confirm that, subject to check?

MR. FENRICK: Yes, subject to check, I can.

DR. SCHWARTZ: Fine. Because I know what you were saying. You were saying that if you went from 100 to 110 and then, at that 110 base, you fell ten percent, you might need a logarithmic change to do it.

But I am just saying assuming the base for the increase and for the decrease, it's the same.

MR. FENRICK: Yes.

DR. SCHWARTZ: So I agree with what you said.

MR. FENRICK: Yes, if the base is the same.

DR. SCHWARTZ: That was my point.

MR. FENRICK: But in reality, as we are moving through time, the base never stays the same. It changes, and so you need to calculate these things logarithmically.

Otherwise, if you go up ten percent and then you go back down 10 percent, that same 10 percent, you are not at the same spot again, whereas using the logarithmic method, you are.

And that's why precedent states and that -- that's why

you calculate these things this way.

DR. SCHWARTZ: I am not talking about moving through time in any kind of serious way. I am just asking to make the general point, and maybe we can agree on this much, that the logarithmic equivalent of any simple percentage change will be numerically smaller than the corresponding simple change. That is to say, if we went up 10 percent, the logarithmic change would only be 9.53 percent, and if we fell from 100 down to 90, the simple change would be negative 10, but the logarithmic change would be negative 10.54 percent.

So what I am saying here only, and I think perhaps you will agree with me, that when you use logarithmic changes you have to be a little careful because people may not understand what a -- who don't know what a logarithmic change is might come to the conclusion that things are smaller than they had understood, because that's what logarithmic changes do. They make the numbers smaller than the corresponding simple percentage changes.

MR. FENRICK: I can agree. I can agree to that. I would also like to add that's why you should do logarithmic calculations, because they are more accurate, they more accurately depict both the decline and -- you know, an increase and a decline in percentage terms.

DR. SCHWARTZ: I agree with you, and that's the issue, but as I have said in my simple example, the base is the same, and the logarithmic changes tend to produce smaller numbers.

MR. SHEPHERD: Can I just ask a clarifying question here? It sounds to me from your discussion like logarithmic changes actually produce a number biased towards the negative, not a smaller number, because, in fact, when change is going down --

DR. SCHWARTZ: It becomes more negative. If it's negative to begin with then it becomes more negative under logarithmic, and if the growth rate is positive it becomes less positive.

MR. SHEPHERD: Sorry, Mr. Schwartz, I wasn't finished. And the result of that is that when you do a log analysis of a series like this where you have negative productivity, that tends to increase the negative productivity because you are using logs. I am not saying it's incorrect, I am just saying that tends to be the effect. Here the effect is not very big, but the effect is always going to be to push down the -- increase the negative productivity if that's what the trend is.

MR. FENRICK: Right. I believe that -- Mr. Shepherd, I believe that's correct, that it would have a higher decline if you are using the natural log versus the arithmetic average, and we are talking about four basis points, which doesn't change any recommendations here whatsoever.

DR. SCHWARTZ: Well, yes, and you're correct in that. Would you agree with me that for large changes, such as 10 percent, 15 percent, there could be a significant difference in the reported number, but when we are talking

about simple percentage increases on, say, 1 percent, 2 percent, or minus 1 percent, maybe the difference between the logarithmic and the simple percentage change would not be very large and may even be close to similar, so that --

MR. FENRICK: If your question is as the magnitude of the change increases the differences between the two would increase --

DR. SCHWARTZ: Yes.

MR. FENRICK: -- yes, I can agree to that.

DR. SCHWARTZ: Okay. Fine, that's fine.

So you are right to say, and I will just confirm that, and I am glad you have confirmed my own number, that if we move from the logarithmic minus 1.71 percent in your table to using simple growth rates, percentage changes, it goes up, the productivity figures, minus .67 percent versus your logarithmic change, and it's only four basis points, and that's because the simple changes are relatively small.

MR. FENRICK: Right.

DR. SCHWARTZ: All right. Good, thank you. Thank you very much. I am sorry for the interruption. And I mean that. I get involved in these things, so...

Now, I'd like to just confirm -- as you will see, the issue number 3 is does the analysis of the U.S. utilities -- and here I am restricting to the 47 companies in your indices -- support the PSE's aggregate index approach.

So you will see from the tables that what I have done is I have downloaded your growth -- your indices, and then

-- which is not what you have done -- and tried to make inferences about the total productivity change. You have used what I could call the aggregate index approach? That is, you have taken all the data regardless of company, if that's the way to put it, and used totals, perhaps, and things like that? That is, you have not analyzed individual company productivity indices that you have in fact created?

MR. FENRICK: Yes, that's correct. I aggregated the industry consistent with the fourth-generation incentive regulation procedure for the electric distributors. That's exactly how those calculations were done as well in that proceeding.

DR. SCHWARTZ: Okay. But there could be other ways to do it. And one way to confirm -- and this is why I did it. I said, let me look at your individual company-specific TFP indices and see if I can get close to your number, which is minus 1.7 percent, and just to confirm that I do. I get very close to that number, as we will see in a second.

But you did not, in your report, present individual company productivity indices, which is why we had -- is that correct? And you didn't discuss them?

MR. FENRICK: That's correct. I think it's better to have the report so it can be on the public record. We don't need confidential. And if we included individual utilities, we would have to have the report be confidential, and that's also the fourth-generation IR also did not disclose the individual distributors' performance.

They aggregated the industry into one and presented that.

DR. SCHWARTZ: Would you then turn to table A in the handout and confirm or disconfirm that for each year and for each company I have correctly downloaded the company-specific indices for each year? And maybe you want to take that as an undertaking or...

MR. FENRICK: Yes, I would like to take that as an undertaking.

DR. SCHWARTZ: Okay.

MR. SIDLOFSKY: That will be a confidential undertaking. It's JTX2.4.

UNDERTAKING NO. JTX2.4: TO PERUSE TABLE A IN THE HANDOUT AND CONFIRM OR DISCONFIRM THAT FOR EACH YEAR AND FOR EACH COMPANY DR. SCHWARTZ HAS CORRECTLY DOWNLOADED THE COMPANY-SPECIFIC INDICES FOR EACH YEAR

DR. SCHWARTZ: And so to be specific, you're undertaking to examine Table A and to confirm or disconfirm whether Energy Probe has downloaded your company-specific annual indices correctly from the data that you have provided confidentially in the interrogatories process.

MR. FENRICK: Sorry, Dr. Schwartz, could you repeat that question?

DR. SCHWARTZ: Well, we have given an undertaking, and what I am asking you to do is to confirm essentially that the data in Table A are correct.

MR. FENRICK: Oh, yeah, absolutely we can, yeah.

DR. SCHWARTZ: That's all that that is, and if you say I am wrong then everything else I have done is probably

wrong too. Thank you.

Now, in -- let's go to the next question. Would you then turn to Table B, the next one, and confirm or disconfirm that the annual percentage changes in each company's TFP index as shown in the table have been calculated correctly? So now if you look at Table B, these are the simple annual changes of your indices for each company. Perhaps --

MR. FENRICK: If I could just ask a clarifying question. Those percentage changes, did you calculate those arithmetically or logarithmically?

DR. SCHWARTZ: In your language I did it arithmetically.

MR. FENRICK: What's your language?

DR. SCHWARTZ: A percentage change is easy to compute. It's A minus B over B. You want to call it an arithmetic change, we can call it an arithmetic change.

MR. FENRICK: Okay. So that's how you did it?

DR. SCHWARTZ: Yes.

MR. FENRICK: Okay. Yes. If I can take an undertaking to confirm those.

DR. SCHWARTZ: Now, would you look at the very bottom right-hand corner.

MR. SIDLOFSKY: Sorry, I am sorry, I am just going to interrupt you there. JTX2.5.

UNDERTAKING NO. JTX2.5: TO ADVISE WHETHER IN TABLE B THE PERCENTAGE CHANGES WERE CALCULATED ARITHMETICALLY OR LOGARITHMICALLY.

DR. SCHWARTZ: JTX2.5. Okay. Now, just to show you that I think you and I are probably on the same side, though we have used different methodologies to some extent, if you look at the very, very bottom right-hand corner of Table B, you will see the average of the row averages is minus 1.709.

MR. FENRICK: Yes, I see that.

DR. SCHWARTZ: So that's pretty close to your arithmetic -- sorry, your logarithmic change that you display in Table 3 of your report? It's just that we have gone about it somewhat differently?

MR. FENRICK: Right. And you don't have Hydro One Networks in here --

DR. SCHWARTZ: Yes, without Hydro One and using what you refer to as simple arithmetic growth rates, say, we come out to almost identical.

MR. FENRICK: Right, I see that.

DR. SCHWARTZ: And if I might call your attention to the final row in table B, where we have the averages of each company's changes for that year, and if you look closely at it -- and my eyes are suffering now -- there is only one of those years, I think it's 2006, where the average growth rate of companies in your sample was positive.

You might want to look at it some more. But as I look at, it they are all negative.

MR. FENRICK: Yes, according to table B, that's correct.

DR. SCHWARTZ: And if we look again at table B down the right-hand column, I think there are one, two, three, four, five, six, seven, eight companies whose average annual growth rate over the study period is positive, and all the other 47 are negative, all the other -- well, companies in your sample of 47 are negative.

You can take that subject to check, if you like.

MR. FENRICK: Yes, I count eight as well.

DR. SCHWARTZ: Okay. So the case is pretty clear, but more especially so on the bottom row, I think, the year-to-year changes are overwhelmingly negative.

Now, thinking again about table B, we have 47 companies and, I think, 12 growth -- so there are 564 observations of the annual percentage change in the TFP index for each of the 47 companies, and that 209 of those 564 observations are positive.

MR. FENRICK: I would probably want to take an undertaking. I don't want to count 209...

DR. SCHWARTZ: Yes, okay.

MR. SIDLOFSKY: JTX2.6.

UNDERTAKING NO. JTX2.6: TO CONFIRM THE NUMBER OF POSITIVE TFP RESULTS IN TABLE B

DR. SCHWARTZ: Now, I have a note here, if we could turn to Energy Probe and your response -- sorry, Hydro One's response to Energy Probe's question number 29F. I guess we'd have to turn to that.

Yes, and here is just a clarification. If you look at Energy Probe Interrogatory No. 29, we were unsure what was

in the sample and what wasn't.

So I claimed there it was 552 observations. The numbers are a little different, but just to confirm now that we are on the same page, that if you confirm table B undertakings, then we are talking about 47 US sample companies over your study period. So we have 564 observations. I will just point that out.

MR. FENRICK: Right, because without the 12 Hydro One...

DR. SCHWARTZ: Yes, okay. Fine, thank you. I have prepared in chart A, based on those 564 observations, a frequency distribution to summarize the 564 growth rates in table B. Would you say --

MR. SHEPHERD: Can I just stop you, Dr. Schwartz? Chart A doesn't appear to me to be a confidential document. Now, I understand it comes from confidential data.

DR. SCHWARTZ: Yes.

MR. SHEPHERD: But the actual pattern wouldn't have seemed to me to be confidential. Can you comment on whether that's confidential or not, or whether it should be treated as confidential?

DR. SCHWARTZ: I had assumed that --

MR. SHEPHERD: Sorry, I was asking the witness.

DR. SCHWARTZ: Oh, I'm sorry.

MR. FENRICK: Yes, to the extent that we are not revealing utility names and things like that, I would think this would not be confidential.

MR. SHEPHERD: I wonder if we could have chart A --

and before I go there, charts B and C which you have also seen, similarly don't seem to me to be confidential. And I wonder if charts A, B and C can be treated as public documents rather than confidential documents.

DR. SCHWARTZ: We have no objection.

MR. SIDLOFSKY: If you could just bear with me for a moment?

MR. SHEPHERD: The Board hasn't ordered that these particular documents be confidential, right?

MR. SIDLOFSKY: If we look at material that was filed on the public record by Energy Probe on January 10th, so on Thursday of last week, we can actually see the issues that Dr. Schwartz is taking the witnesses through, as well as redacted versions of the two tables.

So there are no company names showing there, and the charts themselves. So there is -- that material is on the public record now.

MR. SHEPHERD: And it's identical to this?

MR. SIDLOFSKY: Well --

MR. SHEPHERD: And it has an exhibit number of some sort?

MR. SIDLOFSKY: Well, it's on the record. It hasn't been assigned an exhibit number. It's in the WebDrawer.

MR. SHEPHERD: Okay, then I withdraw my comment.

DR. SCHWARTZ: If I may, I believe when we submitted our request or after PSE had seen, they said it would be too easy to identify individual companies even if we had taken out the company names. So that's why I assumed table

A and table B would be confidential.

MR. SHEPHERD: I am not objecting to table A and B. I understand that it's the other five pages. Okay, good, thank you.

DR. SCHWARTZ: Chart A is a matter of judgment, I suppose.

MR. SHEPHERD: Thank you.

DR. SCHWARTZ: Now, you will see, and based on that average I have shown you in table B in the bottom right-hand corner of minus 1.709, that that pretty much lines up with this chart. I mean, you might want to check it, but I don't dispute that the simple mean of that distribution is 1.709, close to your own estimate of minus 1.71 percent.

Would you consider that what I have done with the data in table B and chart A to be producing a parameter estimate, that is my estimate of the productivity change is, by chart and by table B, minus 1.709 percent, very close to your own.

I am calling that a parameter estimate. Would you consider that to be correct, just from your general knowledge of statistics?

MR. FENRICK: Could you define what you mean by a parameter estimate?

DR. SCHWARTZ: Well, I will tell you, what do you think a parameter estimate is? I am using a sample to estimate a mean, and that mean is presumably an estimate of some population parameter. Isn't that right?

MR. FENRICK: This is your estimate of the average

annual TFP growth of the industry, and to the extent you want to call that a parameter estimate, I mean, that's your estimate, yes.

DR. SCHWARTZ: Well, okay. Now I would like you to turn to your study on page 30, where your PSE report, 3.4.1 statistical tests. It reads briefly:

"The precision of parameter estimates is an important dimension of the cost estimation exercise. It specifies a business condition variables that have statistically significant effect on cost, in particular the standard errors of parameter estimates, which measure the precision with which a parameter is estimated, are used to construct a test of a relevant hypothesis," et cetera, et cetera, et cetera.

So you obviously know what a parameter estimate is, because you have done that in your statistical tests for your total cost benchmarking, I guess.

But you haven't done any statistical analysis or confidence or, parameter -- you know, parameter estimates for your own approach because to do that, you would have to deal with the sample information that I show in chart -- Table A and Table B, perhaps.

Could one do, given your estimate of minus 1.71 percent, a parameter -- calling that a parameter estimate, other analyses to understand its precision?

MR. FENRICK: To clarify, on page 30 of the report we are talking about the total cost benchmarking model and the parameter estimates that go into the total cost model.

Regarding the TFP estimate that we came up with -- and this goes back to our earlier discussion -- we aggregated the industry into one large aggregation, if you will, following fourth-generation IR precedent, and did that the same way.

So we don't have -- no way into our TFP estimate do the individual TFP estimates play a role, because we are aggregating them up into one large industry number and then looking at the TFP for that full industry, and so there was no way to do statistical or parameter tests on that estimate because of the aggregation procedure that we used.

Now, by your approach, you know, you do have those, and maybe you're looking at that. But the approach that we took, which again followed fourth-generation IR, was to aggregate the industry and then report that number of what the industry shows as far as the TFP trend.

DR. SCHWARTZ: Going back then to Table 3 in your report, where you show annual logarithmic changes -- sorry, annual -- no, you show the average of logarithmic changes as minus 1.71 percent, and you show at least the index data on which those are calculated.

Did you ever calculate, since you calculated a mean, an average of logarithmic changes, did you ever calculate a variance or standard deviation for those -- for that sample?

MR. FENRICK: No, I never calculated that. I, again, followed and was consistent with the fourth-generation IR procedures in calculating TFP indices.

DR. SCHWARTZ: Now, is that a parameter estimate, your minus 1.71 percent a parameter estimate, in the sense that you use that term in total cost benchmarking?

MR. FENRICK: It's certainly different in a number of important ways in the fact that there's only -- you know, there's 12 growth years in here and it's aggregating the whole industry, whereas in the total cost benchmarking we are taking each of the individual utilities in each individual year where we have a number, you know, hundreds of observations, and then are calculating econometric model off of those and coming up with the parameter estimates. Here we are taking the full industry and calculating the productivity index as it goes throughout time, and that's our estimate of the industry's TFP index.

If you want to call that -- it's certainly an estimate and it's an estimate of what we believe the transmission industry's productivity trend has been from 2004 to 2016.

DR. SCHWARTZ: Fair enough. So it is a parameter estimate in your Table 3, and I agree with that. But you haven't considered any associated measures of precision around that estimate to which you refer on page 30, and I guess my question is why not?

MR. FENRICK: Again, in doing the TFP research we were consistent with the fourth-generation IR precedent, and this is traditionally how TFP indexes have been calculated in calculating X factors, to my knowledge, in Ontario and in other places I haven't seen where there's precision statistics on the estimate, especially when you are

aggregating the industry like we have in following that precedent, that's not something that has traditionally been done.

DR. SCHWARTZ: Okay. Well, I agree with you that it is not common practice, but from a professional economic statistical point of view, isn't it appropriate if one, generally speaking, reports a mean, a simple average, that the data is all there to compute measures of variation, the standard deviation, the variants and so on, and then subject the mean estimate to statistical testing? Nobody seems to do that in TFP work, and I have been wondering why. Have you ever thought about that?

MR. ENGELBERG: Dr. Schwartz, the witness has answered the questions about what was done and why it was done that way. I don't think the technical conference is a place for a debate about what might have been done, what could have been done, what other people might do. Maybe you can save that for another time.

DR. SCHWARTZ: I would rather ask this witness's view. He is an economist. He has had a lot of experience with data and statistics, and I don't think it's really a matter, because this question is now very precise, and I ask him why in his view these other measures, other studies, TFP, don't do it when we use his index approach. And I agree with him that by and large people who do these studies don't introduce measures of variability. Is there any good reason for that?

MR. ENGELBERG: I am going to tell him not to answer

the question --

DR. SCHWARTZ: And, sorry, I am not sure it's your place to tell a witness what to answer when he is inexperienced. He is inexperienced, and he is allowed to answer. If he doesn't want to answer, that's fine with me.

MR. ENGELBERG: I am instructing him not to answer the question.

DR. SCHWARTZ: Okay.

