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1 October 27, 2015  
 2 (9:07 a.m.)  
 3 CHAIRMAN:  
 4 Q. Good morning, everybody. I think we're ready  
 5 to proceed with the next section of our  
 6 hearing and that is on prudence. There's no  
 7 preliminary matters, is there?  
 8 MS. GLYNN:  
 9 Q. No, there's not. Mr. Chair, we should  
 10 probably have the parties identify themselves  
 11 where we do have some new parties in the room.  
 12 CHAIRMAN:  
 13 Q. Okay, all right. Let's start with Hydro, I  
 14 guess, once again into the breach.  
 15 MR. MACDOUGALL:  
 16 Q. Good morning, Mr. Chair, Commissioners, my  
 17 name is David MacDougall. I'm assisting Hydro  
 18 with the prudence phase of the GRA, and I'm  
 19 joined today with two counsel from Hydro, Mr.  
 20 Young and Ms. Pennell, and we'll introduce our  
 21 panel afterwards.  
 22 CHAIRMAN:  
 23 Q. Okay.  
 24 MR. O'BRIEN:  
 25 Q. Good morning, Mr. Chair, Liam O'Brien, outside

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1 counsel for Newfoundland Power, with Gerard  
 2 Hayes.  
 3 MR. COXWORTHY:  
 4 Q. Paul Coxworthy for the island industrial  
 5 customer group.  
 6 JOHNSON, Q.C.:  
 7 Q. Good morning, Commissioners, Tom Johnson,  
 8 consumer advocate, with my colleague Greg  
 9 Kirby.  
 10 MR. FLEMING:  
 11 Q. Good morning, Commissioners. Denis Fleming  
 12 for Vale Newfoundland, outside counsel.  
 13 GREENE, Q.C.:  
 14 Q. Mr. Chair, it's Maureen Greene, Board hearing  
 15 counsel, and with me seated at the table  
 16 because they are free at the moment, we do  
 17 have representatives from Liberty that we will  
 18 be hearing from later during this part of the  
 19 proceeding. We have Mr. John Antonuk, Mr.  
 20 Rich Mazzini, Mr. Mark Lautenschlager, and  
 21 Randy Vickroy. Those are the four  
 22 distinguished looking gentlemen sitting there  
 23 in the back.  
 24 CHAIRMAN:  
 25 Q. Among other distinguished looking gentlemen.

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1 GREENE, Q.C.:  
 2 Q. Of course, and at the front as well.  
 3 CHAIRMAN:  
 4 Q. And don't forget the ladies. Okay, back to  
 5 Hydro.  
 6 MR. MACDOUGALL:  
 7 Q. Thank you, Mr. Chair. Before we have the  
 8 witnesses sworn for this panel, Mr. Chair, I  
 9 would just like to introduce who we have  
 10 today. Hydro's panel on the prudence today is  
 11 dealing with management and operations issues,  
 12 so closest to the Board is Mr. Darren Moore,  
 13 he's General Manager Transmission and Rural  
 14 Operations, and Mr. Moore has testified  
 15 previously before you in the GRA phase. Next  
 16 to him is Mr. Rob Henderson, he's VP  
 17 Newfoundland and Labrador Hydro, he has also  
 18 testified before you in the GRA phase. Next  
 19 to him is a new face to this panel, Mr. Terry  
 20 LeDrew, and Mr. LeDrew is Manager, building  
 21 the production organization at the Lower  
 22 Churchill Project, but he's on this panel  
 23 today because Mr. LeDrew was formerly the  
 24 Manager of Thermal Generation and in charge of  
 25 the Holyrood facility at the relevant times

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1 for the prudence inquiry, and next to Mr.  
 2 LeDrew is Mr. Paul Humphries, he's Vice  
 3 President System Operations and Planning, and  
 4 Mr. Humphries has also testified before you in  
 5 the earlier GRA phase. If we could have the  
 6 panel sworn, Mr. Chair.  
 7 MR. DARREN MOORE (SWORN)  
 8 MR. ROB HENDERSON (SWORN)  
 9 MR. TERRY LEDREW (SWORN)  
 10 MR. PAUL HUMPHRIES (SWORN)  
 11 EXAMINATION-IN-CHIEF BY MR. MACDOUGALL:  
 12 MR. MACDOUGALL:  
 13 Q. Mr. Henderson, in this proceeding there have  
 14 been various requests for information posed to  
 15 Hydro, which Hydro has responded to with  
 16 respect to the prudence inquiry, and there has  
 17 been reply evidence filed by Hydro dated  
 18 August 7th, a revised version of which was  
 19 filed on September 23rd, and surrebuttal  
 20 evidence filed on October 14th. Was that  
 21 information generally prepared under your  
 22 direction and control?  
 23 MR. HENDERSON:  
 24 A. Yes, it was.  
 25 MR. MACDOUGALL:

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1 Q. And before I ask you to adopt that evidence as  
 2 the evidence of Hydro, I understand there's a  
 3 couple of small corrections you would like to  
 4 make to that evidence?  
 5 MR. HENDERSON:  
 6 A. You'll have to help and remind me where I have  
 7 to go for that, please.  
 8 MR. MACDOUGALL:  
 9 Q. I will. If I could take you to the reply  
 10 evidence of August 7th.  
 11 MR. HENDERSON:  
 12 A. Yes.  
 13 MR. MACDOUGALL:  
 14 Q. And if we could go to page 14 of that  
 15 document.  
 16 MR. HENDERSON:  
 17 A. So on page 14, it's just a minor correction  
 18 there. On line 10, there's a reference to a  
 19 cost of \$527,740.00, and then on line 13,  
 20 similarly there's a number very close to the  
 21 same, it's not, but it should be the same, it  
 22 should be \$527,740.00.  
 23 MR. MACDOUGALL:  
 24 Q. So the 240 should be 740 in line 13. Then if  
 25 we could go to page 23 of the same document.

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1 MR. HENDERSON:  
 2 A. In this case, on line 7, the reference to  
 3 \$13,400.00 should be \$14,301.00, and I think  
 4 that ties back to an RFI PUB-NLH 208.  
 5 MR. MACDOUGALL:  
 6 Q. Thank you very much, Mr. Henderson. With  
 7 those two corrections, can you confirm that  
 8 the RFI responses filed by Hydro, the reply  
 9 evidence, and the surrebuttal is true and  
 10 correct to the best of your knowledge and  
 11 belief?  
 12 MR. HENDERSON:  
 13 A. It is.  
 14 MR. MACDOUGALL:  
 15 Q. And do you adopt that as the evidence of Hydro  
 16 in this proceeding?  
 17 MR. HENDERSON:  
 18 A. I do.  
 19 MR. MACDOUGALL:  
 20 Q. Thank you very much. Mr. Chair, Hydro has no  
 21 direct-examination, but there is a brief  
 22 opening statement that was pre-filed. Mr.  
 23 Henderson is just going to read the opening  
 24 statement into the record, and then the panel  
 25 will be available for cross-examination.

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1 (9:15 a.m.)  
 2 MR. HENDERSON:  
 3 A. Thank you. Good morning, Mr. Chair, and  
 4 Board members. Thank you for the opportunity  
 5 to provide this opening statement on behalf of  
 6 Newfoundland and Labrador Hydro. Over the  
 7 past year and a half, Hydro has participated  
 8 in the outage inquiry which followed the  
 9 events of early January, 2014, culminating in  
 10 the prudence hearing we are participating in  
 11 today. The prudence review deals with actions  
 12 and decisions by Hydro, not only related to  
 13 the January, 2014 outages, but also supply  
 14 issues arising in early 2013 and certain prior  
 15 year projects.  
 16 Hydro takes its position as a regulated  
 17 supplier of electricity to the citizens of  
 18 Newfoundland and Labrador very seriously. At  
 19 all times we strive to make decisions that  
 20 provide safe, least cost reliable electricity  
 21 to our customers. Sound, prudent business  
 22 decisions are made every day to achieve the  
 23 balance between cost and reliability. Safety,  
 24 protection of the environment, and a reliable  
 25 supply of electricity to our customers are

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1 tantamount to Hydro. Over the past number of  
 2 years, Hydro has had to deal with an aging  
 3 asset base and is committed to enhance asset  
 4 management practices. Hydro's overall asset  
 5 management approach has been proactive and  
 6 cost effective. Hydro completes hundreds of  
 7 projects in the operation of the provincial  
 8 electricity system with decisions and  
 9 approaches completed in a considered fashion,  
 10 with adjustments made appropriately as our  
 11 plans proceed. As our electrical system ages  
 12 and customers demand grows, like other  
 13 utilities in North America, increased  
 14 investment is required to provide reliable  
 15 service to customers. Hydro's capital  
 16 expenditures have increased significantly over  
 17 the past several years and this additional  
 18 capital spending, along with numerous asset  
 19 condition assessments and reviews, are  
 20 completed with the goal of ensuring continued  
 21 reliable and safe electricity supply for our  
 22 customers.  
 23 Hydro has an experienced and highly  
 24 dedicated workforce of over 800 people with  
 25 diverse skillsets and backgrounds located

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1 across the province, who are committed to  
 2 ensuring a high level of service reliability  
 3 and standards for our customers. The  
 4 experience of our workforce, together with the  
 5 ongoing condition assessments and enhanced  
 6 focus on asset management, has provided Hydro  
 7 with the information necessary to make  
 8 critical judgments on how best to utilize  
 9 Hydro's resources, both internal and external,  
 10 to provide reliable electricity supply to the  
 11 citizens of Newfoundland and Labrador at least  
 12 cost. The management of Hydro takes  
 13 significant pride in the dedication and  
 14 commitment of our entire workforce. It is in  
 15 a large part due to the increased focus on  
 16 asset management and the significant efforts  
 17 of our workforce that Hydro has taken issue  
 18 with certain of the findings of the Liberty  
 19 Consulting Group in the prudence review  
 20 process.

21 With the benefit of hindsight, it's  
 22 always easy to second guess decision. Hydro  
 23 is understandably concerned that Liberty has  
 24 in its view determined that certain of Hydro's  
 25 actions may have been imprudent. Hydro

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1 respectfully disagrees with Liberty in this  
 2 regard for the reasons discussed in detail in  
 3 the record of the outage review and the  
 4 prudence review, including Hydro's reply and  
 5 surrebuttal to Liberty. Hydro considers that  
 6 with the information available at the time of  
 7 the various decisions which Liberty has  
 8 questioned, and keeping in mind a balanced  
 9 approach to cost and reliability, Hydro's  
 10 decisions were reasonable and appropriate.  
 11 Hydro has cooperated with Liberty, Board  
 12 staff, and intervenors in responding to  
 13 hundreds of information requests with respect  
 14 to the matters in issue, and participated in  
 15 numerous interviews and meetings to fully  
 16 explain its action. Hydro believes that the  
 17 record, when fully analyzed, supports the  
 18 reasonableness of its actions. It all times,  
 19 Hydro has provided an essential service, has  
 20 endeavoured to make the best informed and  
 21 reasoned decisions to ensure least cost  
 22 reliable supply of electricity to the citizens  
 23 of our province. That has always been and  
 24 remains our focus.

25 With respect to the Holyrood blackstart

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1 and Unit 1 issues in this proceeding, Hydro  
 2 felt it particularly appropriate to seek  
 3 independent views of its actions following  
 4 receipt of the initial Liberty Prudence  
 5 Report. The independent views of La Capra  
 6 Associates, a well respected energy regulatory  
 7 consulting firm, support Hydro's view that its  
 8 decision making in respect of these issues was  
 9 both properly informed and reasonable. We  
 10 appreciate that Liberty has a differing view,  
 11 however, we simply do not concur that the  
 12 actions of our company in the issues under  
 13 discussion rose to the level of imprudence as  
 14 they suggest. We look forward to discussing  
 15 this in detail over the next number of days.  
 16 It is very important for us to let all  
 17 stakeholders, including our customers, the  
 18 board, and government know that we take our  
 19 responsibility to our customers very  
 20 seriously. We are disappointed in the outages  
 21 that occurred in early 2013 and 2014, and we  
 22 fully understand the impact these events have  
 23 had on our customers. We are ever mindful of  
 24 the need to continue to focus on the  
 25 maintenance of reliable service. We are

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1 always looking to learn from past experiences  
 2 and continuously improve our service delivery.  
 3 We wish to once again confirm our commitment  
 4 to ensuring reliable least cost electricity  
 5 supply to our customers in a safe and  
 6 environmentally friendly manner going forward.  
 7 Thank you, and that concludes our opening  
 8 remarks.

9 MR. MACDOUGALL:  
 10 Q. Mr. Chair, the panel is available for cross-  
 11 examination.  
 12 CROSS-EXAMINATION BY GREENE, Q.C.:  
 13 GREENE, Q.C.:  
 14 Q. Good morning, gentlemen. As you know, the  
 15 Board retained Liberty to review a number of  
 16 Hydro's projects and actions, and Liberty  
 17 filed a report dated July 6th, with its  
 18 conclusions relating to all of the projects  
 19 that the Board had asked them to review. My  
 20 focus with you will be with respect to those  
 21 projects or actions and decisions that Liberty  
 22 found in their opinion Hydro had acted  
 23 imprudently. The first project that I'd like  
 24 to begin with is the project that we refer to  
 25 as the blackstart project, and again this is

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1 one of the projects where in Liberty's opinion  
 2 Hydro had acted imprudently. So to begin, I  
 3 think it would be helpful if we explain what  
 4 blackstart is, and I'm not sure if it's Mr.  
 5 Henderson or Mr. Humphries - I don't think  
 6 it's Mr. Moore.  
 7 MR. MOORE:  
 8 A. No.  
 9 GREENE, Q.C.:  
 10 Q. But if one of the Hydro witnesses could  
 11 explain what do we mean when we talk about  
 12 blackstart?  
 13 MR. HENDERSON:  
 14 A. I'll start and I'm sure the others will jump  
 15 in to fill in any gaps that I may indicate.  
 16 Blackstart generally refers to what I would  
 17 call a generator at a facility that would  
 18 enable it - it may not be just a generator, it  
 19 may be other items within the plant that will  
 20 enable the unit or plant to start without the  
 21 benefit of supply from the rest of the  
 22 electrical grid. So in some of our plants we  
 23 have that ability where basically you don't  
 24 need power coming into the facility to get it  
 25 going, you can start from that facility, so we

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1 would have blackstart facilities throughout  
 2 the system. In the context of, I'll say at  
 3 Holyrood, we had a blackstart gas turbine at  
 4 site to enable the start up of that plant  
 5 without any power, and what we had basically  
 6 looked at was that the - that plant and the  
 7 Holyrood plant was necessary for starting the  
 8 - come back into service to restore power to  
 9 our customers, and so we had procedures in  
 10 place to do that, and what we wanted to do is  
 11 ensure that we have a manner in which we're  
 12 able to get that plant going if we needed to,  
 13 if we had, in particular, a repeat of similar  
 14 issues which we've had historically which was  
 15 the loss of supply to the Avalon Peninsula  
 16 where we've had ice storm issues that have  
 17 caused long outages to the transmission supply  
 18 system. In order to ensure that we can get  
 19 service back to customers, we wanted to - we  
 20 used the blackstart facilities at our various  
 21 generating stations to be able to get the  
 22 system up and running in an isolated area to  
 23 be able to get supply back to customers in  
 24 those isolated pockets in the power system.  
 25 In particular, we've experienced issues in the

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1 past with the Avalon Peninsula where we've had  
 2 ice storm related outages, and so we looked at  
 3 the blackstarting of Holyrood in the context  
 4 of getting the load back to customers from  
 5 that facility to ensure that that could  
 6 happen. So what we were doing is we were - in  
 7 terms of the situation here, we had used the  
 8 Hardwoods plant which has blackstart  
 9 capability to supply into the Holyrood plant  
 10 to start it up if the system became isolated.  
 11 So that's the context in which we were  
 12 speaking to blackstart.  
 13 GREENE, Q.C.:  
 14 Q. So in your response, you indicated that at  
 15 Holyrood, as with other plants in your system,  
 16 it had been part of Hydro's planning that they  
 17 would have a means of being able to start the  
 18 Holyrood plant if it went down and had no  
 19 source of power from the grid, is that  
 20 correct?  
 21 MR. HENDERSON:  
 22 A. That's correct.  
 23 GREENE, Q.C.:  
 24 Q. And Holyrood plant had on site an existing CT  
 25 for that purpose, is that correct?