MR. SHEPHERD: I wonder if I can jump in here for a second. It is Mr. Engelberg's right to decide what his witnesses will answer, number one. But number two, I think I wanted to ask some questions about outliers, and I think that the technical conference is exactly the place where you are supposed to do that, Mr. Engelberg. We should not be wasting the Board's time with that sort of technical analysis of the components of a sample. And this is the place where -- Mr. Fenrick may well be able to satisfy us that it is correct to leave the outliers out, to ignore medians and use averages. And if that's the case, doesn't that help the Board?

MR. ENGELBERG: I understand your position, and thank you for putting it on the record, but I don't believe this question is an appropriate question to answer. Maybe when we get to yours they will be.

MR. SHEPHERD: Okay, go ahead.

DR. SCHWARTZ: Thank you. Let us turn, then, to the final two charts, two pages of our handout. And if you'd look at chart B, this is information based on U.S. energy

information -- administration on net electricity generation for the period '49 to 2017. There are some numbers that I have put on there, but forgot the numbers. Just looking at that chart, do you see a trend?

MR. FENRICK: Yes.

DR. SCHWARTZ: A long-term trend, a historical long-term trend?

MR. FENRICK: Yes, I mean, the trend is upwards from, you know, right after the World War II era, and you have increasing -- increasing electricity generation in the U.S., and then that's increasing, and then it flattens out around the 2000s.

DR. SCHWARTZ: Okay. So, well, let's be clear. Just looking at the chart, the line as a whole, just to pursue this a bit, would you say that there is a long-term trend and that maybe the last few years are what we would say is off-trend?

MR. FENRICK: There's certainly been a change from the World War II era and the baby boomers and that type of era where use per customer was increasing rapidly and electrification in homes and that type of thing, versus now, you know, use per customer has gone flat due to technology changes and economic changes, there is certainly a different trend now in more recent years than there was post-World War II.

DR. SCHWARTZ: Okay. So I guess you are saying there are two trends here, one historical and one more recent; is that...

MR. FENRICK: Examining the data, that sure looks like it to me, that there has definitely been a flattening out of U.S. electricity generation due to those things I cited.

DR. SCHWARTZ: And so you do not, then, expect the longer-term trend to continue. That is we flattened out, we have kind of peaked, we have no reason to expect any future increases -- a return, if you will, not long-term trend?

MR. FENRICK: I would rather not speculate on the future forecasts of U.S. generation. It certainly appears in historic, recent historical times, that there has been a flattening out of generation. I would be speculating if I were to look out ten, twenty years on what U.S. generation is going to look like.

DR. SCHWARTZ: Are you familiar with long-term energy plans in Ontario, published either by the Energy Board or what used to be called the power authority, or maybe the system operator, when they talk about long-term trends in consumption of electricity? Are you familiar with any of those?

MR. FENRICK: No, sir.

DR. SCHWARTZ: Okay. The Board has said, as I understand it, that they want an historically based long-term trend to satisfy its, you know, X factor number.

And did you refer to any specific documents of the Board that sustain that conclusion? Are you relying on any other reports of the Board that say anything more than the Board wants an historical long-term trend to be used in

setting the X factor, or the productivity factor?

MR. FENRICK: Yes. Again, I think looking at the fourth-generation IR in that decision, there the TFP trend calculated for the electric distribution industry began in 2002 and went through 2012. So that was a ten-year trend in the Board decision based its X factor of 0.0 percent on that TFP of ten years.

Further looking through other precedents, the recent merger of Enbridge and Union Gas, the Board's consultant, Pacific Economics Group, put together a report and this was in EB-2017-0306, in Exhibit M1, page 42 of 77. And starting on the bottom of page 42, they talk about the sample period and what an appropriate long-term trend would be, and they say:

> "In choosing a sample period for an indexing study used in X factor calibration, it is generally desirable that the period include the latest year for which all of the requisite data are available. In the present case, this year is 2016. It is also desirable for the sample period to reflect the long run productivity trend. We generally desire a sample period of at least ten years to fulfill this goal. A long sample period, however, may not be indicative of the latest technology trend. Moreover, the accuracy of the measured capital quantity trend is enhanced by having a start date for the indexing period that is several years after the first year

that the good capital cost data are available. We attempt to balance all of these considerations by presenting productivity results for the eighteen-year, 1999 to 2016, period."

So in this, which was Board Staff's consultant as well as fourth-generation IR, there was -- you know, PEG said a ten-year sample period reflected a long term. Here they used an 18-year for the gas distribution.

I believe in the OPG case, the company's consultant also used a 12-year long-term trend from '02 to '14 in that case. As well as, if you go outside of Ontario, probably the most prominent transmission productivity study has been done by the Australian energy regulator and this was funded by AER, the regulator itself. And in there, they have a ten-year TFP trend '06 to '16, and I refer to that study in Exhibit 1, tab 1, schedule 63.

So I think there's a number of precedents that support having a 12-year TFP trend estimate in this case.

DR. SCHWARTZ: Well, I am sure you are right on that. That's not really my question, but I accept that.

Would you turn to chart C, which is the comparable data on Canadian utilities and its available in two series from Statistics Canada.

Does that suggest to you a different long-term trend than what -- again ignoring the numbers -- than the U.S. chart? Are there any significant differences, in your point of view?

MR. FENRICK: Is there a reason why we are not seeing

the Ontario graph?

DR. SCHWARTZ: We don't have it, as far as I know. Sorry, I don't know what Stats Canada had, but what I wanted was a series that was comparable to the U.S. data and the U.S. data is at the national level, so this chart is at the national level for Canada.

MR. FENRICK: I do know that Stats Canada does provide an Ontario graph, and it look far similar to the U.S. graph that you showed.

If you want me to comment -- I don't know if this is a relevant graph for a transmission TFP study, because I don't really see how generation plays into transmission costs and cost drivers on the transmission system. I mean there's it's the demand and the transmission km of line.

So I don't know how generation is relevant here. But if you want me to comment on this graph, there's certainly a long-term trend post-World War II that has been much higher than in recent times. There's been a slowdown again in more recent times here, although it looks like for Canada -- not for Ontario, but for Canada generation, it seems like the growth rate is a bit higher in the more recent historical times.

DR. SCHWARTZ: Well, it's about twice the size, roughly speaking, isn't it, in your study period?

MR. FENRICK: Twice the size of the trend?

DR. SCHWARTZ: In the U.S. for your study period. According to these numbers, the growth rate in Canada was .97 percent a year on the simple average of years. And in

the States it was what? 4.2? So I guess I am --

MR. FENRICK: Could I answer that? Yes, according to the -- if you compare electricity generation from Canada -- and I don't know exactly how these are calculated, if embedded generation are included in these numbers as well.

DR. SCHWARTZ: It's all utilities.

MR. FENRICK: It's all utilities, okay. But if you go to my report, the PSE report on page 38, table 8, you'll see if we look at Hydro One -- when she brings that table up, it will show that in the future period, Hydro One Networks is projecting basically flat growth, which matches much closer to the more recent U.S. experience. In fact, is even flatter than the U.S. experience that's included in our sample.

And I think when we are looking at TFP indexes and sample periods, we should try to match the historical period with what a reasonable expectation of the utility that we are studying and going to apply this X factor to, we should be looking at what the expectation is for that utility and here it's essentially flat output growth. And it's much more appropriate to have a sample period that better reflects that reality than going back to the 1950s and '60s, which had a much different trend due to a number of factors that just aren't relevant today anymore.

DR. SCHWARTZ: The Board has asked for a long-term historically based trend. That's what these X factors are supposed to be based on. They didn't call for a trend of what future productivity is going to be like. They just

wanted to know what the long-term historical trend was.

So what you say makes sense, but I am not sure it's what the Board wants -- or rather has asked for, let's put that it way.

MR. FENRICK: I don't know what the Board -- I don't want to speak for the Board. But looking at past precedents here in Ontario, specifically the fourth-generation IR where they depended on a ten-year TFP estimate to come up with the long-term industry trend, it certainly seems that our study, the PSE study aligns with the precedence of the Board.

DR. SCHWARTZ: I appreciate that, and I am sure that you are right in citing those documents correctly.

In the OPG study, it did become an issue as to, you know, what the long-term -- you know, historical growth rate was. So I will just -- and the people who know about that are Mr. Hovde and a few others from PEG, because they were on the other side, they were on the side of Board Staff. And I asked Mr. Lowry about this very same question, although not using this data, and basically, as I recall, looking at Canadian total factor productivity, it's an economic variable, not an electricity variable, that, yeah, there has been some tapering off in the last -- since 2000 in Canadian business sector productivity, but the long-term trend is still upwards.

So I will just make that comment to you because I am trying to suggest that maybe the U.S. and Canadian experiences in the last ten, 12 years are somewhat

different, and that maybe this is because of the result of that incredible financial and economic crisis we had in the United States, which affected Canada, certainly, but to a lesser extent.

And so when we are thinking about setting, you know, parameters for a formula here, we might be a little wary of relying on U.S. samples, because they obviously -- I mean, if you ask me, I would be inclined to attribute the stabling off in chart B to precisely that factor.

Any thoughts?

MR. ENGELBERG: Well, you have certainly put your position on the record, but I think what the witness has said is that the Ontario experience is similar to the U.S. experience.

DR. SCHWARTZ: Okay. Well, that's fine, then we can take --

MR. ENGELBERG: Experience versus the U.S.

DR. SCHWARTZ: That's fine. We can take that up if it goes to a hearing. Thank you. Those are my questions, and I appreciate and I am sorry if I interrupted you. I mean that sincerely.

MR. FENRICK: No, thank you.

MR. SHEPHERD: Before you go out of camera or whatever the term is, I do have some questions on this confidential information.

MR. SIDLOFSKY: Go ahead, Mr. Shepherd.

EXAMINATION BY MR. SHEPHERD:

MR. SHEPHERD: So I'm going to ask you a couple of

things about this data, and I am going to refer to Tables A and B in the confidential Exhibit KTX2.1. I didn't hear anything confidential in the discussion you had with Dr. Schwartz, but hopefully I will be able to change that, and we will get some redactions.

So first of all, in your TFP index, PG&E is not in there; right?

MR. FENRICK: That's correct.

MR. SHEPHERD: Now, we are familiar, of course, with the big problems that PG&E is having now and indeed had several years ago, but they are not the only U.S. utility that has had some significant, like, big, big challenges; right? Like, billion-dollar challenges; is that true?

MR. FENRICK: That's true.

MR. SHEPHERD: Have you, in selecting your sample, excluded those utilities, the utilities that have things happen to them?

[Reporter appeals.]

MR. SHEPHERD: I apologize. Okay. Those utilities that have that similar sort of, like, big problems?

MR. FENRICK: No, we didn't exclude on any sort of basis of whether they had problems or did not have problems. We only excluded based on data, data reasons.

MR. SHEPHERD: So is it correct -- and you're very well aware that -- and I am told by Dr. Lowry and Dr. Kaufmann periodically this, that I don't know anything about statistics or economics, but is it correct that your sample still produces an appropriate average for the

industry if those big, big events like a company going bankrupt, for example, are included?

MR. FENRICK: Yes, it is an appropriate estimate, it's the industry -- it's the U.S. industry experience of the total factor productivity trend without any what I would call, you know, arbitrary exclusions based on events. It's what has actually happened in the industry as far as the productivity trend.

MR. SHEPHERD: Well, that sort of begs the question, though, doesn't it, and that's really what I was trying to get to, and, again, I am trying to get you to educate me here, is the -- that -- it does tell you some information about what the average was for the industry. The question is whether it's the information you need for Hydro One; right? Is it the appropriate information that you need for Hydro One?

So I will give you an example. A few years ago the Board did an analysis of total factor productivity for electricity distributors in Ontario and then excluded Hydro One and Toronto Hydro because they were outliers. And the Board concluded that without those exclusions the final number wouldn't be representative of the industry. Do you do that sort of process here? And if not, why not?

MR. FENRICK: Mr. Shepherd, in the fourth-generation IR that you are alluding to you may recall I adamantly was opposed to those exclusions in that case. I felt like you should take the full industry when calculating a productivity trend without exclusions, because you are

trying to come up with the industry -- the productivity trend for the entire industry, and excluding Hydro One and Toronto Hydro in there excluded a huge portion of the industry from that productivity trend.

I do recall in that proceeding one of the rationales for excluding those two was just the magnitude of the size of those two distributors relative to the rest of the sample and how they -- those two drove -- essentially drove the results.

And so I think that was one of the rationales, but I was -- I was opposed to making those exclusions. I felt like coming up with an industry TFP trend should include the entire industry.

MR. SHEPHERD: So this study, then, takes a different approach and says I am not excluding anything, no matter how serious?

MR. FENRICK: Yes, we include all of the data observations that have good data and include those in the industry definition.

MR. SHEPHERD: Let me put this to you as a hypothetical, because I don't know any particular examples from the list. I just saw the list for the first time today. But let's say your study included 2019 and PG&E is in it and they have $30 billion of claims for causing wildfires in California.

How does that factor in to their costs and therefore their productivity? Is that $30 billion in there somewhere? If they had to write a cheque, is it in there

somewhere?

MR. FENRICK: I mean, it's a hypothetical. I don't know where those expenses would be booked to in the future.

MR. SHEPHERD: Well, no, I am asking a more -- okay. I will ask it in a general way then. If one of these companies has a big claim, a billion-dollar claim for something, their reactor exploded -- no, reactors are a bad example. Their transmission line fell down and the whole city went bankrupt. How is that factored in? Is that a cost in here somewhere?

MR. FENRICK: What costs are you referring to? The legal costs or the -- actually, the transmission costs? Because this study looks at transmission costs. And so if it was a transmission cost that enters into the cost definition. If it's legal and if it's outside of the transmission realm, if it's a legal cost, I don't believe that would enter.

MR. SMITH: So if a transmission company has to pay billions of dollars for a claim because they managed their transmission utility badly, that's not included as a cost?

MR. FENRICK: It depends on how they book it. I mean, I can't speculate as to where they would book that cost. If they book it into a transmission expense category it would enter the study. If it's booked outside of transmission where it doesn't enter the cost definition then it would not be booked.

MR. SHEPHERD: So here is the reason why I am asking that. I have some specific examples on table B that are,

for example, a negative productivity in 2016 for one utility of 32 percent in one year. And there's another one of 29 percent in one year. And there's lots of them in double digits, 24 percent, et cetera.

But there are some the other way, too -- not as many, but there are some the other way, a 40 percent improvement in productivity in one year.

When you go through the data don't you look at that to see are these truly representative of what I am trying to measure?

MR. FENRICK: I think you are getting to a good point in the fact that you don't want to look at individual year observations. We are looking at a long-term trend here.

And so taking one year and one observation in a study that is attempting to look at the entire industry, and what's the experience of the entire industry over a 12-year period, you know, if you look at one utility here and one utility there in one specific year, you are just naturally going to have a higher variance there than if you look at the long-term trend.

I'd also say, yes, there's positives, negatives, in the cases; we take the data as it is and do the study. I don't make judgment calls on whether to exclude or include based on the results. I feel like that would, on some level, bias what I am trying to do.

MR. SHEPHERD: I wasn't asking that. I was more asking the question do you -- you have heard of the phrase scrubbing the data?

MR. FENRICK: Yes.

MR. SHEPHERD: And scrubbing the data means you take out stuff that is irrelevant to the thing you are trying to study, right?

MR. FENRICK: Take out stuff that's irrelevant to what you --

MR. SHEPHERD: Yes. There's sometimes stuff in your data that is simply not what you're trying to look for. You have got extraneous information in there that is not what you are looking for, right, and so you have to take it out?

MR. FENRICK: Right. So for instance, we don't include distribution costs, and we scrubbed the cost data, if you will, and we focused on transmission costs. Is that kind of what you mean by making exclusions that aren't relevant?

MR. SHEPHERD: Sure. But extraordinary events are not Exclusions. No matter how extraordinary, they are never an Exclusion, right?

MR. FENRICK: We don't specifically -- no, we don't specifically exclude observations based on events that occur.

MR. SHEPHERD: Do other economists do that sometimes when they are studying total factor productivity?

MR. FENRICK: Certainly if you go back to the fourth-generation IR, excluding Hydro One and Toronto Hydro due to the outlier status and the fact that it drove the results, was an example of taking out -- based on the results,

taking out two utilities. I viewed that as arbitrary, but that's an example.

MR. SHEPHERD: I am more talking now about extraordinary events, and there's a purpose of this. In the proposals -- in basically every IRM plan in Ontario, there is a Z factor for extraordinary events. So extraordinary events do not need to be in your IRM formula because they are going to be dealt with separately.

So I am asking the question when you go to your data then, your 564 observations, do you look and say, well, obviously my final number shouldn't be including extraordinary events because that's dealt with separately, can I take this out of the data.

And the answer is you don't, right? This includes extraordinary events.

MR. FENRICK: Right, that's correct and I believe that's a slippery slope, when the researcher starts making arbitrary decisions on defining extraordinary events rather than just taking the data as it lays.

MR. SHEPHERD: Well, you know the definition that the Board has, right?

MR. FENRICK: Not off the top of my head, no.

MR. SHEPHERD: But you could find it out?

MR. FENRICK: I could, yes.

MR. SHEPHERD: I guess the reason I am asking this is because when you look at all these big negative numbers -- you know, 52 percent, 41 percent, negative productivity in a single year -- that looks like, just from the just from

the non-economist's eye, it looks like something extraordinary happened. And if I were trying to understand these numbers, I would be saying, well, what's that all about?

And that's no part of your process, right, to say what's that all about? Why is that number the way it is?

MR. FENRICK: What line would you suggest we draw in the sand for that exclusion?

MR. SHEPHERD: I am not suggesting anything because I am not the economist. Otherwise, I would get paid more money.

MR. FENRICK: I am not sure if that's true.

MR. SHEPHERD: But I am trying to understand, from your point of view, why that's okay.

MR. FENRICK: I don't want to be in the business of making these -- of arbitrarily excluding or including data. I feel like that's -- those would be arbitrary exclusions and very difficult to define what an extraordinary event is in a sample of 48 utilities over 12 years. Defining that would be arbitrary.

I'd rather -- I think it's more professional to take the data and put that into the TFP study and use it as it results.

MR. SHEPHERD: Okay. Then I have two other questions on this stuff. The first is your averages are averages of simple annual growth rates, right -- sorry, of natural log growth rates, right?

MR. FENRICK: Yes.

MR. SHEPHERD: But they are simple averages; they are not compound averages. If I were to look at the compound annual growth rate of productivity for these companies, it would be significantly lower -- actually, I guess it would be higher because they are negative, but you know what I mean. The numbers would be significantly different if I used a compound annual growth rate, right?

MR. FENRICK: Right, that's true. It's an average annual growth rate. So we take the simple average of the logarithmic growth rates to calculate that.

MR. SHEPHERD: So why don't you use a compound annual growth rate, which is what the utility industry uses for virtually everything else?