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1 MR. HENDERSON:  
 2 A. The Holyrood plant had approximately 13  
 3 megawatt gas turbine that could produce  
 4 basically back into the system about 10  
 5 megawatts, and that unit was a 1960s vintage  
 6 gas turbine that was located in Holyrood at  
 7 some point after the plant was built.  
 8 GREENE, Q.C.:  
 9 Q. Around approximately 1966 it was installed, is  
 10 that correct, subject to check?  
 11 MR. HENDERSON:  
 12 A. It was not installed at Holyrood in 1966.  
 13 It's a 1966 unit. It was originally, to my  
 14 knowledge, and I don't have direct experience  
 15 with it, but it was originally out in - I'm  
 16 going to say in Paradise. There used to be a  
 17 steel mill or something out there in Paradise  
 18 and it was out there in that area originally,  
 19 and then at some point it got moved to  
 20 Holyrood. The Holyrood plant went into  
 21 service around 1969/1970.  
 22 GREENE, Q.C.:  
 23 Q. So we know that it was an older unit and it's  
 24 certainly been at the Holyrood plant for quite  
 25 a significant period of time, is that correct?

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1 MR. HENDERSON:  
 2 A. That's correct.  
 3 GREENE, Q.C.:  
 4 Q. Prior to January, 2014, how many times would  
 5 the blackstart unit at Holyrood been required  
 6 to start the plant when the plant was isolated  
 7 from the system?  
 8 MR. HENDERSON:  
 9 A. I'll have to refer to the RFI, but there was  
 10 an RFI that indicated the number of times that  
 11 the plant had been called into action, and it  
 12 was a few.  
 13 GREENE, Q.C.:  
 14 Q. Yes, it's PR-PUB-NLH 003.  
 15 MR. HENDERSON:  
 16 A. Thank you.  
 17 GREENE, Q.C.:  
 18 Q. It was two times, is that correct, Mr.  
 19 Henderson; once in 1994 -  
 20 MR. HENDERSON:  
 21 A. It was in '94, it would have been - at that  
 22 time we had a severe ice storm and at that  
 23 point it was called into action, but I don't  
 24 think it was successful at the time.  
 25 GREENE, Q.C.:

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1 Q. And the other occasion?  
 2 MR. HENDERSON:  
 3 A. The other occasion that blackstart would have  
 4 been required would have been in 2014 in  
 5 January - 2013, I'm sorry.  
 6 GREENE, Q.C.:  
 7 Q. And apart from those two occasions, we also  
 8 saw in January, 2014, three different  
 9 occasions when there was a total loss of  
 10 offsite power to the Holyrood plant, is that  
 11 correct?  
 12 MR. HENDERSON:  
 13 A. Yes, there were other occasions where there  
 14 was total loss of power to the plant, yes.  
 15 GREENE, Q.C.:  
 16 Q. So am I correct in saying then that Hydro's  
 17 plans up until at least, and we'll talk about  
 18 a timeline, 2010, would have been to reply  
 19 upon the existing combustion turbine that was  
 20 at the Holyrood plant to get the plant up and  
 21 running if it did lose power from the grid, is  
 22 that correct?  
 23 (9:30 a.m.)  
 24 MR. HENDERSON:  
 25 A. That unit was relied up until the end of 2011,

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1 and it was in early 2012 that we were - after  
 2 doing a condition assessment and a review of  
 3 the facility in early January, 2012, we were  
 4 told by the consultant who was doing that  
 5 review that the plant in its current state at  
 6 that time should not be run because of the  
 7 number of risks associated with - safety risks  
 8 related to its operation.  
 9 GREENE, Q.C.:  
 10 Q. Yes, and we're going to talk about the  
 11 timeline, but I just wanted to confirm that up  
 12 until at least 2010, Hydro's plans had been if  
 13 Holyrood went down and isolated from the  
 14 system, they did have a means by the onsite CT  
 15 to blackstart - to get the plant up and  
 16 running and connected to the system again on  
 17 its own without power from the grid, is that  
 18 right?  
 19 MR. HENDERSON:  
 20 A. You say 2010, and I go to 2011, there was a  
 21 period of time during that which you  
 22 referenced where there was a stop work order.  
 23 GREENE, Q.C.:  
 24 Q. All right, so we will go the timeline.  
 25 MR. HENDERSON:

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1 A. So there was an interval period of time that  
 2 we could not operate it because of the stop  
 3 work order.  
 4 GREENE, Q.C.:  
 5 Q. So let's agree at least up until 2009 that was  
 6 Hydro's plan to have the existing CT that was  
 7 on the site capable of getting Holyrood up if  
 8 Holyrood got isolated from the grid, is that  
 9 correct?  
 10 MR. HENDERSON:  
 11 A. I'm going to say that it was our plan up to  
 12 the point that it was decided in 2012 that it  
 13 could no longer do that.  
 14 GREENE, Q.C.:  
 15 Q. Okay.  
 16 MR. HENDERSON:  
 17 A. There was a period in time in there where we  
 18 had a stop work order, but that - only for  
 19 that period of time that there was - that it  
 20 couldn't. The other thing, at all times the  
 21 use of Hardwoods was always considered as a  
 22 backup, if you like, to that. If that  
 23 facility was not available or wasn't able to  
 24 start for some reason, then Hardwoods was  
 25 always considered and we formally did

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1 modelling with Hardwoods to do that, which we  
 2 knew we could, but we put the operators  
 3 through training following January 2012 to  
 4 ensure that we had something at that point  
 5 which would be able to start the plant on an  
 6 interim basis going forward.  
 7 GREENE, Q.C.:  
 8 Q. Up until - perhaps if we go to page 51 of  
 9 Liberty's July 6th report. It's page 51. I  
 10 thought here it would be helpful in talking  
 11 about these dates, and you've jumped ahead and  
 12 got into some of the dates, but if we have  
 13 that before us to assist us as we go through  
 14 the chronology with respect to blackstart, so  
 15 we know from your evidence so far that Hydro's  
 16 plans had included a CT at the Holyrood site  
 17 to be able to get the plant connected to the  
 18 grid if it got isolated, and perhaps everyone  
 19 understands, but could you explain why is it  
 20 important to get Holyrood up and running if it  
 21 loses power?  
 22 MR. HENDERSON:  
 23 A. Well, the reason for having that is in order  
 24 to be able to get the system and the plant  
 25 started if there was a failure of the

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1 transmission system coming into this area, so  
 2 that we can get the service restored to  
 3 customers.  
 4 GREENE, Q.C.:  
 5 Q. Holyrood is a pretty big plant, isn't it?  
 6 What is the capacity of the plant?  
 7 MR. HENDERSON:  
 8 A. The Holyrood plant is 490 megawatts.  
 9 GREENE, Q.C.:  
 10 Q. So it is a critical and has been a critical  
 11 part of Hydro's capacity and its ability to  
 12 supply customers for a number of years, is  
 13 that correct?  
 14 MR. HENDERSON:  
 15 A. That's correct, yes.  
 16 GREENE, Q.C.:  
 17 Q. So the first date that I wanted to ask you  
 18 about is shown there, starting in red, which  
 19 was 2010, and we see down below the line that  
 20 in March 2010 there was a stop work order  
 21 issued by the Department of Occupational  
 22 Health and Safety related to some concerns  
 23 with respect to the operation of the unit from  
 24 an occupational health and safety perspective.  
 25 Could you please explain what that was and how

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1 that affected the operation of the unit?  
 2 MR. HENDERSON:  
 3 A. Terry, do you want to -  
 4 MR. LEDREW:  
 5 A. Yes. Well, on that instance we had some lube  
 6 oil leaks in the gear box on the unit and we  
 7 had the presence of some smoking when the unit  
 8 was operating, so we were trying to ascertain  
 9 the nature of the leaks and had a couple of  
 10 vendors in that assisted us trying to diagnose  
 11 that and try to repair them. We were  
 12 unsuccessful, could minimize it, but we could  
 13 not address it completely.  
 14 GREENE, Q.C.:  
 15 Q. So at that time, you were issued a stop work  
 16 order by the Provincial Government, Department  
 17 of Occupational Health, you weren't allowed to  
 18 operate the unit, is that correct?  
 19 MR. LEDREW:  
 20 A. That's correct. The operators had concerns  
 21 that we were unable to repair it, we could  
 22 reduce the volume of the leak, but we couldn't  
 23 fix it without tearing apart the whole unit,  
 24 and they weren't happy with that arrangement.  
 25 GREENE, Q.C.:

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1 Q. Okay, and my understanding, as shown in this  
 2 chart, is that that stop work order remained  
 3 in effect for approximately a year until  
 4 February of 2011, is that correct?  
 5 MR. LEDREW:  
 6 A. Yeah, that's correct.  
 7 GREENE, Q.C.:  
 8 Q. Okay. Now prior to the stop work order being  
 9 issued in 2010, my understanding from a review  
 10 of the information Hydro has filed is that  
 11 there had been some work done on the unit in  
 12 earlier years, 2008/2009, is that correct?  
 13 MR. LEDREW:  
 14 A. That's correct, yes.  
 15 GREENE, Q.C.:  
 16 Q. Okay. So your plan at that time had been to  
 17 keep the CT in situation at the Holyrood plant  
 18 and to be able to operate it for blackstart,  
 19 is that correct?  
 20 MR. LEDREW:  
 21 A. Yes.  
 22 MR. HENDERSON:  
 23 A. That's correct.  
 24 GREENE, Q.C.:  
 25 Q. So I also understand from the record some

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1 additional work was done after the stop work  
 2 order in order to be able to get the unit back  
 3 in service, is that correct?  
 4 MR. LEDREW:  
 5 A. There was efforts to try to address the  
 6 leakage so that we could remove the oil and  
 7 the flammability concerns that were present in  
 8 the gear box. That was very difficult. We  
 9 had some success, but could not eliminate it.  
 10 GREENE, Q.C.:  
 11 Q. We come up to February, 2011, and we see that  
 12 the department were satisfied to the point  
 13 that they lifted the stop work order and said  
 14 that Hydro could operate the unit for  
 15 emergency purposes if required, is that  
 16 correct?  
 17 MR. LEDREW:  
 18 A. Yes, I met with the employees and Department  
 19 of Labour and we discussed the nature of what  
 20 was remaining of the problem, and what we  
 21 would put in place to control it if it got out  
 22 of hand, and the unit was left as emergency  
 23 use only just for blackstart and not for  
 24 peaking purposes.  
 25 GREENE, Q.C.:

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1 Q. So after that point in time when you knew that  
 2 the unit would be available if required for  
 3 emergencies, what action did Hydro undertake  
 4 at that time?  
 5 MR. HENDERSON:  
 6 A. Well, we undertook - we brought in a  
 7 consultant to look at the condition of the  
 8 plant and what would be required to refurbish  
 9 it, and we also undertook for them to look at  
 10 what options there were to replacing that with  
 11 a similar facility at Holyrood.  
 12 MR. LEDREW:  
 13 A. I think just one point of clarity there, and  
 14 Jim was in your seat before, but at the time  
 15 we had some capital items identified as well  
 16 coming out to put incremental investment in  
 17 that unit and had these current operating  
 18 problems, so Jim at the time, and I was in  
 19 agreement, that we would step back, get a  
 20 third party in to have a complete look at the  
 21 unit to make sure if we're going to reinvest  
 22 there, that we're in a good position going  
 23 forward.  
 24 GREENE, Q.C.:  
 25 Q. Thank you, Mr. LeDrew. I was going to ask you

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1 about the capital budget proposal.  
 2 MR. LEDREW:  
 3 A. Okay.  
 4 GREENE, Q.C.:  
 5 Q. And when you mention "Jim", you mean Mr.  
 6 Haynes, who was the former Vice President?  
 7 MR. LEDREW:  
 8 A. Yes, that's correct, Jim was in Rob's role  
 9 then, yes.  
 10 GREENE, Q.C.:  
 11 Q. So prior to retaining the consultant, you did  
 12 come up with a capital budget proposal to do  
 13 additional work and that was included in your  
 14 2011 capital budget plan, was that correct?  
 15 MR. LEDREW:  
 16 A. That is correct, yes.  
 17 GREENE, Q.C.:  
 18 Q. Mr. Henderson has just explained that in  
 19 addition to that, you determined that it was  
 20 necessary to get an external consultant. That  
 21 was AMEC, was it?  
 22 MR. LEDREW:  
 23 A. Yes, we hired AMEC.  
 24 GREENE, Q.C.:  
 25 Q. My understanding from the record in PR PUB-NLH

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1 002, is that AMEC filed its report in December  
 2 of 2011, is that correct?  
 3 MR. LEDREW:  
 4 A. Yes, it was near the end of the year, yeah.  
 5 GREENE, Q.C.:  
 6 Q. And again I don't know if we need to go  
 7 through the actual report for this purpose,  
 8 but the consultant at that time came back with  
 9 three different options, is that correct? One  
 10 was to refurbish the existing unit, another  
 11 was to buy two new 5 megawatt units, and a  
 12 third option was to buy five new 2 megawatt  
 13 units?  
 14 MR. HENDERSON:  
 15 A. There was two variances to that as well.  
 16 There was variances of purchasing, I'll say  
 17 like new, for both the purchase options, so  
 18 there is a variance there. So there was five  
 19 options, if you like, but two were variances  
 20 of one - you know, there was variances on the  
 21 diesel option, there was a variance on the gas  
 22 turbine option.  
 23 GREENE, Q.C.:  
 24 Q. So with that explanation of the variances, you  
 25 would agree that the consultant did come back

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1 with options to either refurbish the existing  
 2 unit that had been in place at Holyrood for a  
 3 number of years, or to get additional units  
 4 and then there was an option as to which type  
 5 of additional new units to get, is that  
 6 correct?  
 7 MR. HENDERSON:  
 8 A. That's correct.  
 9 GREENE, Q.C.:  
 10 Q. Okay. The cost for those options, as listed  
 11 in the report, varied from about 9.5 million  
 12 to 12.7 million. Do you recall if that is  
 13 correct?  
 14 MR. HENDERSON:  
 15 A. Subject to check.  
 16 GREENE, Q.C.:  
 17 Q. And nothing turns on the point, but if you  
 18 want to -  
 19 MR. HENDERSON:  
 20 A. I realize that, but I do have notes I may need  
 21 to refer to.  
 22 GREENE, Q.C.:  
 23 Q. Sure, okay, and also that the in-service date  
 24 as outlined by the consultant at that time  
 25 varied with in-service dates from February to

Page 30

1 May of 2013, do you recall that?  
 2 MR. HENDERSON:  
 3 A. That's correct. I think it would have been in  
 4 2013 before it would get in-service.  
 5 GREENE, Q.C.:  
 6 Q. And in that report, the consultant did not  
 7 even refer to the use of Hardwoods as another  
 8 option, did they?  
 9 MR. HENDERSON:  
 10 A. They were not asked. The consultant was asked  
 11 to look at the condition of the existing  
 12 facility, the cost of existing facility, and  
 13 the options for the plant. So in terms of -  
 14 there was two things, and maybe I can go to  
 15 the AMEC Executive Summary, which is PUB-NLH-  
 16 002 Attachment 1, and on page five of the 371,  
 17 and I will just - if I could take you down to  
 18 on the screen there where it says on the  
 19 fourth paragraph, Part "A", and in Part "A"  
 20 the study is primarily a detailed condition  
 21 assessment and refurbishment study of the  
 22 existing gas turbine plant located at Holyrood  
 23 with recommendations and cost to extend the  
 24 life of the gas turbine plant as a highly  
 25 reliable operation to the year 2020, and then

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1 Part "B" of the study examines the replacement  
 2 of the existing gas turbine plant with a new  
 3 or good used mobile generating plant  
 4 considering either, and it was a gas turbine  
 5 plant, as you mentioned, two 5 megawatt, or a  
 6 diesel generating plant with five 2 megawatt  
 7 diesel units. So that was the scope that they  
 8 looked at. They did not look at - it wasn't a  
 9 system study to look at how you would start up  
 10 the Avalon Peninsula if we had isolation. It  
 11 was specifically related to either  
 12 refurbishing the existing plant and then the  
 13 options to having something at that site. So  
 14 this would have been a piece of information  
 15 that was available to the management of Hydro  
 16 at that time for consideration of what to do  
 17 in the current circumstances.  
 18 GREENE, Q.C.:  
 19 Q. Okay, so your answer is that Hydro directed  
 20 the consultant to look at the options to  
 21 replace the existing unit? That's the way I  
 22 understood your answer.  
 23 MR. HENDERSON:  
 24 A. It's there in the Executive Summary, as I just  
 25 read, that this was what was given to the

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1 consultant.  
 2 GREENE, Q.C.:  
 3 Q. AMEC is a reputable consultant, isn't it?  
 4 MR. HENDERSON:  
 5 A. Yes, they are.  
 6 GREENE, Q.C.:  
 7 Q. If they had determined that you didn't need a  
 8 combustion turbine for the purposes of  
 9 blackstart at Holyrood, do you think that  
 10 would have come up at any point during the  
 11 scope of their review?  
 12 MR. HENDERSON:  
 13 A. They would not have been asked that question.  
 14 The scope was particularly an engineering  
 15 study to look at the assessment for options  
 16 for Hydro management to make a decision. It  
 17 was not do we need blackstart at Holyrood, it  
 18 was not how do we start the Avalon Peninsula  
 19 if we have a loss of transmission. The  
 20 question was we want estimates, cost  
 21 estimates, schedules, for the options here  
 22 that I just read out. So the scope was narrow  
 23 to that. It was not asked for opinion whether  
 24 you need it or not, it was - the scope was  
 25 related to this and the cost of those options.