MR. FENRICK: Two reasons, probably. The first is, you know, reporting productivity indexes, this is how it traditionally is done. You report the average annual growth rates, again following the fourth-generation incentive regulation proceeding. And you know, so we followed that to be consistent with that.

The second reason is this is going to flow into my recommendation for the X factor, and the X factor is an annual adjustment to revenue. And so the fact that it flows into the revenue cap index in the X factor, you want an average annual growth rate into that.

MR. SHEPHERD: I guess that's why I asked the question, because the IRM formula is a formula that compounds every year, right?

MR. FENRICK: It builds off prior revenues from the

prior year, so -- but the formula itself is an annual formula that would necessitate an average annual growth rate for the X factor.

MR. SHEPHERD: Isn't that why you use compound annual growth rates, because you have a compounding formula and you are going to fit it into it?

If you have a compounding formula, then the annual growth rate that matters is what's going to be the compound annual growth rate, isn't it? That's just math.

MR. FENRICK: I guess I am not -- can you repeat? What do you mean? I guess I am not following your thought.

MR. SHEPHERD: If -- and again I am just trying to -- I am probably wrong here, but it seems to me that if you have a formula that compounds every year, then the only number to put into it that will produce the right result after multiple years is one that is a compound growth rate, because you are going to compound it, aren't you?

MR. FENRICK: You are compounding it year after year in the revenue cap index. But in the specific year as you are escalating, you want to have the proper productivity expectation for that given year, which is the average annual growth rate.

Then, yes, it compounds year after year, the revenue cap formula compounds. But in that specific year, you want what the productivity expectation is in that given year which is the average annual growth rate.

Maybe I am not understanding the question, but that's...

MR. SHEPHERD: We will deal with the math later.

MR. FENRICK: Okay.

MR. SHEPHERD: The last thing I wanted to ask you about this stuff before we go off, is the -- I am looking at charts B and C. Let's look at chart C, is the easier one. And one of the reasons why generation isn't as applicable to transmission as perhaps to other things is because generation includes exported generation and things like that. And so it isn't necessarily reflective of what the load is on the transmission system; right?

MR. FENRICK: That's one of the reasons why generation is not, you know, is not a relevant factor for driving transmission costs.

MR. SHEPHERD: Now, this, this -- the break in the trend in the last ten, 15 years, that's something that's been studied by -- in the electricity industry at some length; right? Have you looked at any of those studies that look at how the trends have changed?

MR. FENRICK: I probably have, but not -- I can't cite a study that I looked at recently. But it is certainly something that's studied quite well, I am sure, in the electric industry.

MR. SHEPHERD: And it's true that while these particular numbers in the generation table are not necessarily the right numbers for transmission or for distribution for that matter, transmission and distribution generally show a break in the trend as well, a similar type of break. It may not be the same numbers, but it's a

similar break; right?

MR. FENRICK: From what time period over -- this whole time period?

MR. SHEPHERD: Yeah, from the post-war growth time period where there was very high growth in electricity transmission, distribution, and generation, to the more recent period where it's flattened out. That's been true in all three cases, right, generation, transmission, and distribution, generally speaking?

MR. FENRICK: Generally speaking, yeah, that's true.

MR. SHEPHERD: And the reason why I ask that question is because I am trying to understand -- you use as one of your metrics, one of your outputs, I guess, ratcheted the peak demand, right? So whatever the highest peak demand historically is, that's what it is today, right?

MR. FENRICK: That's right. We call it maximum peak demand in the report, but...

MR. SHEPHERD: And so doesn't that mean that the -- the use of the system -- I understand why you feel that it drives costs. There's good logic to that. But doesn't that mean that necessarily companies will continue to spend on the same basis as if the trend line was continuing to increase like after the post-war, but the actual number of billing determinants they are going to have, the number -- the amount of need for their system is going to decline relative to that? Isn't that going to produce negative productivity, is my question?

MR. FENRICK: Using the maximum peak demand variable?

MR. SHEPHERD: Yeah. If the trend is actually flattening, isn't that going to produce negative productivity?

MR. FENRICK: No, I don't -- no, I don't see why that would produce negative productivity, the use of that variable.

MR. SHEPHERD: Okay. All right, that's all of my questions on the confidential stuff.

MR. LADANYI: May I ask a couple more questions, really simple ones? Back to Table B, and I was very interested in the questions that Mr. Shepherd asked about data scrubbing. When you look at Table B -- we are still in camera, aren't we?

MR. SHEPHERD: Yeah. Try not the use the names if you don't have to.

MR. LADANYI: Well, in particular, however, here I am going to have to use the names. That's why I asked.

MR. SIDLOFSKY: We are still in camera, Mr. Ladanyi.

MR. LADANYI: Yes, so if I look at Table B the highest growth rate is for [redacted] in 2007 of 51 percent. That's the highest positive. And that same [redacted] then has the highest negative growth rate in 2012 of minus 38 percent. Further down we see that [redacted], has the highest growth rate of 40 percent in 2011, and I don't want to ask you specific ones. But when you see this data there is obviously something going on, and I just happened to look up on the Internet what was going on in [redacted]

[redacted], and there could be some cost allocation issues going on between the parent company and [redacted], so did you actually in any way look at the reasons behind this and say, well, this is an unusual event, that we should be looking at why these numbers are such large outliers?

MR. FENRICK: The simple answer is no. With the exception we did exclude mergers. So if the utilities merged, you know, then we don't have a consistent data series, so we excluded based on that basis. Otherwise, no.

MR. LADANYI: So regarding -- I mentioned [redacted]. They merged in the early 2000s. I think the merger was 2003, so it's actually not in this table, so something else must have occurred later, and I couldn't discover anything right now.

Similarly, when you look at [redacted], which seems to be swinging all over the place, and I don't know what's going on there, you know, why they would have such a large growth rate in 2007 and then such a positive growth rate and such a large negative growth rate in 2012, but you didn't actually do anything with that, did you, you just took the numbers as --

MR. FENRICK: Yes.

MR. LADANYI: Now, in your report, you mentioned, actually, you didn't really completely take the numbers as you got them off the FERC form. You actually did some cost

allocation yourself with the numbers?

MR. FENRICK: Right, that's right, we allocate out -- you have the transmission expenses and then the administrative and general expenses, we took -- we create an allocation factor to allocate out the transmission portion of those A&G expenses.

MR. LADANYI: Regarding both of those companies, [redacted], I checked. They're both in the gas business, they are in the electricity business, they are in the electricity distribution, they are in electricity transmission, and they have generation as well, so there is a lot of potential allocations going on, and also in the case of [redacted] they also have a parent company which is managing the whole thing out of [redacted]. Again, I don't know if you know that.

So it's a -- is this any -- so when you looked at the FERC forms how do you disaggregate all these companies and make them essentially comparable?

MR. FENRICK: As you say in the question, we look at the FERC Form 1, where these utilities are using the uniform system of account procedures, list all of the expense categories, and they break out, you know, the production expenses, transmission, distribution, administrative, and general, as well as break out the specific account categories laid out in the uniform system of accounts, and so we look at -- and that's all reported on to FERC, which is a federal agency, and reported on the

FERC Form 1, and we are talking all that FERC Form 1 data and how they reported their transmission expenses and administrative expenses and their plant additions and using that government source as the data source for the FERC study.

MR. LADANYI: As we know from many hearings at the OEB there's great variety in the way companies allocate head-office costs to their subsidiaries. There's no question about that. So when you look at this kind of large group of utilities, wouldn't that be very sensitive to allocations from column, head-office costs, essentially they will be like common services that the head office providing to the affiliates, so that kind of stuff. You really cannot yourself figure out directly from FERC form; is that right?

MR. FENRICK: A couple points with that. First of all, this is a TFP trend study. So the utilities would have to change -- have changed those allocations over time for that to impact the TFP study. If the procedures for the utility had stayed the same throughout the sample period then it would not impact, so there would have to be material change.

The second point is, you know, the uniform system of accounts is very detailed. Those reports are reported to the federal government and audited, and so if you look at the specific categories within transmission or within distribution there could be differences, but we are taking the full cost level at the higher level. And so a lot of

those differences cancel themselves out in our study, because we are looking at just the transmission expenses and not looking at the detailed aggregate data that's been reported, we are aggregating all that up, and a lot of those differences are going to balance themselves out.

MR. LADANYI: Thank you, those are all my questions.

MR. SIDLOFSKY: Thank you. I believe that concludes the in camera session. Sorry, Hydro One, was there a question?

MR. SMITH: The PEG folks are on the phone. They didn't have any questions?

MR. SIDLOFSKY: Not for the in camera session. So our next step will be to go back on the record. I understand that PEG -- and just before we do, I understand that PEG has about three quarters of an hour.

Mr. Shepherd, do you have a sense of how many public questions you have?

MR. SHEPHERD: Probably 45 minutes to an hour.

MR. SIDLOFSKY: So that would be an hour and three quarters to two hours.

Why don't we break for lunch now. If we could come back at 1:15, that would be great, and we will continue with the public session.

MR. SHEPHERD: Good.

MR. SIDLOFSKY: Thank you.

MR. SHEPHERD: Can I suggest you go on the public record and tell anybody who is trying to listen that...

MR. SIDLOFSKY: Yes, that will just take a minute,

then. Mr. Ladanyi, do you have public questions?

MR. LADANYI: I don't expect to have questions, unless a new issue is raised during examination by other parties.

MR. SIDLOFSKY: Mr. Engelberg, I don't believe anyone else is planning to ask questions in this area.

MR. ENGELBERG: Thank you.

MR. SIDLOFSKY: If you can just bear with me for a minute while we go back on the public record, so we can close out for lunch.

--- On resuming public session at 12:25 p.m.

MR. SIDLOFSKY: We are now back on the public record; it's just coming up on 12:25. We have completed the in-camera session. We are going to be breaking for the lunch break and we will be resuming at 1:15 this afternoon with a public session for questions on total productivity factoring and benchmarking. Thank you.

--- Luncheon recess taken at 12:25 p.m.

--- On resuming at 1:21 p.m.

MR. SIDLOFSKY: We are going to continue with David Hovde of PEG with questions on TFP and benchmarking. I assume there are no preliminary matters. Sorry, I should have asked. Mr. Engelberg?

MR. ENGELBERG: None.

MR. SIDLOFSKY: Thank you. And not seeing any others, Mr. Hovde.

ISSUE B, REVENUE CAP PROPOSAL

EXAMINATION BY MR. HOVDE:

MR. HOVDE: Thank you, my plan is to start with

Exhibit 1, tab 1, schedule 72. It's basically Staff IR 72, and I would like to start with that one and then move to, for the people who are kind of running the exhibits there -- and then I want to move back to 65 and then proceed in numerical order.

There's a couple questions that I had at the outset that related to previous conversations that were taken that were discussed in camera, but none of the stuff is confidential.

I will just briefly describe what they are just in case someone has an objection. I wanted to just briefly do a follow-up about the arithmetic, logarithmic issue and then also the issue about, you know, the characterization of the average annual growth rate as reported in the report as being some sort of estimate or parameter, and I had a question about that, and so -- and then a couple other things that should not be controversial at all, but I thought I would ask just in case somebody has an objection about me following up with stuff that was in camera.

Okay. If there's no objection then, I had some difficulty, and I even know what these issues are all about, but I had some difficulty following the examples given about the arithmetic versus the logarithmic discussion, and for the benefit of those reading the transcript, I'd like to briefly put forward a simpler example and just ask a few questions about it.

Assuming a value goes from 1 in a period to a value of 2 and then back down to 1, in other words, you know, it

goes up by 100 percent arithmetically, you have got, you know, 2 minus 1 divided by 1 will get you 100 percent, and then goes down from a value of 2 to a value of 1, you know, 1 minus 2 divided by 2 gives you a minus 50 percent. If you undertook to go ahead and average that 100 percent value and a negative 50 percent value you will end up with a value of plus 25 percent. And as can clearly be seen, you end up, you know -- you know that you are going -- if you do a separate calculation of the endpoints, you went from 1 to 1, that's a zero percent change, so clearly it seems to me that, you know, just doing things arithmetically year by year and then averaging them just isn't a good idea.

And what I wanted to ask is, I just would like to ask Mr. Fenrick in your experience, you know, is this sort of thing done, is it a good idea, and does the logarithmic problem solve this?

MR. FENRICK: Yes, Mr. Hovde, I fully agree with your example. I think that's a great example to bring up to illustrate why using logarithmic percentages is superior to the arithmetic.

MR. HOVDE: Okay. Then just one other follow-up. Are you aware of any TFP study by the U.S. government, Stats Canada, any productivity work, scholarly journals, anything, where people use arithmetic -- take arithmetic growth rates year by year and then average them?

MR. FENRICK: I am not aware of any.

MR. HOVDE: Okay. And then just one more just for

clarity, to be fair to the person that was asking the questions before. I mean, an alternate way of looking at this is you could in theory take the values from your Table 3, which was all of your productivity results along with that annual average growth rate, and you could take the endpoint value and the beginning point value and calculate an arithmetic growth rate from starting from beginning point and an endpoint to kind of get a total percentage change and then maybe divide that by, you know, number of years.

In your opinion would that be a legitimate -- would that be a legitimate kind of alternate way to calculate an average annual growth rate that wouldn't be subject to the problem that I just discussed? If you want to take an undertaking that's fine with me too.

MR. FENRICK: Yeah, let me take an undertaking on that, Mr. Hovde, so I can think through the math on that and just make sure before I answer.

MR. HOVDE: Sure, no problem. Still on schedule 72 --

MR. SIDLOFSKY: Sorry, just, Mr. Hovde, just hang on for a sec. That will be Undertaking JT2.7.

UNDERTAKING NO. JT2.7: TO PROVIDE AN OPINION ON MR. HOVDE'S ALTERNATE CALCULATION FOR AVERAGE ANNUAL GROWTH RATE.

MR. HOVDE: Thank you. Continuing on with the same -- Exhibit 1, tab 1, schedule 72, I believe -- and I can't remember if Mr. Fenrick stated this or the questioner stated this, but somebody was characterizing the average

annual growth rate as presented on Table 3 as being some sort of estimate or a parameter, and I was having a little difficulty understanding that in that context.

I normally think of, you know, a parameter as something that is unknown that needs to be estimated and -- you know, such as like the impact of a particular variable on cost in the context of an econometric model, and what I am having a problem with is I am having a hard time thinking of anything that is unknown about the TFP calculations.

To give an example, you know, you are taking a bunch of accounting data, you know, they are going to report O&M costs, they are going to report numbers of customers and peak demand, and all of these things to me are not random, they are reported, they are just taken as being fact. I mean, when somebody fills out a Form 1 there's nothing random about it. When somebody fills out a RRR there's nothing random about that either, although I think some people might disagree.

But what I am having a problem with here is that when I look at the data that go into the productivity calculations I look at the variance of these variables with respect to being zero, and so it's not really a stochastic exercise, it's really just a non-stochastic calculation, and I guess what I want to ask you is, you know, when you talk about your productivity numbers, are these not calculations and not estimations?

MR. FENRICK: Yes, I think that's a fair

characterization. It's -- these are calculations based off of the accounting data.

MR. HOVDE: Thank you. Also, could you just please confirm subject to check that FERC account 925, which is titled "injuries and damages", is where, you know, if you had a lawsuit settlement, if you had to pay out a bunch of money because you were liable for something, that this is one place it could show up in the data?

MR. FENRICK: You said account 925? Is that in the A&G section of the FERC Form 1?

MR. HOVDE: Correct, yeah.

MR. FENRICK: It's subject to check, yeah.

MR. HOVDE: And then to your knowledge is account 925 included in your cost calculations?

MR. FENRICK: Yes, an allocated portion of the A&G expenses is included. So to the extent account 925 is included in the total A&G expenses an allocated portion of that would be included.

MR. HOVDE: All right. And that's my understanding also --

MR. FENRICK: Mr. Hovde, I might just also add to that, it might help for context, you know, in the transmission business well over half of the expenses are capital, capital expenses, so we are really talking about a smaller portion on these injuries and damages and those types of things, we are talking in the OM&A portion, which is going to tend to be a smaller portion of the business than, you know, other businesses. But, yes, that should

be -- that would be included, the injuries and damages.

MR. HOVDE: Thank you. Then also could you please confirm that just, you know, hypothetically if a company had a major expense for whatever reason, it could be a major O&M expense, let's say, that would be -- let's say you had a one-dollar-bill judgment against you, and they stuck it all in one year and it was in the middle of the sample period.

Now, using, you know, your logarithmic methods for calculating growth rates, is it fair to say that there is a blip in the data, would have absolutely no effect on your overall trend calculation?

MR. FENRICK: Yes, if it was on -- in the middle period of the sample and it was OM&A rather than capital it would have no impact on the long-term trend that was measured.

MR. HOVDE: Yes, so in other words it's only really the endpoint matter for this regard for blips and stuff like that; is that correct?

MR. FENRICK: That's correct, for the long-term trend estimate.

MR. HOVDE: Okay. That's -- now I am done with kind of the follow-up questions for what we had previously discussed in camera.

Now what I would like to do is to ask a number of questions about the working papers, and I am going to do this in general terms that I believe Mr. Fenrick will understand without quoting from anything that would be

confidential.

Effectively, I reviewed the working papers, and I am going to ask for two undertakings, and I am going to end up stating -- I am just going to kind of read these out as if they will become the undertakings, and if Mr. Fenrick would like, you know, additional clarification maybe I can clean up the language so that it's clear.

But basically we found that -- after reviewing it, I found two things that might be errors in the calculations. So I would just like to have undertakings just to review my assertions and then just make any corrections that he deems necessary.

And just for everyone's information, in my opinion these are -- you know, neither of these issues will affect the conclusions of the study put forward. I just want to make it clear there's nothing too controversial here.

For the first matter, a section of commands that average the values of cost input quantity and output quantities appear to produce results that include more companies in the calculation than are included on table 6 of the PSE report.

PEG believes that the issue lies with only restricting the sample to "bad TFP observations", and not additionally for "excluded observations". Please undertake to review this conjecture and provide revised results, if required.

Is that kind of a clear enough statement of what I am after?

MR. FENRICK: Yes, I think that's clear, and we can

undertake that.

MR. SIDLOFSKY: JT2.8.

UNDERTAKING NO. JT2.8: TO REVIEW PEG'S CONJECTURE AND PROVIDE REVISED RESULTS, IF REQUIRED, THAT THE ISSUE LIES WITH ONLY RESTRICTING THE SAMPLE TO "BAD TFP OBSERVATIONS", AND NOT ADDITIONALLY FOR "EXCLUDED OBSERVATIONS".