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1 (9:45 a.m.)  
 2 GREENE, Q.C.:  
 3 Q. So Hydro always gives very defined scope to  
 4 the consultants when they retain them, is that  
 5 how I take it, at least for this particular  
 6 one?  
 7 MR. HENDERSON:  
 8 A. For this particular one, that was the scope.  
 9 So they were looking at the cost of those  
 10 options for us, which would be part of the  
 11 decision making that would have been made by  
 12 management at the time as to which option to  
 13 choose or if there were other options, given  
 14 the circumstances that Hydro was in at the  
 15 time looking at the whole picture of  
 16 generation supply.  
 17 GREENE, Q.C.:  
 18 Q. And at that time then, do I take it from your  
 19 answer that Hydro did not ask for expert  
 20 opinions with respect to the suitability of  
 21 Hardwoods as a backup option instead of having  
 22 an onsite CT?  
 23 MR. HENDERSON:  
 24 A. No, we did not, that wasn't part of the scope.  
 25 GREENE, Q.C.:

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1 Q. Okay. So here we are, if we go back to page  
 2 51 of the Liberty Report, because I'd like to  
 3 keep that in front of us as we talk about the  
 4 dates. Here we see we're in 2012, we see that  
 5 the AMEC Report came in in December of 2011,  
 6 and some time in early 2012, I think it was in  
 7 January, 2012, Hydro made a decision not to  
 8 use the existing CT for any purpose, given the  
 9 deteriorated condition and the work that was  
 10 done by AMEC, is that correct?  
 11 MR. LEDREW:  
 12 A. Yes, that in addition to an understanding that  
 13 there was a known failure, catastrophic  
 14 failure, present in this fleet design of a  
 15 power turbine disc failure and it could not  
 16 address that unknown without complete unit  
 17 disassembly. So that in combination with the  
 18 problems we tried to address brought it to a  
 19 stage that we would no longer operate it for  
 20 any purpose.  
 21 GREENE, Q.C.:  
 22 Q. And that was in January, 2012, was it, Mr.  
 23 LeDrew?  
 24 MR. LEDREW:  
 25 A. That's correct, yes.

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1 GREENE, Q.C.:  
 2 Q. So I want to take some time and go through  
 3 what happened next after the January decision  
 4 that you couldn't use this unit for any  
 5 purpose, even for emergency purposes, and the  
 6 decision that you were not going to pursue a  
 7 replacement of the unit, and here again could  
 8 we just talk about what happened after January  
 9 and to the point when somebody made a decision  
 10 that you were not going to replace the unit,  
 11 but that you were going to rely upon the  
 12 combustion turbine located at Hardwoods. Can  
 13 you tell me what happened at Hydro and how the  
 14 decision process unfolded from January 2012 to  
 15 when that decision was made to use Hardwoods?  
 16 MR. HENDERSON:  
 17 A. I'll try to explain it as best - I wasn't  
 18 directly involved, but I'll explain it as best  
 19 I can, and Terry, you can jump in if there is  
 20 anything there that I miss. At the time, we  
 21 were faced with, in essence, a period of time  
 22 until some time in March or May in 2013  
 23 without an option there for that facility, and  
 24 so immediately there was a requirement to  
 25 identify an action, and the plan was to

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1 implement what would have been an  
 2 understanding that Hardwoods would be used in  
 3 this manner if necessary, to add additional  
 4 training for the operators, and a simulation  
 5 in our training simulator for our operators to  
 6 be able to use the Hardwoods unit to be able  
 7 to bring power into the Holyrood plant in the  
 8 event that we had a sustained transmission  
 9 outage to the area, to the region, and so that  
 10 was done, that was developed. At the same  
 11 time as this was happening, it was known that  
 12 we were going to be requiring a combustion  
 13 turbine for demand growth in the province, and  
 14 that was identified requirement for 2015. So  
 15 we also at that time were looking at the  
 16 location, the site of that combustion turbine,  
 17 so we had done a risk assessment on different  
 18 locations with respect to how successful the  
 19 project would be and the options and benefits  
 20 different sites would have, and that workshop  
 21 was completed, I think, about mid year 2012  
 22 and at that time it was decided that the ideal  
 23 or preferred location would be to put the new  
 24 generation source at Holyrood, and it would  
 25 bring the benefit of reestablishing a local

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1 blackstart capability at the Holyrood plant.  
 2 So it was another option to establishing local  
 3 blackstart at Holyrood. The decision - what  
 4 would have evolved there from that was the  
 5 decision was made that given that that machine  
 6 would be in place in 2015 and would be located  
 7 at Holyrood with the capability of blackstart,  
 8 that on an interim basis we would continue to  
 9 use the Hardwoods gas turbine for supplying  
 10 that starting capability for the region, you  
 11 know, using it until the new combustion  
 12 turbine was in place.  
 13 MR. LEDREW:  
 14 A. Yes, and, I guess, the procedures then for  
 15 starting Hardwoods to bring power into the  
 16 Holyrood terminal station and into the  
 17 Holyrood plant, those had to change, the  
 18 procedures had to change at the Holyrood  
 19 station for internal switching and the  
 20 procedures had to change in the energy control  
 21 group for routing that energy into the  
 22 station. So those things were done as well in  
 23 that window.  
 24 GREENE, Q.C.:  
 25 Q. So I understood from your answer that

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1 Hardwoods - Hydro at that time determined that  
 2 this was an interim arrangement, probably not  
 3 the best solution, would you agree with that?  
 4 Ideally, you would like to blackstart at  
 5 Holyrood which is why you had a new CT?  
 6 MR. HENDERSON:  
 7 A. Ideally, and that's why we were putting the  
 8 CT. This was an interim solution to get to  
 9 where ultimately we wanted to be, where we had  
 10 been historically, and so looking at the  
 11 balance of - what we were doing, I'll say, in  
 12 looking at the balance of cost and  
 13 reliability, that would have been all part of  
 14 the consideration to have an interim solution  
 15 to get to the new combustion turbine would  
 16 provide the least cost, recognizing that there  
 17 was a compromise by not having something on  
 18 site, which would have been not there for the  
 19 winter of 2012/2013, it would have been there  
 20 for the - I think the schedule, and I can  
 21 bring that up, but the schedule, I think, was  
 22 late to February/March type time frame, or a  
 23 May time frame, depending on which of the  
 24 options for a new or close to new facility  
 25 that you used.

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1 MR. LEDREW:  
 2 A. I think, Rob, I'm listening now, but any of  
 3 the options that were available to put on site  
 4 blackstart back at Holyrood, none of those  
 5 could get executed inside the next coming  
 6 winter season, so the reality was we got one  
 7 winter here now depending on Hardwoods, and  
 8 we're three years away from a larger gas  
 9 turbine going to be built at Hardwoods, so -  
 10 MR. HENDERSON:  
 11 A. At Holyrood.  
 12 MR. LEDREW:  
 13 A. At Holyrood, pardon me, so that was the  
 14 interim time line, I guess, all that red band,  
 15 solid red band you have in the middle there.  
 16 MR. HENDERSON:  
 17 A. Right.  
 18 GREENE, Q.C.:  
 19 Q. I want to go back for a moment back to prior  
 20 to 2010, the stop work order. Mr. LeDrew, as  
 21 plant manager, could you describe the  
 22 condition of the unit as you viewed it at that  
 23 time prior to the issuance of the stop work  
 24 order?  
 25 MR. LEDREW:

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1 A. Yes. That unit, I think it's a 66 vintage, so  
 2 it's the oldest gas turbine in our fleet, and  
 3 we would start that on a bi-weekly basis for  
 4 risk and insurance purposes, and then  
 5 troubleshoot any fail starts or any issues  
 6 that surfaced. As well, there was an ongoing  
 7 capital reinvestment based on condition  
 8 assessments that we had at the time, so we  
 9 were satisfied it was a unit available for  
 10 blackstart purposes and peaking, and the  
 11 business used it for peaking on occasion when  
 12 we had high demands.  
 13 GREENE, Q.C.:  
 14 Q. You had no concerns about the unit prior to  
 15 the stop work order being issued?  
 16 MR. LEDREW:  
 17 A. No, I wouldn't say that. There are always  
 18 nagging issues with it. It is in a salt  
 19 environment on the ocean and that tends to be  
 20 aggressive as the years move along, so we did  
 21 have some reports of some fouling on inlet  
 22 veins and so forth.  
 23 GREENE, Q.C.:  
 24 Q. Were you surprised with the AMEC 2011 report  
 25 that outlined the deteriorated condition of

Page 41

1 that CT?

2 MR. LEDREW:

3 A. The biggest stand-alone surprise was the

4 imminent catastrophic failure of the power

5 turbine disc that was common in the fleet that

6 we were not aware of, and the other assessment

7 items that were picked up, inlet veins and

8 that and fuel, we had done work in those

9 areas, but from their perspective it was not

10 in a state that they would have liked to have

11 seen it. That was the message we got back

12 from AMEC, yes.

13 GREENE, Q.C.:

14 Q. Okay, in hindsight, and this is not part of

15 the prudence review with respect to the

16 finding of prudence, in hindsight, would you

17 have done more capital work on that CT prior

18 to the stop work order in 2010?

19 MR. LEDREW:

20 A. I've struggled from the beginning with this

21 hindsight question, but I guess the holistic

22 condition assessment that we did do with AMEC,

23 that brought up some issues we weren't aware

24 of, redundancies and obsolete equipment, so

25 there was some new significant learnings that

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1 happened in that process.

2 GREENE, Q.C.:

3 Q. Because the condition of the unit as found by

4 AMEC was found to be very deteriorated, wasn't

5 it?

6 MR. LEDREW:

7 A. I guess, the comments that they identified,

8 they picked up some other issues that we had

9 had other vendors in over the years, we had

10 had Avon in, Green Ray, and other service

11 providers that are in the gas turbine fleet

12 that hadn't identified these concerns that

13 AMEC did.

14 GREENE, Q.C.:

15 Q. So let's come back up to 2012. You just had a

16 report from AMEC, and based on that report,

17 you decided that you couldn't run the CT, it

18 was too bad a shape to run, and Mr. Henderson

19 has explained a little bit about the decision

20 making process, could you tell us who was

21 involved, Mr. Henderson, or Mr. LeDrew, I

22 understand, Mr. Henderson, you weren't in your

23 current position at that time - Mr. LeDrew,

24 who did you talk to with respect to the AMEC

25 Report and the decision that the unit couldn't

Page 43

1 be operated?

2 MR. LEDREW:

3 A. When the final report was issued, we scheduled

4 a meeting in early January, and I brought in

5 the Safety Committee at the plant as well as

6 Mr. Haynes was there at the time, and the

7 consultants were there to explain in detail

8 their findings and their recommendations, and

9 the employees heard the same message as the

10 same time.

11 GREENE, Q.C.:

12 Q. Okay.

13 MR. LEDREW:

14 A. Rob wasn't there, but certainly would have -

15 there was a follow up conversation with Rob

16 the next day, I guess.

17 GREENE, Q.C.:

18 Q. Who was involved in the discussions with

19 respect to how Hydro would deal with this

20 situation of not being able to run the CT it

21 had relied upon up until 2011?

22 MR. LEDREW:

23 A. Well, subsequent to that, there was some

24 conversations and conference calls happened,

25 and I know Rob probably can speak to that

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1 better than me, but things happened

2 immediately thereafter.

3 MR. HENDERSON:

4 A. What I can recall was that my concern was that

5 we have something in place to be able to start

6 the Holyrood plant, and so what I had - I had

7 some conversations with Mr. Haynes at the time

8 and said to him that we needed to make sure

9 that we get the Hardwoods option well

10 established, and had, therefore, given - I had

11 given instructions to the energy control

12 centre people to make sure that that got well

13 reviewed and documented, so that we had a good

14 plan to be able to use it if need be and got

15 the proper studies done with respect to that.

16 There were discussions at the time regarding -

17 I should say, regarding the fact that we

18 wouldn't have local benefits, but we would

19 have Hardwoods and making sure that Hardwoods

20 was able to provide that as solidly as we

21 could. So the focus was on that, and also

22 recognizing that there was discussion around

23 the fact that if we had - it would be a rare

24 event to lose all the transmission into the

25 area and - into the Holyrood plant, and if we

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1 had that kind of, I'll say, a sustained  
 2 transmission outage to the Holyrood plant, we  
 3 were going to be a long time getting the  
 4 Holyrood plant back, in any event. We did not  
 5 discuss a short term transmission outage which  
 6 would have been similar to what we experienced  
 7 in January, 2013, and certainly we would know  
 8 that that would have that kind of impact, but  
 9 it was more around having sustained  
 10 transmission, you know, where you have - the  
 11 concern was avoiding a long outage to the  
 12 Avalon Peninsula due to transmission line  
 13 failures that were going to take some days to  
 14 repair, and so if that was the case going into  
 15 Holyrood, the benefit of the local start was  
 16 not going to be that great in that  
 17 circumstance, but there would be benefit there  
 18 to have the plant ready when the transmission  
 19 lines were repaired, but we were concerned  
 20 that make sure that if we had something like  
 21 we've experienced in the past, which is the  
 22 transmission failures in and around the  
 23 Isthmus of the Avalon, that we had a good  
 24 solid plan to be able to get that plant up.  
 25 So that was the area of discussion that I had

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1 with Mr. Haynes. What transpired then in  
 2 terms of making the final decision, that was  
 3 with Mr. Haynes at the time.  
 4 (10:00 a.m.)  
 5 GREENE, Q.C.:  
 6 Q. You mentioned that there was analysis done.  
 7 Was there any formal analysis done with  
 8 respect to the risks associated with the lack  
 9 of blackstart at the plant and the use of  
 10 Hardwoods, and the various options that could  
 11 be used?  
 12 MR. HENDERSON:  
 13 A. The analysis was we have to use Hardwoods, so  
 14 we have to make sure that that is, I'll say,  
 15 well known by the operators so that they know  
 16 how to execute that quickly and execute it  
 17 well, so there was simulations done in the  
 18 control centre, and as Terry mentioned, there  
 19 was as well work done at the Holyrood plant  
 20 for their operators as well to be able to  
 21 execute that type of restoration to the plant.  
 22 GREENE, Q.C.:  
 23 Q. I understood from the record, and just from  
 24 your answer as well, there was no formal  
 25 documentation of the risk assessment that was

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1 involved, was there?  
 2 MR. HENDERSON:  
 3 A. There was nothing that I could find when I  
 4 looked back that there was a specific risk  
 5 assessment for the variance between Hardwoods  
 6 and Holyrood, but there was a -- I can say  
 7 that it was obvious that what would happen  
 8 here is the -- we had no option until the  
 9 spring of 2013. We had to -- the primary  
 10 focus is to make sure that the Hardwoods  
 11 option was going to work for that interim  
 12 period. Then as I said, the risk assessment  
 13 then was done with regard to the location of  
 14 the new CT and that was done in 2012. That  
 15 was a thorough risk assessment workshop that  
 16 was carried out and that resulted in the  
 17 decision of the new CT being placed at  
 18 Holyrood in 2015.  
 19 GREENE, Q.C.:  
 20 Q. So if we come back to the chart, to January  
 21 2012 when you were looking at the fact you had  
 22 no CT in place at that time that you could use  
 23 at Holyrood, I guess Hardwoods was your last  
 24 option for that winter? Is that how you  
 25 settled upon Hardwoods, your only option for