MR. HOVDE: Also I have this question now, and I think you may have answered this earlier. But I think I will just ask it briefly just, you know, for this part of the record, the non-confidential part.

The code that I am alluding to in part A appears to show that the method used is to aggregate the company level data to industry level. In other words, you are taking the individual company data necessary to calculate productivity. You both average that and aggregate it, and then you do productivity calculations on whatever -- on the kind of a typical average company or a typical aggregate.

And what I want to ask is: Is there a reason why you prefer to do it this way?

Let me just start with that. Is there a preference for why you wanted to do it this way?

MR. FENRICK: Sorry, you mean the aggregation portion?

MR. HOVDE: Yes, I mean -- sorry, aggregated the data before doing productivity calculations as opposed to doing company-by-company productivity calculations, and then averaging the results of those calculations.

MR. FENRICK: Averaging the results, so rather than --

is this kind of back to the discussion I had with Dr. Schwartz earlier today, as far as why not take an average of the company results versus the aggregation? Is that what you are alluding to?

MR. HOVDE: What I really want is -- I've got a couple questions. The first is just that is there a particular reason why this -- why you chose to average and/or aggregate the data to kind of a typical firm and then do productivity calculations, as opposed to doing productivity calculations for every single company in the sample and then averaging like, let's say, the productivity trends of all of the individual companies that he calculated productivity for.

MR. FENRICK: I think that the answer there is to be consistent with the fourth-generation IR research, we did the aggregation method that builds up the full industry rather than taking an average of the individual TFP results of the utilities.

MR. HOVDE: I will just point out I believe there is one difference there, in that previously in the fourth generation, we did an aggregation where it's kind of a size-weighted average, while I believe you are doing more of a straight average of the companies then doing the calculations, which is -- and I believe there's going to be similar results in everything.

MR. FENRICK: I think I know what you are talking about, Mr. Hovde, and I think the results will be if not identical very, very similar.

MR. HOVDE: I agree. And then I guess what I am driving at here is do you -- let's put it this way. Our evidence eventually is going to do it the other way, where we're going to do it company by company, and then take an average.

Do you have an objection to doing that way?

MR. FENRICK: You are going to take the simple average of the utility TFP trends, and so you are not weighting? Or you're going to have a weighting procedure?

MR. HOVDE: I am not necessarily talking about weighting them up. I am talking about calculating, you know -- I am going to have productivity results for Algoma Power, Black Hills Power, all of the companies, and then I am going to average the productivity results to come up with an industry average productivity trend, as opposed to what you were doing, which was to average all of the data and then calculate a productivity trend for a typical kind of average company.

I am just wondering if you have any objection to doing that, so I can adjust accordingly if you do.

MR. FENRICK: Would that not be different than what PEG did in fourth-generation IR then?

MR. HOVDE: It would be different because what we did in fourth-generation IR is we aggregated all of the industry data together -- no, you are right. It would be different in that we'd end up aggregating all the industry data together, and then we calculated, you know, kind of an aggregate industry trend off of that.

And there's some reasons why we did it that way, which I can get into if people want to hear that. But forgetting about the question and everything. Do you have any objection about a method where I just go ahead and do it differently than we did it for fourth-generation IR, you know, calculate individual company productivity results and then average them. I am just wondering if you have an issue doing it that way, doing it different.

MR. FENRICK: If I could withhold judgment on that, I would like to read your report prior to and see what your explanation and rationale is, if that would be...

MR. HOVDE: That's fine. That's fine. We can move on.

MR. ENGELBERG: I would like to put out a reminder that this session is public now, so company names should not be used.

MR. SHEPHERD: Surely we can use company names as long as we don't attach them to any data?

MR. ENGELBERG: If the data can't be attributed to a particular company name, I guess that's the case. But I think there was a concern, there has been a concern that perhaps data could be attributed to a certain company.

MR. SHEPHERD: I understand that and the caution is a fair one. But I think the reference to a couple of companies names just a minute ago didn't attach it to any data, so I think it's okay.

MR. ENGELBERG: It's probably okay, but it's probably unnecessary.

MR. SHEPHERD: Yes.

MR. HOVDE: Yes, and I apologize for that. But I will -- I was just using that as an example to talk about, to illustrate what I was talking about.

Okay, the second undertaking, and I will just read it out so it can be just the text of the undertaking. There are two sets of commands that calculate weighted averages of historic levelized asset prices, i.e. triangulized weighted averages. The first is for HON, which calculates the average for 46 years ending in 2002. The second is for the 46 years ending in 1989 used for U.S. companies. It appears that the values of the levelized asset price index, i.e. the variable WKA, were not calculated for years prior to 1963 that are needed for the U.S. calculations.

Please undertake to review this conjecture and provide revised results, if required.

The shorthand version that Mr. Fenrick would understand is that I think that when you created a WKA, you dropped some of the early years and it never got included, so your weighted average is off by a little bit, is what I am thinking.

So does that question make sense? Is the undertaking clear?

MR. FENRICK: Yes, I believe I know what you are talking about, Mr. Hovde. I will take a look at that and take that undertaking.

MR. HOVDE: And then also...

MR. SIDLOFSKY: Mr. Hovde, just hang on a sec. That's

JT2.9. Thanks, Mr. Hovde, go ahead.

UNDERTAKING NO. JT2.9: TO REVIEW PEG'S CONJECTURE AND PROVIDE REVISED RESULTS, IF REQUIRED, THAT THERE ARE TWO SETS OF COMMANDS THAT CALCULATE WEIGHTED AVERAGES OF HISTORIC LEVELIZED ASSET PRICES, I.E. TRIANGULIZED WEIGHTED AVERAGES. THE FIRST IS FOR HON, WHICH CALCULATES THE AVERAGE FOR 46 YEARS ENDING IN 2002. THE SECOND IS FOR THE 46 YEARS ENDING IN 1989 USED FOR U.S. COMPANIES. IT APPEARS THAT THE VALUES OF THE LEVELIZED ASSET PRICE INDEX, I.E. THE VARIABLE WKA, WERE NOT CALCULATED FOR YEARS PRIOR TO 1963 THAT ARE NEEDED FOR THE U.S. CALCULATIONS.

MR. HOVDE: All right. Why don't we move now to -- let's go to Staff IR 65, which is Exhibit 1, tab 1, schedule 65. And here I am interested in responses to parts A and B of this question regarding the transmission peak load data.

This is going to be -- the Form 1 has been revised a while back, and there's now kind of multiple different measures of what might be considered a maximum demand or peak demand. There's kind of a transmission version that's on page 400, and then there's kind of another kind of system peak on page 401B.

And so the first question for you is that if the transmission peak load data were not available or missing, you know, do you believe that the values on page 401B would, broadly speaking, be a reasonable proxy for the, you know, the values you don't have on page 400?

MR. FENRICK: My understanding is on the system peak the -- was it page 401B, those don't include all of the sales for resale demands that, you know, that the transmission system would need to carry. So it would be missing a portion of those sales for resale.

MR. HOVDE: Right. And when you say "the sales for resale", you were talking -- I know it's split into something called requirement sales for resale and non-requirement sales for resale, whereas the distinction is that requirements are the -- are kind of firm service deliveries, you know, they're the contracts that are so firm that, you know, that other -- the utility that's buying that power can rely upon it for capacity calculations. And the non-form portion is kind of, you know, other, you know, more economy energy.

And so first of all, is that kind of your understanding of how that works?

MR. FENRICK: Yes, that aligns with my understanding.

MR. HOVDE: Okay, and then I guess my conjecture for why the -- why these two might be a little more equivalent than you might think to start with is that you wouldn't expect necessarily that a lot of economy transactions be happening at the peak, you know, if it is the peak then you would think that you don't have a lot of extra capacity laying around and you are not saying, hey, I have got some extra power I can throw over to you because it's at the peak, so I would think that that part of it that's being excluded would be relatively minor. I am just wondering if

you concur with that or have a different opinion.

MR. FENRICK: I don't think I would necessarily concur with that. I think that's on some level speculation whether those non-required sales for resale, when those would be occurring.

MR. HOVDE: Okay. Do you believe that if you hypothetically used the page 400 values instead of the page 401B values that you -- sorry, the other way around -- if you use the page 401B values instead of the values you used from page 400, do you think you would have got significantly different values out of your study?

MR. FENRICK: That -- again, that's -- I didn't test -- I used the transmission -- we used the transmission system peak in the study, we did not do the study with the page 400 variable. So I don't know what the study result would be.

MR. HOVDE: Okay. That's fine. The -- also, you did some adjustments to the data for Algoma Power and Gulf Power as a result of the previous interrogatory. And you have some productivity results that moved a little more than I expected. You went from, I think, 1.71 to 1.29. I was a little bit surprised about the impact of that, and I am just wondering if you can just tell me if you kind of know why the numbers moved that much. I mean, I would speculate it might be because the weights in your econometric model have changed, but I just want to get a story for why you would have got such a big impact from changing two companies' observations.

MR. FENRICK: Just to clarify, there was actually three utility observations that were changed: Alabama Power, Gulf Power, and Mississippi Power in the TFP sample because of the southern companies incorrectly reporting their data.

The reason why it went from negative 1.71 to negative 1.29 percent is primarily because of, as you mentioned, the weights on the maximum peak demand variable, as well as the transmission came of line, those changed after making that adjustment, and so I believe that's why we see that change in the TFP.

MR. HOVDE: Okay. Thank you. And then for part H of the same interrogatory you listed a number of variables that -- you had kind of tested the model and it didn't turn out, and one of my colleagues wanted to know if we can get the data for that, and I looked at your working papers, and I think you may have provided a lot of this, but I can't tell for sure because of the variable names.

I was just wondering if you could undertake just to review what you -- you know, the variables that you had tried and didn't work in part H and just -- and just check to see whether or not you have already provided those data in the working papers, and if you haven't, could you please just undertake to provide whatever might not be there?

MR. FENRICK: Mr. Hovde, just to clarify, do you also -- do you need the variable names? Because I believe we didn't take anything out of the data set when we provided the working papers, because I wanted folks like

you to be able to review all of this. And so I believe these variables are all in the data set. Do you just need -- do you need the variable names just to make sure you're using the proper variable that's referenced here?

MR. HOVDE: Yeah, that's a perfect way to approach it. Yeah, if you can just undertake just to give me the variable names that correspond to your responses in part H, that would be great.

MR. FENRICK: Yes, I can undertake to do that.

MR. SIDLOFSKY: That will be JT2.10.

UNDERTAKING NO. JT2.10: TO PROVIDE THE VARIABLE NAMES THAT CORRESPOND TO RESPONSES IN PART H

MR. HOVDE: Okay. Move on to Exhibit 1, tab 1, schedule 66. We are talking about the declining balance parameter. One quick question. You ended up using the 1.65, which I believe corresponds to assuming everything's equipment. I am just wondering, is the method you used to come up with your appreciation rate, is that just consistent with an assumption that all transmission assets are equipment and none are structures?

MR. FENRICK: Yes, that's the implicit assumption in there using the 1.65 declining balance parameter. I would note if we somehow took some sort of weighted -- weighted average of the 1.65 and the 0.91, that would likely have the impact of reducing the TFP trend lower. So we took a conservative estimate and used the 1.65.

MR. HOVDE: Okay. Thank you. Let's move on to -- let's do Exhibit 1, tab 1, schedule 67. Let's see. In

part -- which part was it... In part -- response to part A. You were talking about the impact of pensions and benefits. And I suspect I know what you did here, but it's -- I just want to be clear. You had a relatively small impact on productivity as a result of including pensions and benefits. And the -- I was just wondering, when you did it, is this a case in which you took the pensions and benefits, added it to labour cost, but when you did the calculation of labour input quantity you still used just the salaries and wages? In other words, the pensions and benefits just got stuck into the weight?

Or alternatively, another way that it could be done would be that you would, you know, take the, you know, salaries and wages, add in the -- whatever share of pensions and benefits are appropriate here, and then divide through by the, you know, umm, you know, by the price -- by a price index that includes pensions and benefits, in which case then the pensions and benefits numbers would then impact the input quantity index? And I guess this is maybe a long way of asking, you know, when you included pensions and benefits did this impact the calculation of labour quantity at all?

MR. FENRICK: When we included pensions and benefits for -- in response to the OEB Staff No. 67? Is that --

MR. HOVDE: That's correct, yeah.

MR. FENRICK: When we did that?

MR. HOVDE: If you want to take an undertaking that's fine with me too.

MR. FENRICK: I mean, what we did, I can describe, and you can see if you have follow-ups, follow-up questions. What we did was when we put together this IR response, in the code we had a subtraction of pensions and benefits already coded in and -- on the OM&A spending, and then we basically deleted or remarked out that -- that portion of excluding pensions and benefits. So essentially the OM&A definition would then include the pensions and benefits. Does that help?

MR. HOVDE: Yeah, and then -- and do you happen to know that then if you take the -- you know something? That's good enough. If that's literally what you did, then I can figure out the rest for myself, that's fine.

Continuing on with schedule 67. Let's see. Okay. You were mentioning in one of the responses you were talking about aging of plant. I think we had a question about that. And the -- and you responded that, you know, because you don't have experience within this industry and no empirical evidence that you really just didn't -- you didn't do anything about the age of plant, and I guess what I am going to ask is, do you think that is a -- adjusting for the age of plant, do you think that's -- is that more of an impossibility or is that just a data limitation?

And where I am coming from is just that, I know you were limited to starting in 1969 because of a -- I mean, sorry, 1989 because of your FNL database you were dealing with, but if you had data like we did back in the 1960s, would that provide a better basis for doing age

calculation? Or do you still think it's just not possible to do anything about age?

MR. FENRICK: Mr. Hovde, this is in reference to the total cost benchmarking research, correct? Or are you talking in the TFP realm as well?

MR. HOVDE: No, this would be a benchmarking question.

MR. FENRICK: Okay. I do think there is an issue with including an age variable, in that that's not entirely out of the utility's control as far as its capital spending in the age -- the age of its infrastructure. So with the benchmarking, when you are constructing your total cost benchmarking model, ideally you want to get variables that are mostly external and basically given to the utilities rather than choice, choices that they have made or the regulators have made.

So those -- you know, an age variable is in the realm of a choice, if you will.

MR. HOVDE: Okay, that's fine.

MR. FENRICK: I might also say, and as you're quite aware, constructing it is difficult when you're looking at accumulated depreciation, and given the different deprecation rates of utilities and those types of things. So there's kind of -- there's two issues.

You know, you alluded to the impossibility. To me, if it does violate that principle of including it in the total cost benchmarking because it's, you know, it's not primarily an external variable, I think that might preclude the rationale for it.

MR. HOVDE: Okay, we will leave it at that. Let's see, how about moving on to -- let's go down to number 69.

Okay, for 69, this is where we asked for some Hydro One-specific data. And for the first question, we asked for some rate of return data, and I wasn't precise enough in what I was asking for. What I really wanted was kind of like a weighted average cost of capital.

You provide some ROEs and I am thinking that rather than asking for you to provide that data, I think I have an alternative. And the alternative is just that the Hydro One distribution has reported all the data that I would want for Hydro One transmission. I looked at some of the values; it seemed like the ROEs were the same, at least where I was looking.

And I guess what I am wondering is rather than me asking for you to put together something that, you know, that might be difficult, would it be okay -- I mean, is there any reason why I couldn't use rates of return, kind of allowed rates of return of Hydro One distribution as kind of a proxy for that, for Hydro One transmission? And that might be a company, the witness question.

MR. VETSIS: I think the reason against it would be just due to timing differences, so when it comes to the ROE parameters in the short-term debt, the rates that are set by the OEB on an annual basis. And what had been happening historically is you would have -- in one year, Hydro One distribution would file a two-year cost of service application and the rate would be locked in. And then in

the subsequent year, the transmission would file potentially with new parameters.

In some instances, the values were updated each year; in some instances, they were not. And I don't have enough of a recollection of the history to know how many years you would see a difference between transmission and distribution.

It might be easier, if all you are looking for is the cost of capital, to just take that as an undertaking to provide for the transmission business. So at the very least, you can make sure you are not having any of those issues with timing.

MR. HOVDE: That will be fine, yes. If you could provide me something that's relatively easy to get, that would provide me a basis for deciding whether or not there is a significant difference between the turnout. That would be helpful.

MR. SIDLOFSKY: We will --

MR. VETSIS: And just to be clear, it's the full cost of capital, including debt parameters as well? Or do you just want the ROE itself?

MR. HOVDE: Oh, no, I want the return on capital. There's a -- you know for the distribution business, I think they have a -- return on equity gets a certain weight, and long-term debt gets a certain weight, and short-term debt gets a certain weight, and they kind of weight it all up, and I am kind of looking for that calculation.

But if it's easier just to give me the transmission equivalent of that calculation all rolled up, that will be fine, too.

MR. VETSIS: Again I am still not clear. You want the output of the weighted average calculation? So you would like -- you want actually the ROE with the 40 percent applied and the debt with the 60 percent? You want -- so the final outcome?

So for example, you know, you might have an ROE of 9 percent in a year. But weighted with the cost of debt, the weighted average cost of capital would be about 6 percent. So of those two values, which would you want?

MR. HOVDE: The 6 percent value, the weighted average one.

MR. SIDLOFSKY: We will make that JT2.11.

UNDERTAKING NO. JT2.11: TO PROVIDE A WEIGHTED AVERAGE RETURN ON CAPITAL

MR. HOVDE: Also on the same response, you have provided something called racheted peak demand, when I actually think it's just normal peak demand. I am just wondering if you can confirm that's a peak demand as opposed to a racheted peak.

MR. VETSIS: I would have to confirm, but this does look like just a regular peak variable.

MR. HOVDE: That's fine. I am not looking for any extra data here. I will rachet myself; I just want to get that on the record.

And then I think you reported some 1 percent values

for percentage kilometres, for percentage underground. And is that still miles based?

MR. FENRICK: Mr. Hovde, I know in the data set I provided in the working papers, the percent under grounding variable and that is pole, pole cam, I believe -- just off the top of my head, I think the number is 1.34 percent in that data set. This looks -- they probably rounded, the company. But my guess is the pole is around 1 percent, if that helps.

MR. HOVDE: I am just wondering could I have an undertaking just to give me the other version of this, the percentage of plant that's underground.

Is that pretty easy to do? I think it's just a matter of grabbing some values off of a capital continuity schedule, I would think.

Just to be clear, what I would be asking for here is, you know, a value of plant that is underground, total value of plant, and then just take a ratio is what I am looking for.

MR. ENGELBERG: Can we discuss that matter offline, perhaps at the break?

MR. HOVDE: That's fine, we can move on if you wish.

MR. SHEPHERD: Is there something problematic with that information?

MR. ENGELBERG: I am not saying it's problematic to do, but to do additional work and additional interrogatories on that may be something that we are not willing to do. I just wanted to have a discussion with the

witness as to how much is involved in doing that.

MR. SHEPHERD: Okay. It should be actually on your continuity schedules, right? But fine, I understand what you are saying. It's about the effort rather than about the nature of the information. Okay, thanks.

MR. HOVDE: All right. Okay, if we can move on to -- I think we are going to move on to what might be my last question. Staff IR 71, which is Exhibit 1, tab 1, schedule 71. I think it's part F. Yeah, this has to do with the -- and this might take a little more back and forth than my previous questions. We are talking about customer contributions, and we are just trying to gain a little more clarity about how this is done. We honestly just don't know how this is done.

So using the example of perhaps a, you know, a major transmission substation that, you know, that is constructed to, you know, to step down power so that Toronto Hydro can make use of it. And if I understand right, I know Toronto Hydro, you know, they sometimes will complain that, hey, well, we had these big contributions we had to make to Hydro One for the substation. What I am -- I am just trying to figure out how this factors into the data.

And so as I see it right now, I think that the way this is all -- the way this works -- and, you know, I am asking for clarification -- is that I believe that the plant values that are used to calculate capital quantity and capital cost are net of the contributions that other LDCs -- that LDCs will make towards the construction of

these substations, and the -- and therefore, you know, I's going to be lower by that amount.

And I know that some of this might -- some of these sorts of things might happen in the U.S., and I will leave that. I think we asked a question about that. I am not going to follow up and ask you about anything you don't know about for the U.S. But what I really just want to know is, am I right that the -- that the data used in the capital cost calculation kind of already nets out what Toronto Hydro's already given to you for the construction of such a station?

MR. VETSIS: That was my understanding of the data, that it's net of capital contributions.

MR. HOVDE: Okay. And then in order to give me an idea of if this is really important or not, I mean, we are only talking about, you know, some substations that will have, you know, capital contributions and trying to weigh how important that is in relation to all of the transmission assets.

I was just wondering if you could just undertake to just provide maybe a ratio of total -- total customer contributions as a ratio of, you know, your total plant, meaning the, you know, plant they are using in the study plus whatever other -- so basically, it would be the plant, you know, the plant net of customer contributions as a ratio of the plant net of customer contributions plus the customer contributions. So I just want to have an idea so I know how big the customer contributions are as a

percentage of the total plant that's in-service. Because if it's like a small amount then I am not going to worry about this, but if it's bigger then maybe I will take it into account and try and do something about it.

MR. FENRICK: Mr. Hovde, this is Mr. Fenrick. We are just discussing this, and it's our understanding that the U.S. data is also net and does not include the contributions in aid of construction; is that your understanding as well?

MR. HOVDE: Well, I mean, I consider that a little more about the distribution side of things when they're, you know, when they are building subdivisions or something like that, but when you are talking about a transmission system, I mean, you know, it's not as though the, you know, I don't know, umm, I don't know umm, Commonwealth Edison Transmission, the distribution pays Commonwealth Edison Transmission for the construction of a, you know, substation which they own. So I am just saying that this has been probably a little more prevalent in Canada than it would be in the U.S. for this particular segment of utility operations, and what I am just trying to do, I'm just trying to get an idea of what the magnitude of this is for Hydro One just to determine whether or not it's important or not. And I honestly just don't know, and I am just trying to get an idea whether it's even something worth studying additionally.

MR. VETSIS: From a relevance perspective, the index we are proposing is to adjust Hydro One's revenue

requirement itself, which would be net of capital contributions, so I am just curious why you would need the ratio for the purposes of this application for adjusting something that's already net.

MR. HOVDE: Yeah, that's a fair question. This is actually not some sort of trend issue as it is a levels issue. This really goes more to the benchmarking study. You know, to the extent that LDCs like, you know, Toronto Hydro and other LDCs are paying Hydro One Networks to, you know, basically build a lot of substations, and if that isn't happening in the U.S. that just means that there is an incomparability between the U.S. data and the, you know, and Hydro One. And to the extent that's large, then, hey, maybe that explains some of the superior performance that's being observed for Hydro One and I am just trying to get an idea of the magnitude, you know, that if it's -- if it's big then, hey, maybe this is a big explanation of what you are seeing, and if it isn't then, hey, maybe we can ignore it.

MR. VETSIS: Unfortunately I am not aware of the magnitude, so I think we can -- we can look into that.

MR. HOVDE: Okay. Yeah, if you can just please undertake to provide whatever information you have on customer contributions and what percentage that is of the -- of the total, you know, property, plant, and equipment, that would be great.

MR. SIDLOFSKY: That will be JT2.12.

UNDERTAKING NO. JT2.12: TO PROVIDE WHATEVER

INFORMATION AVAILABLE ON CUSTOMER CONTRIBUTIONS AND WHAT PERCENTAGE THAT IS OF THE TOTAL

MR. HOVDE: Let's see. Going on to Staff IR 70 -- sorry, I am backing up one here. We had asked for a breakdown of transmission lines by voltage, kind of equivalent to what was provided for HOSSM. And the response says that the breakdown by voltage isn't readily available. But yet -- I mean, the PSE study was able to do a kind of an average voltage calculation, so I imagine those data must be available, so I am just wondering if you can just undertake to, you know, to give me a transmission line breakdown so we just kind of know what the composition of the, you know, the 29,000 kilometres -- we are just kind of interested in, hey, how many of them are at what voltage just so we know what we are dealing with when trying to compare it to U.S. companies. The issue here is a little more level than trend. It goes more to the benchmarking than to the productivity work.

MR. FENRICK: Mr. Hovde, did you look through the working papers? I believe should have that breakdown for the Hydro One Networks, if I understand what you are asking for here. The Hydro One Networks should have km of lines by voltage in the asset, in the worksheets -- this is off of memory, but in the Hydro One data worksheet there's multiple worksheets that have the assets in them and that has -- that will have a breakdown of the km of line by voltage. Is that what you are --

MR. HOVDE: No, no, that's actually what I want, and

if that's been provided, if you can just -- actually, can you just undertake to just tell me where that is so we don't have to take up more time here?

MR. FENRICK: Yes, that's fine.

MR. HOVDE: That's fine, yes, because if it's there I am perfectly happy with that.

MR. SIDLOFSKY: That will be JT2.13.

UNDERTAKING NO. JT2.13: TO ADVISE OF THE LOCATION OF THE BREAKDOWN IN THE WORKING PAPERS

MR. HOVDE: I am just going to review my questions here to make sure I have everything. Some are out of order here.

Okay. I reviewed what I wanted to ask, and I believe I am finished my questions, and I thank the panel for their responses.

MR. ENGELBERG: Before you get off the line -- are you leaving us now?

MR. HOVDE: I thought I would hang on for a little bit.

MR. ENGELBERG: Because we were going to have the offline discussion here at Hydro One regarding the request you made about ten minutes ago.

MR. HOVDE: That's fine, we can do that.

MR. SHEPHERD: You are going to do that at the break though, right?

MR. ENGELBERG: We can wait until the break. That's why I was asking how long he would be on line.

MR. SIDLOFSKY: Mr. Hovde, if you are going to stay on

the line, then Hydro One will deal with this at the break and advise people on the -- and will advise after the break about that possible undertaking.

MR. HOVDE: Okay, that sounds great.

MR. SIDLOFSKY: Thanks. Mr. Shepherd?

EXAMINATION BY MR. SHEPHERD:

MR. SHEPHERD: I just want to follow up on one of David Hovde's questions on 71F. When you adjusted for contributions in the Hydro One data, did you make any adjustment for sort of notional contributions between distribution and transmission? Because most of the transmission stations, or many of the transmission stations actually serve Hydro One distribution.

So is there an adjustment for that somewhere?

MR. FENRICK: The adjustment is we take just the transmission expenses from Hydro One. So they delineate between the transmission expenses and the distribution, and we are just taking the transmission.

But there's no other type of adjustment. I am not sure what would be needed there.

MR. SHEPHERD: So I am going to ask Hydro One. When you build a transmission station that's serving your own distribution component, you don't allocate some of that to distribution, right?

MR. VETSIS: Transmission station? You are saying for a transmission station?

MR. SHEPHERD: Yes.

MR. VETSIS: No, my understanding is if it's a

transmission asset, it's in the -- and there is no capital contribution received, it is in the rate base of Hydro One transmission.

I believe if a capital contribution would have been received, you would credit down the transmission rate base and it would go to the distribution side, the way it would for any distributor.

MR. SHEPHERD: But you wouldn't get a capital contribution from Hydro One distribution, right?

MR. VETSIS: My understanding is that we would.

MR. SHEPHERD: You would? So then all of your transmission stations that serve distribution LDCs, including your own, have contributions unless they already pass the economic test, right?

Generally speaking. Obviously there's exceptions, but generally speaking.

MR. VETSIS: I can't say a hundred percent. I don't know those specific rules down pat.

MR. SMITH: Yes, obviously it depends if it's connection or network, the nature of the expense of transmission, and I am sure you are familiar. That determines whether a contribution is required.

MR. SHEPHERD: So the reason I ask that is because combined distribution and transmission utilities in the United States, of which most of the ones on this list are that, right? Most of them are combined distribution-transmission, right?

MR. FENRICK: Yes, that's correct.

MR. SHEPHERD: They don't have that allocation, right? They don't have a contribution from distribution to transmission to reflect the economic test that we have here, or anything similar to the that?

MR. FENRICK: I don't know the answer to that.

MR. SHEPHERD: Okay. All right, thank you. Now I will go on to my regularly scheduled questions.

MR. VETSIS: Actually, I would note that in part C of this same question, it does say that -- my mistake. I misread the question. Withdrawn.

MR. LADANYI: May I ask a question as a follow-up on Mr. Hovde's question, just one little question before you go on, Mr. Shepherd?

Right at the beginning in response to the questioning on Staff 72 -- and you don't have to turn it up -- he asked you to confirm that only end points matter in the long-term trend calculation and you said yes, is that right? Or did I misunderstand that?

MR. FENRICK: Yes, that's correct.

MR. LADANYI: So intermediate points don't matter in calculating long-term trends? Like intermediate years or whatever.

MR. FENRICK: They don't matter in sentence that the result that you get as far as your average annual growth rate won't be impacted on what occurs in the middle. It's where you begin with and end, and you are looking at that average over that entire period.

So it's where you start with and what you end with,

and then what -- if it goes up or down in the middle, it's where you start and where you end.

MR. SHEPHERD: And the reason for that is because the sum of all of the ups and downs, the percentages up and down on a log basis, is going to be -- is going to be the same as the difference between the end point and the beginning point, right?

MR. FENRICK: Yes.

MR. SHEPHERD: So your average necessarily mathematically has to be the same?

MR. FENRICK: Right, that's exactly right. It's, you know, it's where you end up. The road how you get there are the middle points. But, yes, you end up and those ups and downs are how you get to the end point.

MR. SHEPHERD: Well, then why do you even do the annual calculations? Why don't you just go straight to the total change for 12 years and divide by 12?

MR. FENRICK: As you are constructing the index, you are building -- the indexes are building on each other as far as like the capital quantity and those types of things. So you have all that information that you are calculating from year to year as you are building those indexes up.

I mean, you are correct. We could just not show that information and just say here is our trend, here is the beginning point, here is the end point, and here is the average annual growth rate. You know, we show that extra information just to -- for transparency's sake.

MR. SHEPHERD: Right --

MR. SMITH: I would just like to remind everyone, too, that the I believe it's 2.7. If I took it down properly, it was to determine whether a simple mathematic growth rate using open and end points only would fairly represent the trend.

So there is more information coming, I think, related to that question.

MR. SHEPHERD: Fine. So now I am going to the interrogatories to ask some follow-up questions, and my first one is SEC 19. And this talks about changes in accounting rules.

And just let me back up for a stage, because I didn't ask this in the question, but it's sort of implied.

How does working capital play into the calculation of either TFP or benchmarking? Does it play in at all?

MR. FENRICK: Mr. Shepherd, it's the net fixed assets that we are using that go into the capital, which is the plant addition -- in-service plant additions. So the working capital would not enter until it became an in-service addition.

MR. SHEPHERD: Well, no, working capital is never an in-service addition. That's why -- that's the whole point. We are not talking about capital expenditures that have not yet been placed in service. Different question.

MR. FENRICK: Sorry.

MR. SHEPHERD: Working capital is the capital you need on hand because you have expenses and revenue that you have to pay, and you have leads and lags for them, right? You

are familiar with this.

MR. FENRICK: So working capital would not enter into to the TFP or the total cost benchmarking cost definition, then.

MR. SHEPHERD: So even though it's a substantial impact on rates, it's not -- and controlling your...

MR. VETSIS: I am sorry. Is that actually true, though, the substantial impact on rates because -- so let's think in transmission here. Working capital is expressed as percentage of OM&A, right? So you are talking, I think, ballpark-ish was 4 and a half percent for Hydro One. Hydro One's OM&A is about -- I don't know, 340, 360 million, in that ballpark.

So you take a few percentages, you are looking at a couple million and that's not recovered dollar for dollar. You then run that through a cost of capital. So by the time you have hit the actual revenue requirement, that number is actually minuscule. So I it's a bit of stretch to say that working capital has a very material impact on rates.

MR. SHEPHERD: And this is because unlike distribution, where you have cost of power which overwhelms your OM&A cost, in transmission you don't have cost of power. You have some cost of power, right?

MR. VETSIS: No.

MR. SHEPHERD: Not as part of your working capital calculation?

MR. VETSIS: But even so, I think same would apply to

distribution as well. So I think distribution Hydro One –- well, let's say the OEB's default parameter of 7 and a half percent. Again that's 7 and a half percent of OM&A, and then you take that and that gets added to rate base, and you add the cost of capital percentage to it. So on a revenue requirement basis, it's a tiny number.

MR. SHEPHERD: That's the difference, right? In distribution cost of power is, what, five, six times OM&A? So it's a completely different calculation, but you are right, in transmission it doesn't matter, so I move on to the next thing.

MR. FENRICK: Are they all going to be that easy?

MR. SHEPHERD: I wish, or maybe you wish. But your answer to this is you're making the assumption that if there are changes in accounting rules that have happened over your study period, which would affect trend; right? Would affect cost trends?

MR. FENRICK: To the extent the accounting changes were material and materially changed, the allocations between capital and OM&A.

MR. SHEPHERD: So for example, Hydro One has a change in capitalization, say, and maybe it was small. That's not my point. If there was a change in their capitalization policy during this period that was not reflected in your -- the sample, then the sample would no longer be applicable in the same way to Hydro One. The difference might be large or small, but that difference still changes the comparability of the data; right?

MR. VETSIS: I am not aware of any major changes that have happened, so I am not sure what you would be referring to in this instance. You are talking about a hypothetical that hasn't occurred in the historical period.

MR. SHEPHERD: So you have had no changes in accounting rules at Hydro One since 2004?

MR. VETSIS: I recall there was a transition from Canadian GAAP to U.S. GAAP, and I think as this IR indicates that the impact of that was not significant. And I think we are comparing to a sample of U.S. utilities, which are also predominantly on U.S. GAAP, so I would expect that from a comparability perspective it's actually -- you are looking at the relative consistency.

MR. SHEPHERD: Well, that's exactly the point, is they have always been on U.S. GAAP and you haven't, and it's the change that matters; isn't that right?

MR. VETSIS: Again, Canadian GAAP was largely aligned with U.S. GAAP, which I think is the reason why the switch from one to the other happened to minimize the impact. So as this IR states, this decision had no or minimal financial impact.

MR. SHEPHERD: So then if I ask the question again, if there is a material change in accounting rules that applies to Hydro One and not the U.S. utilities, does that affect the comparability of the data, is your answer you refuse to answer the question? I am asking Mr. Fenrick.

MR. FENRICK: So you are stating if this hypothetical occurred, which did not actually occur, on the TFP trend,

given that there was no material change in the U.S. data, that TFP estimate would be just as applicable to Hydro One as if there had not been any sort of change with Hydro One, which there wasn't.

MR. SHEPHERD: All right. Let me go to SEC number 26. And we sort of talked about this before. But I am looking at the last sentence in this, which, your assumption is that transmission utilities costs will not go down if peak demand goes down, ever; right? That's what's built into your model?

MR. FENRICK: I don't think that's entirely accurate. First of all, you know, this variable followed the fourth-generation IR definition where there was also a ratcheted peak demand or maximum peak demand variable, so we mimicked that variable definition. I don't think ever where you say it's never going to go down, I don't think these accurate. I think over, you know, three to five CIR, custom IR period, or revenue cap in this case, it's unlikely that the transmission utility can -- if it was at a high capacity can then ramp down that capacity and save costs in the short run.

Now, in the long run, you know, our total costs model does say in the long run there could be some cost savings there, but that's in the long run over, you know -- these are assets that have a long service life. And so in the short run that's true, in the long run, then you are talking about something else.

MR. SHEPHERD: Well, maybe I misunderstood your

ratcheted peak demand. I thought your ratcheted peak demand is if demand is -- if peak demand goes up you keep it at that number, you use that number. And if it goes down you keep it at the higher number from the previous year, and that's what the ratcheting is.

MR. FENRICK: Yes.

MR. SHEPHERD: You do that forever?

MR. FENRICK: Through the sample period.

MR. SHEPHERD: Okay. So 12 years; right?

MR. FENRICK: Correct.

MR. SHEPHERD: Okay. So can you go to Staff 69, page 3 -- or page 2, I guess. So these numbers on the bottom in F, which says ratcheted peak demand, that's actually not ratcheted peak demand; right? Actually, ratcheted peak demand goes -- that column -- this one is just peak demand; right? I thought I heard you say that to Mr. Hovde earlier.

MR. VETSIS: That's how it appears, yes.

MR. SHEPHERD: So the way ratcheted peak demand works is from 2002 up to 2006, 2006 is the maximum, and then for every year after that it's assumed that your maximum peak demand is 27,005 megawatts, even though in 2017 it's only 22,178.

MR. FENRICK: Yes, that's correct.

MR. SHEPHERD: And your assumption is that -- that costs to deliver maximum peak demand, to transmit maximum peak demand of 22,178 is going to be the same as 27,005. Your model assumes that? You can undertake to explain this

if you want.

MR. VETSIS: I think broadly speaking what you are looking at here is these assets are in the ground for decades. You install them, you put them up, they will last longer than the study period. I think the expectation that that cost would immediately decline for something that's already in the ground is perhaps not practical. It's not like, you know, you have factors such as conservation, et cetera, driving down the peak. You don't all of a sudden start knocking down transmission lines because the peak is declining. Those assets are in the ground. They are still useful, they are still providing service.