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1 the winter, in your perspective, for the  
 2 winter of 2012?  
 3 MR. HENDERSON:  
 4 A. The winter of 2012, in winter when that  
 5 decision was made, there was no option then  
 6 but Hardwoods.  
 7 GREENE, Q.C.:  
 8 Q. So let's talk a little bit about Hardwoods.  
 9 For the people who may not know, where is  
 10 Hardwoods and what is it?  
 11 MR. HENDERSON:  
 12 A. Hardwoods is a 50 megawatt two-engine gas  
 13 turbine plant. So there's two engines running  
 14 one generator which you can run the plant with  
 15 one engine at a time so you can run it at 50  
 16 percent. And the Hardwoods gas turbine is  
 17 what we call an aeroderivative gas turbine  
 18 that was placed in service in the mid-1970s  
 19 and it's located in Mount Pearl or very close  
 20 to the Donovans Industrial Park. For those  
 21 who are familiar with this area, it's across  
 22 the road really from Donovans Industrial Park,  
 23 I guess it's in Paradise and close to the  
 24 Trans Canada Highway.  
 25 GREENE, Q.C.:

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1 Q. So it's a fair distance from the Holyrood  
 2 plant? It's about 20 kilometres or so or  
 3 more?  
 4 MR. HENDERSON:  
 5 A. Well, yeah, I guess it could be more, but it's  
 6 -- coming out of the Hardwoods station,  
 7 there's transmission lines that come out of  
 8 that plant that connect into the Holyrood  
 9 plant. There's a direct line, TL 242, which  
 10 goes directly from the Hardwoods station into  
 11 Holyrood. There's -- in addition, there's a  
 12 transmission line TL 201 that goes to western  
 13 Avalon, which then has a line directly into  
 14 Holyrood, which is TL 217. It has another  
 15 line that goes from Hardwoods, which is TL  
 16 236, that goes into the Oxen Pond Station and  
 17 the Oxen Pond Station is connected via TL 218  
 18 back to the Holyrood station. In addition,  
 19 there are -- and we had discussed this with  
 20 Newfoundland Power. There's the underline 69  
 21 or 66 kV system that Newfoundland Power has  
 22 that goes from the Hardwoods station in  
 23 through Conception Bay South down through Seal  
 24 Cove and into the Holyrood plant as well. So  
 25 those four routes that were available to

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1 connect the Hardwoods station back into  
 2 Holyrood.  
 3 GREENE, Q.C.:  
 4 Q. And if the lines are not available, there's no  
 5 way of getting power to Holyrood from  
 6 Hardwoods, is there?  
 7 MR. HENDERSON:  
 8 A. If all of those lines are not available, then  
 9 there would be no way for power to get from  
 10 Hardwoods to Holyrood.  
 11 GREENE, Q.C.:  
 12 Q. And that is what happened in January of 2013,  
 13 isn't that correct?  
 14 MR. HENDERSON:  
 15 A. So in January 2013, which was during the  
 16 period where we were going to not have  
 17 anything, from the AMEC study, the options  
 18 that we had, from -- at that particular time,  
 19 we had a very severe blizzard that was  
 20 particularly, I'll say, bad in the Holyrood --  
 21 in that part of Conception Bay South or  
 22 Holyrood area and it blocked the roads. It  
 23 caused very high winds and salt spray and wet,  
 24 sloppy snow to come into the station and cause  
 25 a number of flash overs inside the station

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1 which made the lockouts, which are protective  
 2 devices that are there to protect equipment,  
 3 had operated and that you cannot remotely  
 4 reset those lockouts to enable the  
 5 transmission lines to go back in service. You  
 6 have to get staff in there to inspect the  
 7 equipment before you put it back in service  
 8 and reset those lockouts. That day, because  
 9 of the severe weather, we were not able to get  
 10 people in until -- it was in the afternoon -  
 11 MR. LEDREW:  
 12 A. Afternoon, early afternoon.  
 13 MR. HENDERSON:  
 14 A. - of that day when we had the initial  
 15 transmission line equipment outages -- the  
 16 most significant part of that occurred around  
 17 six in the morning is my recollection.  
 18 GREENE, Q.C.:  
 19 Q. And we will come back to the unit one outage  
 20 later. But again, in January 2014, we had  
 21 three occasions where all lines were lost into  
 22 the Holyrood plant in the January 5th to the  
 23 8th period, off-site power, no power into  
 24 Holyrood, transmission down. And in 1994, we  
 25 had it as well. Is that correct?

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1 MR. HENDERSON:  
 2 A. In 1994, the issue was around the isthmus and  
 3 the transmission lines coming into the Avalon.  
 4 In 2013, it was related specifically to the  
 5 Holyrood terminal station more than it was  
 6 even the transmission lines coming into the  
 7 station. It was the -- right in the station,  
 8 we had issues, in the terminal station,  
 9 although that day we did have other problems  
 10 on one of our transmission lines coming into  
 11 the Avalon, later in the day.  
 12 The other instance that you refer to, in  
 13 January 2014, they were short term nature, not  
 14 sustained and they had no -- we did lose the  
 15 power into the station, which you said, but  
 16 I'll say that they were of the nature that the  
 17 transmission system could be restored promptly  
 18 and that there would have been no benefit to  
 19 black start at that particular time because  
 20 the timing to get the transmission back in  
 21 would provide you the start-up power for the  
 22 plant quicker than the local black start. By  
 23 the time operators get dispatched to go out to  
 24 the black start facility, get it up and  
 25 running and that sort of thing, the

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1 transmission system would have been back  
 2 because of the nature of those particular  
 3 problems on that day.  
 4 GREENE, Q.C.:  
 5 Q. And you talked about the individual  
 6 circumstances. I was using the incidents to  
 7 show that the loss of off-site power to the  
 8 Holyrood plant has happened on a number of  
 9 occasions. Depending on what the incident is,  
 10 you get into the black start.  
 11 MR. HENDERSON:  
 12 A. And I think that's very important in the  
 13 context of talking about black start is that  
 14 the -- having local black start benefit is  
 15 around the sustained loss of a transmission.  
 16 It's not just loss of transmission. The  
 17 transmission can go down but then you bring  
 18 the transmission -- the operators in the  
 19 control centre can totally operate that to  
 20 bring the power back into the plant to be able  
 21 to restart the units.  
 22 GREENE, Q.C.:  
 23 Q. Another benefit for the local black start is  
 24 the ability to keep the units warm so they'll  
 25 be ready to be up and running when the

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1 transmission system is restored. Is that  
 2 correct?  
 3 MR. HENDERSON:  
 4 A. You get that benefit as well, yes.  
 5 GREENE, Q.C.:  
 6 Q. Yes. And we saw in January 2013, that  
 7 provided about an 11-hour benefit? Is that  
 8 correct?  
 9 MR. HENDERSON:  
 10 A. That was the estimate that we -  
 11 GREENE, Q.C.:  
 12 Q. For that incident.  
 13 MR. HENDERSON:  
 14 A. - we put in -- you know, I'll say after that  
 15 event, we went back and said well, what kind  
 16 of impact would have it had and Terry can  
 17 speak to that because he was the one that  
 18 provided me the number, that 11 hours is what  
 19 we estimate we could have improved the  
 20 restoration.  
 21 MR. LEDREW:  
 22 A. Yeah, and we analyzed the nature of the period  
 23 of time we were out and there's a number of  
 24 pieces of equipment in the plant that you need  
 25 to start to keep the plant in a warm state and

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1 on that incident, the duration that extended,  
 2 we had analyzed that we would have taken 11  
 3 hours off that period of time on that incident  
 4 in particular if we had available generation.  
 5 GREENE, Q.C.:  
 6 Q. And Hardwoods cannot provide that benefit to  
 7 the Holyrood plant?  
 8 MR. LEDREW:  
 9 A. If the transmission lines were up, yes, it  
 10 would have provided the benefit, but the lines  
 11 weren't there for it.  
 12 MR. HENDERSON:  
 13 A. And I just will add that that was a very  
 14 unusual event in our experience of having the  
 15 entire Holyrood station down for a period of  
 16 time that that had happened that day. Having  
 17 the supply to the plant interrupted and not  
 18 being able to get the transmission back  
 19 quickly was very unusual and so that was a --  
 20 no doubt that the 11-hour benefit was there  
 21 for that day, but that was a very unusual  
 22 circumstance.  
 23 GREENE, Q.C.:  
 24 Q. Liberty also questioned in their report why  
 25 Hardwoods was considered to be a viable option