MR. SHEPHERD: Actually, the cost of an asset does go down over time automatically, right, because as you depreciate it your cost of capital goes down every year; right? So that's not correct.

MR. FENRICK: I might just add, you know, we have this in 2006, the value of 27,005. The utility has to build capacity to meet that demand in 2006. As my colleague was pointing out here, you know, those assets aren't just going to disappear, those are in the ground for decades, and so to think, you know, the utility has to build to meet 27,005, it can't just in the short run reduce its costs to go back down to, you know, by 2017 to a value of, you know, 22,000. That's going to take a number of years to realize that.

MR. SHEPHERD: So you do not -- how should I put this? How -- the fact that you have roughly 20 percent less

demand doesn't affect your OM&A at all; right?

MR. FENRICK: I wouldn't want to speculate as far as OM&A impacts on -- from capacity.

MR. SHEPHERD: But your model assumes that both OM&A and capital continue to -- the amount doesn't decline because the maximum peak demand went down to 22,178.

MR. FENRICK: I mean, those are completely separate calculations, calculating the capital and OM&A costs. You know, there we are taking the accounting information and figuring out what the total costs of the utility are.

That's not connected to what the peak demand or maximum peak demand variable; those are separate calculations.

MR. SHEPHERD: If your costs stay the same as they were at 27,005 and your output were to go down to 22,178, but the costs stay the same, that would be negative productivity, right? It's only because you keep the racheted -- the demand up at the racheted amount that it looks like there's no negative productivity.

You can spend just as much and remain just as productive, true, in your model?

MR. FENRICK: Sorry, Mr. Shepherd, could you repeat your question?

MR. SHEPHERD: What were you talking about if you didn't know what my question was? Why did we have to wait all that time if you didn't know what my question was?

MR. ENGELBERG: Mr. Shepherd --

MR. SHEPHERD: I am asking a question.

MR. ENGELBERG: No, just repeat your question.

MR. SHEPHERD: Well, no. This is a gimmick that you teach your witnesses, and I am saying if you were talking about my question, give me the answer you talked about.

MR. ENGELBERG: It's not a gimmick that's taught to the witnesses, and your editorializing are not appreciated. If you have a question, ask it; if not, move on.

MR. SHEPHERD: So you won't answer the question, then; fine.

MR. ENGELBERG: That's not what they said.

MR. SHEPHERD: That's good. That's good, no, the record is clear. I will move on.

I am going to 28, SEC 28. Remember I gave you a chance to answer the question.

So in 28, you say that you didn't examine any mathematical relationships between the two factors we are talking about here, which is kilometres of line and average voltage of lines, right?

MR. FENRICK: Correct, we didn't examine any mathematical relationship between those.

MR. SHEPHERD: I have two questions about that. First of all, don't you normally -- when you have two variables, don't you normally look to see if there's any relationship between the two? There's tests you can do, right?

MR. FENRICK: As far as correlation in those types of things? Is that what you are referring to?

MR. SHEPHERD: Yes.

MR. FENRICK: Normally, no, you don't examine the

correlation. We start with the engineering theory of will these -- are these a cost driver, and we start with that a priori engineering basis. You know, is average voltage -- will higher average voltage increase transmission costs.

MR. SHEPHERD: Clearly.

MR. FENRICK: Clearly, yes, right. And will having more km of lines increase transmission costs. Yes.

MR. SHEPHERD: Yes.

MR. FENRICK: And so we start with that basis and then include those variables. The correlation or the multi-collinearity between those two variables does not impact -- does not bias the estimate, does not impact the estimate. So there's no real reason to test for that correlation, so we don't.

MR. SHEPHERD: Because you're assuming that the two causes of cost increases are independent, they independently cause cost increases, right?

MR. FENRICK: I don't think that's necessarily even -- it doesn't necessarily have to be independent. But it does have to have their own basis primarily to be driving total cost which, you know, the higher the voltage, that's likely to drive higher costs. And the more km of line you have out there is likely to impact costs as well. And I mean those are separate, separate impacts.

Is there maybe a little overlap there in some area? Possibly, but I don't think -- I don't see how that would impact the model.

MR. SHEPHERD: Okay. I am next looking at SEC 29.

Now, am I right that the loading -- you are the first ones to use the loading variable, right, that you know of?

MR. FENRICK: Yes, we constructed that ourselves.

MR. SHEPHERD: Am I right in understanding that that's essentially a weather-driven variable? It's going to be most affected by weather -- or, more correctly, climate, I guess.

MR. FENRICK: That is correct if you go to the appendix of the PSE report, it starts on page 53, 54, it describes the loading variable. And you have CSA and ESC loading zones that primarily take in the climatic conditions of the service area to determine what a minimum requirement would be for construction.

MR. SHEPHERD: Okay. So in studying -- in doing benchmarking around North America, everybody has climate impacts; nobody uses a loading variable. So what do they use to reflect that?

MR. FENRICK: Unfortunately, you know, throughout North America sometimes the benchmarking isn't to the quality that this study is. But there have been times where I have seen weather temperature type variables, or things like that.

This is a much more sophisticated and accurate approach to getting at what the minimum requirements are to build in the service territory.

MR. SHEPHERD: When you invented this new variable, did you look at what other people had done to capture the same sorts of effects, the same sort of cost drivers?

MR. FENRICK: No. To my knowledge, this is the most innovative variable to capture this and there's really not any other variables that are comparable throughout the industry that I am aware of, unless --

MR. SHEPHERD: How would you know if it's the most innovative if you haven't looked at what other people have used?

MR. FENRICK: There's nothing out there. Are you aware of anything else that's like this?

MR. SHEPHERD: I just asked you whether other studies have climate variables of some sort and they do, right? It's not that everybody ignores climate. That's not true, right?

MR. FENRICK: There have been temperature -- there's some temperature variables. I mean, I think we included one for our study in Hydro Ottawa. But there's nothing -- I mean, that's not really comparable to what we are doing here, which is an engineering analysis on the minimum requirements for construction for transmission assets.

You know, I wouldn't say that's comparable at all. This is much more sophisticated.

MR. SHEPHERD: You could capture that with things like a wind variable, which -- a wind variable, by the way, you have seen before, right?

MR. FENRICK: Yes, we tested a wind variable.

MR. SHEPHERD: And you could use, for example, snow level variables, how much snow falls in a particular area. And that's been done, too, right?

MR. FENRICK: I believe so. But again, that's not comparable to the engineering analysis that we did here for this variable, which was far and beyond just looking at precip levels or snow levels. This is looking at the actual codes and what the minimum requirements are in the given service territory to construct a pole.

MR. SHEPHERD: What you are trying to measure, Mr. Fenrick, is the effect of the local area's climate on the costs of the transmission utility, than whether you measure it through your loading variable or through precipitation or through wind, or anything else, it's a question of statistics whether or not there's a relationship, right, and if one predicts the other?

It has nothing to do with whether your engineering is good, does it?

MR. FENRICK: I think it does matter how well we constructed the variable, and how good the engineering was that constructed the variable. That will matter.

MR. SHEPHERD: I guess my question is, you're saying nobody does a loading variable, but other people measure the effect of climate. So I am trying to get you to explain why your method of calculating or portraying the relationship between climate and costs is better than what everybody else in North America uses, and how you came to that determination without looking at what everybody else does?

MR. FENRICK: I would say one of the key differences here is we are actually looking at the standards from the

Canadian Standards Association, CSA, the National Electrical Safety Code, NESC, so these are actually regulatory standards that utilities need to meet for the minimum requirements within the service territories that they serve, and so that's -- my opinion is that's a far more sophisticated and better approach to take in the regulatory environment that each utility is operating in and meeting those -- and what minimum requirements that they need to meet. That's far superior than a snow variable or whatever climatic variable you want to insert.

MR. SHEPHERD: Why has nobody else used anything like this, then? It seems sort of straightforward that you could -- like, if you were a utility in Alaska I would think that you would want to use this. Why has nobody used this before?

MR. FENRICK: That would just be speculation on my part.

MR. SHEPHERD: Okay, thank you. I am going to SEC 31, and I have two questions about this. You'll agree, I guess, that having four of the eight items on this, the variables on the list, in the top decile, suggests that Hydro One is a relative outlier; yes? Or let me put it a different way. There are no other utilities in your sample for -- that have four out of the eight variables in the top decile; is that correct? And you can undertake if you want.

MR. FENRICK: Mr. Shepherd, I would not characterize Hydro One as an outlier in the sample. I am thinking

through the efforts of your request where I have to basically create this table for 57 utilities. I am just thinking of the level of effort required in that undertaking request. It seems like a lot of work to recreate this table 57 times and then report on it.

MR. SHEPHERD: Well, you don't have to look up the data, right? The data's already in.

MR. FENRICK: The data's there, right, but I have to make these calculations then for 57 different utilities and then look and see if there's any one of them or how many of them have four out of eight or five out of eight. I don't know to what end that would serve.

MR. SHEPHERD: Do you know any off the top of your head that are in the top decile at four out of the eight?

MR. FENRICK: I haven't examined that at all, so I have no idea.

MR. SHEPHERD: And in fact, if you were to use the loading variable as well, and you -- and I thank you for this -- provide us with information on the loading variable in SEC 39, and the loading variable, Hydro One is also in the top decile; right?

MR. FENRICK: Correct, that's one of the four out of the eight that you cited. It's --

MR. SHEPHERD: Sorry, is it there? Oh, yes, you're right --

MR. FENRICK: The construction standards, right.

MR. SHEPHERD: The construction standard is loading variable.

MR. FENRICK: We changed the name on you to --

MR. SHEPHERD: Yeah, well, that was sneaky, but okay. Sorry about that.

Then my next one is 36. And this is sort of a motherhood-and-apple-pie question. Your study doesn't look at all and you don't have any information to provide the Board on why transmission costs, whether here or throughout North America, are increasing at more than inflation; do you?

MR. FENRICK: That's right, yeah, that's not an empirical issue that we have researched.

MR. SHEPHERD: Okay. All right. Number 37 is labour percentage, and I have two questions about that. The first one is, you said you -- Hydro One didn't provide you with the expenses broken out by labour. But could we get that data? Could we get the Hydro One percentage of labour calculated in the same way to see where they stand on this scale? Presumably Hydro One has the information.

MR. VETSIS: I don't know if we have the data broken up in exactly the same way that it's shown here on page 49 of Steve's report.

MR. SHEPHERD: Okay, so I am going to ask you to take a look at SEC 37 and undertake to provide us, if you have the information or you can readily -- it's readily available, to provide us with the Hydro One percentage, and if you can't, just tell us it's something you can't calculate easily.

MR. ENGELBERG: We will give that undertaking.

MR. SIDLOFSKY: JT2.14.

UNDERTAKING NO. JT2.14: TO PROVIDE THE HYDRO ONE PERCENTAGE OR IF NOT POSSIBLE TO ADVISE IT'S SOMETHING NOT CALCULATED EASILY

MR. SHEPHERD: And then my next question, on the next page you see the list of the 56 utilities that's in this benchmarking analysis, and am I right that a big portion of these differences is contracting out, is what their contracting-out practices are, some have a bigger workforce and some have a smaller workforce and use outside contractors? Is that a fair extrapolation?

MR. FENRICK: That's a possibility for why the differences exist.

MR. SHEPHERD: Because I would have thought the transmission companies -- this is all transmission data; right?

MR. FENRICK: Correct.

MR. SHEPHERD: Transmission companies should need roughly the same amount of labour, I mean, not exactly, but roughly the same amount. They have similar businesses; is that fair?

MR. FENRICK: They certainly have similar businesses. Whether they have similar needs for labour versus capital, that's -- I am not aware if that's true or not.

MR. SHEPHERD: You don't know whether that's true?

MR. FENRICK: No, I don't.

MR. SHEPHERD: Okay. So if the differences in this list are due to contracting out, how does your model factor

in the underlying labour component of contract costs?

MR. FENRICK: As far as the expenses go?

MR. SHEPHERD: Yeah, whether you have a -- whether the guy building a tower, putting up a tower, is working for Hydro One or working for a contractor, that's still a person, they're still putting up a tower, that's still labour, and the question is how do you adjust for that in your model.

MR. FENRICK: It's my understanding that, you know, if you are doing some sort of transmission project or whatever it might be, those expenses, whether it's internal or outside, are going to be booked to the transmission category. And so those costs are all going to show up, whether it's outsourced or internal, the expenses that the utility incurs are going to all -- they are going to show up into the cost definition.

MR. SHEPHERD: In the labour cost definition? I am asking about the difference between labour and non-labour. So it's all transmission, right?

MR. FENRICK: Right.

MR. SHEPHERD: You have transmission labour and transmission non-labour, and I would have thought that if you contract out, it's treated as non-labour even -- and if the same people do it, but they work for the utility, it's labour, is that right?

MR. FENRICK: In constructing this table and our inflation factor? No, we assumed outside labour or outside services were labour and included that as a labour expense.

MR. SHEPHERD: All outside services?

MR. FENRICK: Well, I believe we had an allocator attached to it. But we included the -- we included that component into that definition. It's on page 49 of the PSE report, where we show that equation.

MR. SHEPHERD: Okay. I missed that, thank you. My next question is on Staff 55, and this is a fairly straightforward one and it may be for Hydro One.

Hydro One said that the formula ensures that the transmitter's revenue requirement will increase at a rate no greater than inflation. But any ICM or capital factor would mean that it would be greater than inflation, right? Is that correct?

MR. VETSIS: Yes, but those are not within the I minus X formula.

MR. SHEPHERD: No, no, I understand that. But it's true that what it really shows is it can't be less than inflation. It can be more because you have adders of various types. But it can't be less, right?

MR. VETSIS: Sure.

MR. SHEPHERD: Thanks. My next question is on Staff 58, and it was really something that just confused me.

This is a question -- you will see it on page 2. The PSE has -- you did this study for Hydro One Networks, right, not for HOSSM?

MR. FENRICK: That's correct. The original intention was for Hydro One Networks.

MR. SHEPHERD: And you've suggested that the same

factors should apply to HOSSM, right? The same -- the results of your study should apply to HOSSM?

MR. FENRICK: Correct. I believe we say that in part B. PSE's recommendation for parameters of the Hydro One SSM revenue cap remain unchanged from our recommendations for Hydro One Networks.

MR. SHEPHERD: And why do you assume that HOSSM has the same results as Hydro One Networks? Why is that?

MR. FENRICK: Same results pertaining to what portion? The TFP? Trend?

MR. SHEPHERD: Benchmarking, for example.

MR. FENRICK: For the benchmarking? We are not making an assumption that Hydro One SSM would have the same results separately. We are making the assumption that the results would be very unlikely to change if the two -- you know, if we benchmarked Hydro SSM plus Hydro One Networks.

Just given the size of Hydro One Networks in relation to SSM, if we added SSM to the Hydro One Network definition, it would be unlikely to change the recommended CIR values.

MR. SHEPHERD: Why would you be adding Hydro One SSM to Hydro One Networks? I don't understand how that follows.

I am asking the question if you study HOSSM separately, could you get a different result? You might get a deferent result?

MR. VETSIS: The companies are in the middle of an integration in the process of becoming one consolidated

entity. Going forward, it seems reasonable that the productivity expectations for a consolidated entity would be the more reasonable benchmark to use, rather than this unstudied historical performance of a much smaller utility whose operations have changed.

MR. SHEPHERD: So it's Hydro One's opinion that this study is applicable to HOSSM, it's not Mr. Fenrick's?

MR. FENRICK: No, it's also my opinion that the recommended parameters that I am recommending would be unchanged for SSM versus Hydro One Networks, on the basis that while there isn't a total cost benchmarking study for SSM, our TFP findings are quite negative, right, negative 1.29 percent or negative 1.1 -- you know, they are largely negative, which implies an implicit stretch factor already.

So Hydro One SSM, if they do get the recommended X factor of 0.0 percent, that essentially implies an implicit stretch factor that is well over 1 percent. And that's a very large, extraordinarily large stretch factor to begin with.

So our stretch factor recommendation would stay at zero percent because of that presence of that implicit stretch factor.

But I would add, Mr. Shepherd, ideally the X factor would be calibrated based on the TFP trend and take the actual TFP trend, and then a total cost benchmarking study would serve as the stretch factor, the basis for the stretch factor.

MR. SHEPHERD: So you haven't studied HOSSM at all,

right? Zero?

MR. FENRICK: Correct.

MR. SHEPHERD: But because there is so much room in the negative productivity factor, it basically means it doesn't matter what stretch factor number -- what benchmarking number you come up with, it's going to be subsumed in the negative productivity. As long as you take from 1.71 to zero, there's never going to be a stretch factor that big anyway, right?

MR. FENRICK: The implicit stretch factor is already extraordinarily large. If the X factor is set at 0.0 percent, that is already an extraordinarily large stretch factor being implicitly applied.

MR. SHEPHERD: So I am not sure I understand why in this case -- I understand why in the transmission case you would be filing these studies. Why would you file these studies in this case when your answer to the question of how do they apply to HOSSM is, well, they don't, but it doesn't matter?

I don't get it. Can you explain? How does your study relate to HOSSM?

MR. FENRICK: For the total cost benchmarking? I mean obviously it relates to the inflation -- the inflation factor is pertinent for HOSSM, just like Hydro One Networks. The productivity research is just as applicable. The total cost benchmarking, I think that's what you are alluding to here. We have not studies Hydro One SSM, and so we do not have results for Hydro One SSM.

MR. SHEPHERD: All right. I am just going to try to get a couple more in before the break, if you don't mind.

I am looking at Staff 59, and I am looking at page 4. And this looks like -- except for the very small areas that are other LDCs, you're saying the service territory of Hydro One Networks is the entire province. Is that fair?

MR. FENRICK: Correct, that's the service territory of Hydro One.

MR. SHEPHERD: And there is probably -- well, at least 50 percent, maybe 75 percent of the province that's not actually served by Hydro One. Did you adjust for that in any way? Nobody lives there.

MR. FENRICK: So in the total cost benchmarking, we did not include a service territory or service area variable in the transmission benchmarking because we had -- we actually had good km of line data from the utilities and from the U.S. utilities.

You may recall in the distribution application, we did have a square km of line -- or a square km of service territory because there's not good distribution line lengths available in the U.S. that's reliable. But on the transmission side of things, there is reliable data on km of line. And so we include that variable in there to account for how much line length and service territory that there is in each utility's service territory. So there was no need for a service area variable, if you will.

MR. SHEPHERD: Okay. I am going to number 60. And on page 4 of Staff 60 you say:

"Our engineering experts do believe that kilowatts and line length are the main drivers of transmission costs."

Blah, blah, blah. And I guess you're not an engineer; right?

MR. FENRICK: Correct, I am a lowly economist.

MR. SHEPHERD: Well, okay, the engineers say they are lowly engineers. Those engineering experts, do we have their evidence somewhere? Do we know who they are?

MR. FENRICK: Yes, if you look at the PSE report it's co-authored by myself as the lead author and then Mr. Erik Sonju, who is a licensed engineer.

MR. SHEPHERD: Okay. So he is the expert that you are relying on?

MR. FENRICK: Yes.

MR. SHEPHERD: And he is going to be a witness at the hearing if there is one?

MR. FENRICK: That hasn't been determined.

MR. SHEPHERD: All right. Number 63 is -- and this is sort of -- is probably an undertaking. What I'd like you to do if you could, and tell me if this is too hard to do, but what I would like you to do is look at the TFP and cost benchmarking approaches that have been used by the Board in the past that are currently used, now, for distribution, and the two studies that you did for TFP and benchmarking, put them side by side, and tell us what the differences are. And if you can give an explanation as to each difference that would be great, but just a side-by-side.

It's not that many; right? You know, obviously there's going to be little stuff that doesn't matter, but anything that has a material impact on any results, could you do that fairly easily?

MR. FENRICK: Sorry, I am just trying to think through what I would be doing.

MR. SHEPHERD: Can I ask it a different way? Can you use your best efforts, and if it turns out to be too much then you can tell us?

MR. ENGELBERG: We will give an undertaking to look at it and see how much effort there would be.

MR. SHEPHERD: All right. And if it's a reasonable amount of effort you will provide it?

MR. ENGELBERG: Yes.

MR. SHEPHERD: Thank you. And maybe that's a good time to take a break.

MR. SIDLOFSKY: That will be JT2.15.

UNDERTAKING NO. JT2.15: TO MAKE BEST EFFORTS TO LOOK AT THE TFP AND COST BENCHMARKING APPROACHES USED BY THE BOARD IN THE PAST AND CURRENTLY USED NOW FOR DISTRIBUTION, AND THE TWO STUDIES DONE FOR TFP AND BENCHMARKING, PUT THEM SIDE BY SIDE, AND EXPLAIN WHAT THE DIFFERENCES ARE

MR. SIDLOFSKY: Just to try to plot out the rest of the afternoon, Mr. Shepherd, do you have a sense of how much longer you might be?

MR. SHEPHERD: Ten or 15 minutes.

MR. SIDLOFSKY: Okay. Why don't we take a break now.

It's 3:05. We'll come back at 3:20.

--- Recess taken at 3:05 p.m.

--- On resuming at 3:23 p.m.

MR. SIDLOFSKY: We are back. Mr. Hovde, are you still on the line?

MR. HOVDE: I am.

MR. SIDLOFSKY: Okay, great. Just one thing before we go back to Mr. Shepherd. Has Hydro One given more thought to the requested undertaking on the percentage of plant that's underground?

MR. ENGELBERG: Yes, and Mr. Vetsis will answer what it is that Hydro One will be able to do.

MR. SIDLOFSKY: Okay, thanks. Mr. Vetsis?

MR. VETSIS: I think we can provide a percentage of the value of plant, of underground plant as compared to overall net plant for a recent historical year. So if that should be helpful for your purposes.

MR. HOVDE: That would be good. In fact, I wouldn't even mind if it was gross plant, if that's possible. I would take either, but of the two, I might prefer gross plant because that is the ratio that I would be able to do in the United States for comparative purposes.

MR. VETSIS: I will do my best. I think we have that. If not, we will provide net.

MR. HOVDE: That would be great.

MR. SIDLOFSKY: That will be taking JT2.16.

UNDERTAKING NO. JT2.16: TO ADVISE THE PERCENTAGE OF THE VALUE OF UNDERGROUND PLANT AS COMPARED TO OVERALL

NET PLANT FOR A RECENT HISTORICAL YEAR.

MR. SIDLOFSKY: Mr. Shepherd?

MR. SHEPHERD: I just have a few questions left. I am on Staff 66, and Staff 66 says that -- I think it says that the construction cost assumed for Hydro One was the Toronto construction cost. Is that right, from the RSMeans index?

MR. FENRICK: Yes. Consistent with how we did the rest of the sample, we used the headquarter city as the map.

MR. SHEPHERD: How does construction costs feed into your model? It affects your capital model, right?

MR. FENRICK: It flows into the capital price. So when you do a benchmarking study, you want to levelize for the regional differences in the prices the utilities have to pay for, you know, for labour or for capital.

And so we use the RSMeans to provide that levelization on the capital price, to correct for the regional -- or adjust for the regional differences between utilities in construction costs.

MR. SHEPHERD: Now, the only component of this that matters is the Delta from year to year, right, because this is a rate of change calculation, right?

MR. FENRICK: No, that's not right. This is a levelization, so we are taking -- we did the levelization in 2012. So we took the RSMeans in 2012, and it's a book that has heavy construction costs for a whole host of cities through North America. We took the values, the headquarter city values for every utility in the sample,

set that, and then we changed that trend using the Handy Whitman indexes. But in 2012, the levelization is based on the differences in the cities as reported by RSMeans.

MR. SHEPHERD: So basically you are saying that the expected costs for Hydro One, for example, will be different than for somebody whose headquarters is in Philadelphia, because construction costs are different in those two cities, right?

MR. FENRICK: Correct.

MR. SHEPHERD: All right. So did you adjust for the fact that Toronto is notoriously -- has the largest amount of construction activity of any city in North America?

MR. FENRICK: No, there was no adjustment made. We took -- we thought we were consistent throughout the whole sample and we didn't make adjustments to cities.

MR. SHEPHERD: So if Toronto's construction costs are affected by the high amount of construction activity and the inability to get people and cranes and stuff like that, how would that affect your results?

MR. FENRICK: Are you saying if those -- that reality increased the value found in RSMeans?

MR. SHEPHERD: Yes.

MR. FENRICK: It would increase the levelization factor for Hydro One.

MR. SHEPHERD: So it would mean that Hydro One's costs would be expected to be higher than peers in cities with lower construction costs.

MR. FENRICK: If the construction costs are higher in

Toronto then, all else being equal, the benchmark would be higher for Hydro One.

MR. SHEPHERD: So what is included in heavy construction? Does it including building condos and stuff like that? Or does it only include things that are specifically relevant to Hydro One, like transmission lines and things like that?

MR. FENRICK: It's the heavy construction, so it's not specific to the utility transmission business. So it would include, you know, condos and those types of things, heavy construction type.

MR. SHEPHERD: My next question is on Staff 68, and you've said in your answer to B that the incentives under the FERC rate plans are generally weaker than the incentives in Ontario plans, right? Is that a fair statement about what you said there?

MR. FENRICK: Yes, I consider formula rates to have weaker incentives than the typical incentive regulation regime here in Ontario.

MR. SHEPHERD: And the incentives we are talking are Basically cost control incentives, right -- mostly they are cost control incentives?

MR. FENRICK: That's fair.

MR. SHEPHERD: So wouldn't that necessarily mean that for regulatory reasons, U.S. transmitters would have worse productivity than Ontario transmitters? All other things being equal, that should be the case, right?

MR. FENRICK: With the caveat that formula rates have

been in place for, you know, throughout the sample period, so there hasn't been a change. And that's -- that's done at the federal level, so it's consistent across the U.S., the FERC regulates transmission primarily in the U.S. And so there hasn't been a change or move from, you know, incentive regulation to formula rates. It's been a consistent series throughout the sample period.

But all else being equal, I would think that someone under a formula rate form of regulation would have weaker incentives than under incentive regulation.

MR. SHEPHERD: So if you are giving a utility in the U.S. 3 percent a year in rate increases and inflation's only going up 2 percent a year, all other things being equal, they should have negative productivity, right?

MR. FENRICK: That would depend on their output growth.

MR. SHEPHERD: I said all other things being equal.

MR. FENRICK: What are we setting equal here?

MR. SHEPHERD: I am trying to understand whether if relative to your outputs, you have more money in the U.S. than you do in Canada each year, that that will tend to make you less productive.

MR. FENRICK: Just so I can understand your example, you are saying if the U.S. utilities are spending more money then, you know, their level of spending is higher than other utilities or Canadian utilities or Ontario utilities, all else being equal, yes, then the productivity would be lower.

MR. SHEPHERD: Sorry, I was saying if they are allowed to spend more money by their regulator. If their regulator gives them a weaker incentive, gives them basically more money each year so they are not as pushed to keep their rates down, then is that going to mean that they will generally have lower or more negative productivity, generally?

MR. FENRICK: I think it would mean the incentives are weaker. How that would actually play out in real life and reality, I haven't seen a study that has examined what that would actually play out as far as the realization of productivity.

MR. SHEPHERD: Your study assumes that the regulatory format of your study sample, and the differences between that regulatory model and the one in Ontario, has no effect on productivity, right? That's what your study assumes?

MR. FENRICK: The PSE study, our study is a calculation of the total factor productivity trends of the U.S. industry, and we are using that that estimate on the TFP to serve as the basis for X factor. I think there's likely to be differences between Canada and the U.S., but that doesn't mean the calculations have any of those assumptions put in them. We are doing a calculation exercise in calculating the TFP.

MR. SHEPHERD: The only reason you can use your -- the results of your U.S. model to assume the expected costs of Hydro One is by assuming that the U.S. results are directly applicable to Hydro One; that is, they have the same basis,

right? That's the whole concept you are using; right?

MR. FENRICK: Are you talking on the TFP study or the benchmarking?

MR. SHEPHERD: Well, either would be true but, yes. TFP is what I am talking about right now.

MR. FENRICK: Okay. To the extent that the formula rates have been in place for the entire sample period, which means they have had weaker incentives throughout the entire sample period, we wouldn't -- we wouldn't necessarily expect that to skew -- you know, it's been a consistent, consistent reality in the U.S. throughout that sample period. And so, you know, we wouldn't expect that to skew the trend in any sort of way.

MR. SHEPHERD: So an easier regulatory regime in the United States is not an explanation for the negative productivity throughout the table that we saw earlier of all the U.S. utilities? The vast majority of the results being negative productivity each year, that's not because of a weaker regulatory regime? If you don't know you can just say so.

MR. FENRICK: It's a possibility, but I really can't sit here and tell you what the end real causes are of that negative productivity, so I would be speculating.

MR. SHEPHERD: You didn't adjust for the different regulatory regimes; right?

MR. FENRICK: That's correct.

MR. SHEPHERD: Okay. My next question is in 69. And actually, I think I already asked these questions when we

talked about SEC 20. So my next question is in Energy Probe 24. And this is -- and this may be my last question, so it's appropriate that I end on what may be a stupid question. Am I right that if you calculated the TFP for each company and averaged that in some way, you would get a similar result to the result you got? Or would that -- would that not be the case?

MR. FENRICK: I believe that's what Dr. Schwartz in his exhibit showed. Because that's essentially, if I understand you correctly, that's the procedure he undertook that showed very similar results.

MR. SHEPHERD: So that result, that simple versus log, his result was simple versus log; right?

MR. FENRICK: Right, but that really was not a very meaningful difference either. So it's wholly similar, it's not going be identical, but...

MR. SHEPHERD: It's not going be the same.

And then one last point. Remember that table that is secret and highly confidential and we can't talk about it that has the list of all the annual productivity. Is it possible to model that, is it easy to do to figure out what the productivity trend is if you take out all the outliers above a certain level, let's say, I don't know, 10 percent? Is it easy to do that?

MR. VETSIS: What would be the basis for taking out the 10 percent?

MR. SHEPHERD: No, I am just asking the question. We are going to ask the Board to consider whether those big

changes are outliers. It would be useful if the Board knows how much of a difference that makes, and so I am asking whether it's easy to calculate. I mean, I suppose I can get the spreadsheet and do it myself, but it's better if you do it.

MR. FENRICK: Why is that?

MR. SHEPHERD: Because you know what you are doing.

MR. FENRICK: I think you can take simple averages; right?

MR. SHEPHERD: Anyway. Is it easy to do?

MR. FENRICK: I would say it's actually easier for Dr. Schwartz, given that he has the Excel spreadsheet. I don't have the Excel spreadsheet put together at this time.

MR. SHEPHERD: Didn't he send you the Excel spreadsheet with the --

MR. FENRICK: No, I just have the paper copy.

MR. SHEPHERD: Okay. Anyway, if you had the Excel spreadsheet could you do it?

MR. FENRICK: That would be a fairly easy exercise to take. It wouldn't be my study, but it would --

MR. SHEPHERD: Can I ask you to do that then? It's the data you collected. I am just asking you to take the data you collected and produce a result with a different -- with one different parameter.

MR. ENGELBERG: Would you be comfortable doing that with somebody else's Excel?

MR. FENRICK: I think the issue is that I am producing results that I don't think are appropriate and are not my

results, when, I mean, Mr. Shepherd, you can just as easily as I can get the Excel spreadsheet and make that calculation.

MR. SHEPHERD: I had to ask. I have asked. That's fine.

MR. FENRICK: Okay.

MR. SHEPHERD: That's all my questions, thanks.

MR. SIDLOFSKY: Thanks, Mr. Shepherd.

So I believe that's it for Mr. Fenrick. The remaining two members of the panel are still needed. Ms. O'Connell has some questions about the scorecard and DBAs -- sorry, and cost allocation. So Mr. Fenrick, if you want to head out, Board Staff are fine with that.

MR. FENRICK: That sounds great to me. Thank you.

MR. SIDLOFSKY: Ms. O'Connell.

ISSUE D, PERFORMANCE SCORECARD

EXAMINATION BY MS. O'CONNELL:

MS. O'CONNELL: Good afternoon. So I am just going to start right now with some questions about the scorecard. If you go Staff IR No. 42, Exhibit I, tab 1, schedule 42. In part E, basically I asked why Hydro One Sault Ste. Marie had not consulted with any customers or external stakeholders in the production of the scorecard. Your response was, no, there are no consultations.

So I am just wondering if you could provide an explanation as to why no consultations were performed, considering the prominence of customers' needs and preferences in the scorecard. So when I refer to the

scorecard report, I am referring to -- I am referring to EB-2010-0379, a report of the Board performance measurement for electricity distributors, a scorecard approach dated March 5th, 2014.

So back to my question, if you could just explain why in particular customers and also as well external stakeholders, why they weren't consulted.

MR. VETSIS: As we mentioned before, the intent with the scorecard was to align to the extent possible with that of Hydro One Networks in light of the eventual integration of the two utilities. I would note that Hydro One Networks itself did do some form of engagement in the original development of its scorecard for its 2017/2018 application, and I am sure that that informed the work done here as well.

MS. O'CONNELL: Okay, my next question is also related to Staff IR No. 42. 42F and G basically asked why benchmarking wasn't done against your peers. Basically what I am trying to get at in this question is the targets column on the scorecard for industry. Once again they are blank, and I'm just -- with these questions in 42F and G I am just trying to get a stake as to what's being planned for the industry targets. And I know you are saying that there's integration with Hydro One Networks, but even if you are integrated with Hydro One Networks you should have comparators to your peers.

MR. VETSIS: If you take a look at Exhibit C2-1 you will see that the actual reliability statistics have

results that are compared to CEA, so that would be to industry peers.

MS. O'CONNELL: I guess what I am getting at is there's no column for the scorecard for industry targets, and that's what I am getting at.

MR. VETSIS: You would note that in the case of distributors which you've compared to, OEB created its own sector-specific scorecard. It relied on existing expectations of performance that have been established for the sector. There's no corollary on the transmission side for us to draw from.

So what Hydro One has provided, Hydro One SSM has provided is a set of targets that it intends to achieve by 2023. And again, it has aligned its metrics with those of Hydro One Networks, to have some degree of comparability between the two.

MS. O'CONNELL: So are you saying that comparable industry targets -- like, for example, for CNPI, Five Nations, et cetera -- that they would not be applicable to consider when you are developing the industry targets on your scorecard.

MR. VETSIS: I don't know the specifics of their operating territories. I do understand that they have different characteristics certainly than -- my understanding is they have different characteristics than Hydro One SSM. So I don't -- I don't have anything more to say beyond that.

MS. O'CONNELL: Okay, thank you. My next question is

regarding SEC No. 14, Exhibit I, tab 5, schedule 14.

So you will note that on the next page, there's a scorecard there. So is it your intention that this is the most latest version that I should look at?

MR. LEWIS: That's correct, yes.

MS. O'CONNELL: Okay, thank you. My next question is in -- so it's IR No. 42, so Exhibit I, tab 1, schedule 42.

So in this IR, basically I asked why the scorecard, A, does not specify improvement initiatives, and B, why Hydro One Sault Ste. Marie believes that its current scorecard has addressed the deficiencies.

In part A, basically you said that the figure 5 scorecard in your prefiled evidence is largely similar to that submitted by Hydro One Networks as approved by the OEB in 2017. You also said that your Hydro One Sault Ste. Marie scorecard is substantially aligned with the Hydro One TX scorecard, and basically it should now be treated as acceptable because it includes the expected outcomes and timelines.

So is it fair to say that you are saying that the OEB should approve this scorecard that's on the record in the Hydro One Sault Ste. Marie proceeding because it's similar to that submitted by Hydro One Networks TX in the 2017 and '18 proceeding? Is that what you are saying?

MR. VETSIS: What we are saying is the revised scorecard addresses the concerns of the OEB in the Hydro One SSM decision, which were that having performance metrics with specific performance outcomes and

implementation timelines, targets have been provided along with metrics that are aligned with the OEB's IRF.

I would also turn to the OEB's handbook for utility rate applications. On page 17, the OEB talks about, in reviewing scorecards, its key considerations are whether measures capture key factors of utility performance.

I think that's the case here. You have execution -- metrics related to customer satisfaction, reliability, cost performance and execution.

Whether the scorecard enables assessments over time. That's the case. There's a full five years' worth of data here.

And appropriate comparisons with other utilities; it's aligned with that of Hydro One.

The third target is whether the utility has set reasonable targets for its performance metrics. You will notice in the revised scorecard that was mentioned in the interrogatory you had before shows improvements in performance in virtually all measures across the board.

So once again we believe that the provided scorecard aligns substantially with the requirements of the OEB and as well from the prior decision as well as its handbook and existing policies.

MS. O'CONNELL: Okay. But back to my question, are you of the view that the Board should accept this scorecard because it's substantially aligned with the Hydro One Networks scorecard?

MR. VETSIS: No, we are of the view it should accept

the scorecard because it meets the criteria the OEB mentions in the OEB rate handbook, and because it addresses the OEB's concern in the last decision for Hydro One Sault Ste. Marie, EB-2016-0356.

MS. O'CONNELL: Okay. I am just going to also basically refer to the Hydro One Networks decision EB-2016-0160, dated September 20, 2017, revised October 11, 2017, on page 38.

Basically, there the OEB did not approve Hydro One Networks' scorecard basically saying that expected the Hydro One Networks scorecard to further evolve. It's my understanding that it's likely you are still evolving and that this -- is this Hydro One Sault Ste. Marie scorecard also a work in progress?

MR. VETSIS: As stated before, Hydro One Sault Ste. Marie's scorecard, we believe should be approved by the OEB in this proceeding for Hydro One Sault Ste. Marie, because it meets the criteria outlined in the handbook for utility rate applications, as well it addresses the OEB's concern in the last decision.

MS. O'CONNELL: Okay. One of the concerns in the last decision was regarding implementation timelines. I looked and basically I -- like for example, some of the measures that you are planning on implementing you were silent in the scorecard.

MR. VETSIS: I believe the evidence indicates that all these metrics are in place and are being tracked currently. So the implementation has occurred.

MS. O'CONNELL: No, that's not accurate. For example, the customer satisfaction survey still shows NA.

MR. VETSIS: As was noted in the evidence, HOSSM did not have a customer satisfaction survey in the past. But going forward following the operational integration that just happened a couple of months ago, they will be included with that of Hydro One Networks.

MS. O'CONNELL: So I will get to this later on in my questions regarding MD&A, but at this point in time, are you willing to basically revise your scorecard to include an MD&A, including the implementation timelines? Because normally at a utility when it's implementing measures, it include a discussion in the MD&A section. Like, for example, you know, customer satisfaction survey. You know, we surveyed customers on issues such as reliability, things of that nature.

MR. VETSIS: I am struggling to understand what you are asking for, and how that's distinct from what's provided in Exhibit C1-1.

My understanding of the MD&A portion of the scorecard was it's a place where utilities put explanations for when the performance is placed publicly for people to look at. The explanations for the things that you are asking about are actually on the record in Exhibit C1-1.

MS. O'CONNELL: Yeah, unfortunately the scorecard needs the MD&A sections. Customers, when they come to your application, I think it would be reasonable to have a separate MD&A section embedded in the scorecard, so that's

all in one place.

And then furthermore, the MD&A section should discuss the implementation timelines.

MR. VETSIS: We believe we have provided a complete record with respect to the scorecard. Should the OEB determine in this proceeding that an MD&A will be helpful when we post our scorecard annually and report to the OEB, we would be happy to adopt that.

MS. O'CONNELL: Okay. And then if -- so basically, you wouldn't take an undertaking to revise the scorecard with an MD&A section?

MR. VETSIS: No, because everything you are seeking for is already on the record in Exhibit C1, tab 1, schedule 1, the descriptions of all the measures, what's being tracked, what they mean, what the historical performance is. I don't even know what we would provide you beyond that.

MS. O'CONNELL: Okay. So basically what you are saying is, is that even though the MD&A sections are required section of the scorecard report you are not willing to revise your scorecard to meet the OEB's expectations?

MR. VETSIS: What we are saying is that if the OEB in its decision in this proceeding would like us to include an MD&A section, we will include such descriptions annually when we publicly post our scorecard for reporting purposes.

For the purposes of this specific hearing, there's no need to refile a scorecard with an MD&A section, because

the information that you are seeking is already fully described in Exhibit C, tab 1, schedule 1. And I should note as well for specifics reliability, Exhibit C, tab 2, schedule 1.

MS. O'CONNELL: Okay, thank you. Okay. You'll note that there's the operational effect of the section of the RRF, the renewed regulatory framework. And basically in your prefiled evidence you stated that:

> "Continuous improvements in productivity and cost performance will drive cost efficiencies inherent in the integration."

Can you let me know on the scorecard where these inherent efficiencies in integration are captured?

MR. VETSIS: I believe yesterday you asked a similar question, and our response was in terms of efficiencies, we have Exhibit B2, tab 2, schedule 1, which shows the savings that have arisen from the initial work with integration of the two utilities.

Additionally, this application includes benchmarking studies with respect to productivity performance and incentive rate-setting mechanism, which includes productivity expectations. As noted again yesterday, the OEB's findings with respect to continuous improvement in the last proceeding were related to the stretch factor and productivity factor.

MS. O'CONNELL: Okay, thank you. I move along to AMPCO number IR No. 31, Exhibit 1, tab 4, schedule 31. Basically, AMPCO asked about on the differences between the

Hydro One TX scorecard and the Sault Ste. Marie scorecard. I looked up your most recent Hydro One TX scorecard, so that was EB-2016-0160, filed May 31, 2016. I did a cross-check, and they didn't seem to match.

Is it my understanding, then, that your answer in AMPCO 31 includes new measures that weren't on the Hydro One Networks TX scorecard in EB-2016-0160?

MR. VETSIS: I think what occurred here was just the evidence -- initially I think the timing, the expectation was that Hydro One were to have filed its custom IR application last year, which would have included a revised transmission scorecard. Subsequent to that, this application would have been filed. And I think the evidence was referencing the work done there.

So the metrics here that are missing that you don't see in the prior application reflect the current work that Hydro One has made in terms of updating its own scorecard. That will be reflected when Hydro One does file its custom IR application next year -- or this year.

MS. O'CONNELL: Okay. So is the intent then in IR AMPCO 31 to roll these new measures then in the Sault Ste. Marie scorecard?

MR. VETSIS: I don't believe so. I think some of these metrics are specific to the work programs of those of Hydro One Networks. I do believe that the reliability evidence has indicated that with respect to T-SAIFI ultimately the metrics will be able to be split between momentary and otherwise -- here, just give me a second to

find you the exact quote.

So, yes, on Exhibit C, tab 1, schedule 1, page 21 at the bottom it states:

> "As the integration with Hydro One progresses this metric, specifically T-SAIDI, T-SAIFI, will be divided into momentary T-SAIFI M and sustained outages, T-SAIFI S, to align with Hydro One's tracking of these metrics."

MS. O'CONNELL: Okay. So I guess what you are saying is other than the T-SAIFI you are not planning on rolling these AMPCO IR number 31 measures into the Sault Ste. Marie scorecard?

MR. VETSIS: No, we don't believe they apply.

MS. O'CONNELL: Okay. Then just linking again to IR number 42, Exhibit 1, tab 1, schedule 42, you talked about some measures that you could possibly implement, one being the level of public awareness and the other one being transmission system plan implementation progress.

If you were able to incorporate these measures into the scorecard, what would be the timing?

MR. VETSIS: It would be pure speculation as to what the timing would be for the inclusion of these metrics. As stated, we believe we have provided a fulsome scorecard, and that's the scorecard that we are proposing at this time.

MS. O'CONNELL: Okay, thank you. Now, I also direct you to IR No. 42, Exhibit I, tab 1, schedule 42. Basically just to summarize what we just discussed, you're saying

that it's your understanding that you are in compliance with the OEB's requirements even though an MDA is not required; right? That's your assumption, that's your position?

MR. VETSIS: Correct.

MS. O'CONNELL: Okay, thank you.

Okay. Okay. If you go to IR No. 42. So that's Exhibit I, tab 1, schedule 42. This is talking about targets. So I asked an IR about the targets for 2023. Your response is saying that it aligns with the TSP for five years and Hydro One TX's -- Hydro One Network's transmission scorecard. I asked you more information about the targets. You basically said that they were set by senior management. Some were based on a discretionary basis, some where there was an algorithm -- algorithm was used to develop the targets, and other areas where targets were not meaningful.

So I just have a few follow-up questions regarding the targets and your management team. So how do you monitor the progress of utility -- areas of the utility that do not have targets set?

MR. VETSIS: Could you be more specific, which metrics you are referring to?

MS. O'CONNELL: Okay, for example, customer satisfaction. The survey.

MR. LEWIS: So for the example you state regarding customer surveys, given this wasn't something that Hydro One Sault Ste. Marie had established in the past, it was

difficult for Hydro One Sault Ste. Marie to establish a target.

With that being said, given that we are in the midst of operational integration and, as my colleague noted, we are moving forward to aligning with Hydro One's scorecard and their approach with customer surveys, when we file the scorecard in the future, the N/As will likely be replaced once better information is available in terms of what a successful metric would be for customer survey response.

MS. O'CONNELL: Okay, thank you. Regarding implementation timelines for metrics that cannot be feasibly calculated, how do you determine those timelines with -- based on your plan to implement going forward? Like, for example, satisfaction with outage planning procedures?

MR. VETSIS: To be clear, these metrics are implemented and they are in place to be tracked. Where there's N/As in the scorecard, it's in instances where there's no history of performance which you can draw from to determine a target. And that's where you see N/A.

So as time goes on, these metrics are in place, they are ready to be tracked. You gain experience with them for a couple years to see what performance is, and then from there determine what targets are appropriate or reasonable.

MS. O'CONNELL: And then regarding the scorecard report that I referred to earlier, basically can you explain how basically targets are set with the requirements of the scorecard reports, basically to deliver services

that would be reasonably expected by the customer at reasonable rates?

MR. VETSIS: I feel you are sort of comparing apples and oranges here. Again, my recollection is when the OEB established the scorecard for DX, it talked specifically about leveraging triple-R information of utilities. It specifically talks about targets being established based on whatever expectations existed already. For example, minimum standards for service calls, et cetera, those are established in the Distribution System Code and those are pulled through into the scorecard itself.

Where there were new measures, the OEB itself actually established no target for performance. So again, all I see is absolute alignment with what it is we have done here. Where there was a history of existing information and performance, we have set targets there for expectation. And in almost every instance, it's a target of improved performance.

Where no history exists, we are waiting to gain experience before setting those targets. So again, absolutely aligned with the DX report.

MS. O'CONNELL: Okay. So basically what you are saying is your scorecard, in your opinion, is aligned with the objectives of the scorecard report, which is to provide a reasonable level of service for customers at reasonable rates.

MR. VETSIS: Correct.

MS. O'CONNELL: Okay, thank you. Now, talking more

again about the targets, thank you for updating the response in the SEC interrogatory. I am just asking -- generally, the scorecards, there's a year, the year of targets will relate to the year of the scorecard. So I noted that this is a 2017 scorecard, but there's no target for the year 2017.

Could you undertake -- A, could you undertake to include that target; and B, if you revise the target for 2018 values? Would that be an onerous task at this point in time?

MR. SMITH: Excuse me, Ms. O'Connell. What number SEC is that again? Do you have that number handy?

MS. O'CONNELL: SEC No. 14, Exhibit I, tab 5, schedule 14.

MR. VETSIS: This scorecard wasn't in place prior to the integrat -- like before. I don't know what targets we would be able to give you, because it's something that was just been established.

So what 2017 targets would you want? We couldn't give you anything; it wasn't in place at the time.

MS. O'CONNELL: But you did submit a scorecard with your EB-2016-0356 application towards the end of 2016.

MR. VETSIS: Sorry, you want us to update a scorecard that was rejected by the OEB with new targets?

MS. O'CONNELL: No, no, I am talking about the scorecard that's in SEC number 14 in this proceeding. Basically, A, either update with 2017 targets; or B -- I am asking you would it be totally onerous to update the whole

scorecard with 2018 values?

MR. VETSIS: We have given you '17 actuals. I don't...

MS. O'CONNELL: Yeah, I'm talking about 2018 actuals. I'm asking you...

MR. VETSIS: I don't think audited financials have come in yet, so we wouldn't be able to provide you updated values for everything. No audited...

MS. O'CONNELL: I agree. But some of the values aren't dependent on audited financial statements. So is it your position that -- I guess it would be too onerous to update this scorecard?

MR. VETSIS: Yes, and of questionable value.

MS. O'CONNELL: Okay. Including a target year for 2017, if you're keeping the status quo target?

MR. VETSIS: Again, there's no '17 target; it didn't exist at the time and you have actuals for that year.

MS. O'CONNELL: Okay. Key performance indicators; this is Staff IR No. 43, Exhibit I, tab 1, schedule 43. Basically, I asked for a list of the historical KPIs and targets for 2018 and 2019.

Basically what you've said is that the KPIs are built into the scorecard and with the operational ongoing integration, you're solely focussed on the scorecard with minor adjustments.

So my question to you is: Is it fair to say that the scorecard replaces your KPIs, your scorecard and your dashboard? Is that fair to say, based on your

interrogatory response?

MR. LEWIS: Yes, the scorecard as presented in SEC 16 is what we would use to measure our performance going forward, and any KPIs would be reflected in that scorecard.

MS. O'CONNELL: Okay, so -- okay. So what you are saying is the KPIs are now being replaced by your dashboard and scorecard?

MR. LEWIS: Yes.

MS. O'CONNELL: Okay. So what do you do to mitigate the risk that some KPIs are no longer covered off, such as the 2017 KPI called execution of vegetation lines and stations preventative maintenance?

MR. LEWIS: We believe the metrics, as presented in the scorecard in SEC 14, represent the best measures of our performance going forward.

MS. O'CONNELL: So basically you are saying you covered off all the KPIs with the scorecard?

MR. VETSIS: No, I think it was that the KPI process has been replaced with the scorecard and in some instances where we felt the existing measures were appropriate they have been pulled in, but going forward the scorecard is the performance measurement tool.

MS. O'CONNELL: Okay, thank you. And then just another question regarding part A of your response to IR 43. You said that you only made minor adjustments to further align with Hydro One. I am just wondering, why did you say minor adjustments? You made quite a few adjustments.

MR. LEWIS: So it is our interpretation that the changes made were minor.

MS. O'CONNELL: Because?

MR. VETSIS: The bigger change in '17 was shifting from an annual review process of KPI performance to a monthly one. So in our opinion that was the more drastic change, was a more regular review of performance to ensure that you can change and realign throughout the year. And the change in the metrics to reflect the new scorecard is more minor. The big deal is the new process for reviewing performance.

MS. O'CONNELL: Okay, thank you. I just have one final question regarding standards. So this is -- one final question relating to this area of the issues list. So if you go to IR No. 46, Exhibit I, tab 1, schedule 46, I asked a question as to how you're complying with the MAADs decision, in particular with the OEB -- complying with the OEB's approved customer delivery point standards. This question -- part of the question was not answered, so I'd just like to you to confirm whether or not you're compliant with the OEB-approved customer delivery point standards.

MR. VETSIS: The performance standards that I believe have been OEB-approved are shown in Attachment 1 of C2-1.

MS. O'CONNELL: So are you saying you are in compliance with the OEB-approved customer delivery point standards?

MR. VETSIS: Yes, for Hydro One Sault Ste. Marie.

MS. O'CONNELL: Okay, thank you. I have a couple questions relating to other sections of the issues list. I am just wondering if anyone else has anything to chime in regarding the scorecard? No? Okay.

ISSUE E, ACCOUNTING

EXAMINATION BY MS. O'CONNELL:

MS. O'CONNELL: So I just have -- I have one -- if you go to regarding deferral and variance accounts, IR number 79. So it's Exhibit 1, tab 1, schedule 79. My first question is, Table 1, the total balance, you have a total credit balance in Table 1 of 1.094 million. I added up these numbers and I came to 1.21 million. So...

MR. LEWIS: Yes, the two numbers, the 94,909 and the 1,115,000, should have been added together, so we acknowledge that the total is incorrect.

MS. O'CONNELL: Okay, thank you.

So the next part of my question is, so, A, could you take an undertaking to revise this number to the correct amount and; B, if you could revise Table 2 to clear the full amount of 1.2 million credit against the 2019 revenue -- proposed revenue requirement?

MR. LEWIS: Yes, we can accept that undertaking.

MS. O'CONNELL: Thank you.

MR. SIDLOFSKY: That will be JT2.18.

UNDERTAKING NO. JT2.18: TO REVISE THE NUMBER OF THE TOTAL CREDIT BALANCE TO THE CORRECT AMOUNT AND TO REVISE TABLE 2 TO CLEAR THE FULL AMOUNT OF 1.2 MILLION CREDIT AGAINST THE 2019 PROPOSED REVENUE REQUIREMENT

ISSUE F, COST ALLOCATION

EXAMINATION BY MS. O'CONNELL:

MS. O'CONNELL: Okay, thank you. And then my last question has to do with cost allocation. So you'll note that in IR Staff 73, which is Exhibit 1, tab 1, schedule 73, I asked you some questions about cost allocation, and I would just like to confirm whether you agree -- Hydro One Sault Ste. Marie agrees that the final allocations approved for Hydro One Networks in the EB-2018-0130 proceeding, 2019 revenue requirement proceeding, if the allocation tool is approved on a final basis in that proceeding, EB-2018-0130 proceeding will be used for the pools for Hydro One Sault Ste. Marie.

MR. VETSIS: I will note that the cost -- that application is also a revenue cap index proceeding, so Hydro One is actually not proposing a change to the allocation. My understanding is Hydro One Networks is not proposing a change to the allocation in that proceeding. It's still based on EB-2016-0160.

MS. O'CONNELL: Okay. Because the reason why I bring this up is that in your -- in the interim decision for Hydro One Networks that came out in December 20th there were some adjustments made, for example 2017 foregone revenue was backed out and that changed the allocations to the pools. So I am just thinking, like, if --

MR. VETSIS: Can you confirm, did you actually check the math? My understanding that the -- was that the deferral accounts were apportioned to the three rate pools

in accordance with the allocation of the revenue requirement itself.

MS. O'CONNELL: This was the foregone revenue, and it was not gone done in proportion, so that's why I am asking basically do you agree that the final allocations approved in EB-2018-0130 will carry forward and be used on an underlying basis for this proceeding, Hydro One Sault Ste. Marie?

MR. VETSIS: I believe they should still be based on 2016-0160, because that's the actual cost allocation exercise that the OEB actually approved. The proceeding you are referencing has not concluded. I don't know what the outcome will be. So currently our proposal stands to align with what has actually been approved by the OEB.

MS. O'CONNELL: Okay, but -- so in general you'll agree with the outcome -- that the outcome of the 2018-0130 proceeding, the outcome of that, whatever it may be, will align to the Hydro One Sault Ste. Marie proceeding?

MR. VETSIS: No, I believe I have cited that we are keeping our proposal as it was. There's no reason to hold up this proceeding to wait for the outcome of the other when we are comparing to a Board-approved cost allocation, and my understanding from what Hydro One Networks has proposed in the other proceeding is just to maintain what has already been approved.

MS. O'CONNELL: Okay. I will leave that for now. Thank you. Those are my questions.

MR. SIDLOFSKY: Does anyone else have questions on

those other items? Seeing and hearing none, I think that the technical conference is complete, thank you very much witnesses.

--- Whereupon the conference adjourned at 4:24 p.m.