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1 given the historic performance of the  
 2 Hardwoods unit and at page 54 of the Liberty  
 3 report, they talk about that the Hardwoods  
 4 performance in 2008 to '12 had a UFOP or non-  
 5 availability of 26 percent. So I'd like you  
 6 to comment about the viability of Hardwoods  
 7 being an option when you knew that the units  
 8 historically wasn't available 26 percent of  
 9 the time when you needed it.  
 10 MR. HENDERSON:  
 11 A. You're looking backwards in terms of looking  
 12 back to 2008 to '12. At that time, the  
 13 Hardwoods plant was -- first of all, I think  
 14 it's clear that the option for that winter of  
 15 2011-12, Hardwoods was the only option and it  
 16 was the only option for the winter of '12-13  
 17 because of the timing that it would take to do  
 18 -- to implement the other options. So, first  
 19 of all, the decision, as we discussed a few  
 20 minutes ago, was to do that because there was  
 21 no other option at that time. I'll say no  
 22 other option that was in place at that time.  
 23 So then when you look at the fact that  
 24 Hardwoods was undergoing a multi-year  
 25 refurbishment program in which we were

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1 investing considerable -- and we had put  
 2 forward proposals in our capital program which  
 3 were implemented at Hardwoods, that we were  
 4 undergoing a life extension investment in that  
 5 facility to improve its performance and we  
 6 were in the middle of that at that time. I  
 7 think the work on Hardwoods essentially was  
 8 completed in 2013 with respect to its multi-  
 9 year refurbishment program, although there  
 10 will be continuing review of that, but I  
 11 believe that was the three-year period for  
 12 Hardwoods. So, it was undergoing that at the  
 13 time, as well, so that's another consideration  
 14 in the decision making that would have been  
 15 known at the time, that that plant was going  
 16 through that refurbishment.

17 So again, we're looking at an interim  
 18 solution using the Hardwoods plant until the  
 19 new CT was in place in 2015. The Hardwoods  
 20 plant was going through a refurbishment  
 21 program to improve its reliability at that  
 22 time.

23 (10:15 a.m.)  
 24 GREENE, Q.C.:  
 25 Q. Okay. So, you've emphasized a number of times

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1 now that Hardwoods was interim. I just wanted  
 2 to summarize from my lay perspective how I  
 3 looked at that option. You just confirmed  
 4 that Hardwoods couldn't supply the plant if  
 5 all the transmission lines were down and we  
 6 know that that has happened before. We know  
 7 that with the lines down, you wouldn't be able  
 8 to keep the units warm and we know that  
 9 Hardwoods didn't work at least a quarter of  
 10 the time. So it wasn't a great interim option  
 11 for Hydro, was it? That's when I look at the  
 12 evidence facing Hydro at the time, and only at  
 13 that time.

14 MR. HENDERSON:  
 15 A. I totally disagree, with all respect. I just  
 16 explained that it was an interim option. I  
 17 also explained that it was very rare for us to  
 18 have a sustained long outage to the Holyrood  
 19 plant. I agree that there have been outages  
 20 to the transmission line into the plant. We  
 21 had one incident during this recent time in  
 22 which the black start would have been a  
 23 benefit. That was in January 2013. In  
 24 January 2013, the options that AMEC had put  
 25 forward were not going to be implemented at

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1 that time in any event, but that wasn't -- we  
 2 didn't know we were going to have an event.  
 3 So that's not really, I'll say, part of  
 4 decision making. The decision making was that  
 5 we had a period where we weren't going to have  
 6 an option there. Hardwoods was the backup  
 7 option in any event. We did considerable  
 8 amount of work to make sure that Hardwoods was  
 9 -- we had all of the practices in place for  
 10 the operators to be able to use Hardwoods.  
 11 The Hardwoods plant was under a refurbishment  
 12 program that would improve its reliability  
 13 through that time.

14 So all of those things are considerations  
 15 and also considering that we had a new  
 16 combustion turbine going to be located at  
 17 Holyrood which, you know, it would end up  
 18 being a cost to customers that would be in  
 19 place in 2015. So, looking at the options,  
 20 least cost supply, all of those considerations  
 21 were undertaken at that time and I think you  
 22 have to look at all the balance of those items  
 23 in looking at this and to say that Hardwoods  
 24 was not a good option, it was under  
 25 refurbishment. It was the only option that

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1 was going to be available for that first 12-  
 2 month period or 14-month period after that  
 3 event. And we were in the middle of  
 4 refurbishment, so we continued with that and  
 5 then we had an interim.

6 Basically, the Hardwoods was bridging us  
 7 from, in essence, from when the -- I'll say  
 8 what we had been presented by AMEC which would  
 9 have come in play in the spring of 2013. We  
 10 had from there to 2015 when the new CT was  
 11 coming in. Hardwoods was bridging that period  
 12 of time and Hardwoods was going through a  
 13 refurbishment program to improve its  
 14 reliability, improve its performance, and that  
 15 was all part of the known things that would  
 16 have been there for the people who were making  
 17 the decisions at that time.

18 GREENE, Q.C.:  
 19 Q. And we'll talk about some of the information  
 20 about Hardwoods and its availability and about  
 21 the CT. I certainly agree with you, it was  
 22 the only option Hydro had in the winter of  
 23 2012, given its decisions up to that point.  
 24 So let's talk about you mentioned it was an  
 25 interim solution because you were looking at a

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1 new CT required for generation capacity. So  
 2 now we might get back to Mr. Humphries in some  
 3 of the discussions we were having last week.  
 4 MR. LEDREW:  
 5 A. I know where that's going.  
 6 MR. HUMPHRIES:  
 7 A. Sure.  
 8 GREENE, Q.C.:  
 9 Q. So that was a factor in your decision making,  
 10 was it, Mr. Henderson, the fact that you were  
 11 looking at a new CT for new capacity was a  
 12 consideration in this decision around the  
 13 black start for Holyrood. Is that correct?  
 14 MR. HENDERSON:  
 15 A. That's correct. As I said, there was an  
 16 assessment done and a workshop done which  
 17 identified that the best location for the new  
 18 combustion turbine would be Holyrood.  
 19 GREENE, Q.C.:  
 20 Q. And I think I already asked you but I just  
 21 wanted to confirm. At the time of this  
 22 analysis, consideration of all of the various  
 23 factors, there was no written documentation of  
 24 any analysis or consideration of the risks and  
 25 costs completed by Hydro, was there, written

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1 for the black start?  
 2 MR. HENDERSON:  
 3 A. For the?  
 4 GREENE, Q.C.:  
 5 Q. Black start option for Holyrood.  
 6 MR. HENDERSON:  
 7 A. There was the workshop analysis that was done  
 8 to determine the location.  
 9 GREENE, Q.C.:  
 10 Q. For the new CT -  
 11 MR. HENDERSON:  
 12 A. Yes.  
 13 GREENE, Q.C.:  
 14 Q. - required for new generation capacity.  
 15 MR. HENDERSON:  
 16 A. And to provide black start at Holyrood.  
 17 GREENE, Q.C.:  
 18 Q. Right, that was.  
 19 MR. HENDERSON:  
 20 A. Yes.  
 21 GREENE, Q.C.:  
 22 Q. But in terms of what Hydro would do, we asked  
 23 for any analysis or any internal communication  
 24 that Hydro had done relating to what it could  
 25 do, given it had no black start at the

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1 Holyrood plant. Nothing was provided. Is  
 2 that correct?  
 3 MR. HENDERSON:  
 4 A. What we provided was the explanation which  
 5 I've basically re-explained this morning,  
 6 which was: we had the AMEC information. We  
 7 knew we had a new CT coming into play. We  
 8 knew Hardwoods was going to be used as the  
 9 interim solution for a period of time in any  
 10 event. So, the decision at the time would  
 11 have been continue to use Hardwoods to bridge  
 12 us from spring of 2013 to basically the fall  
 13 of 2015, which was the original plan for the  
 14 in service of the CT. So it would have been  
 15 the winter of '13-14 and the winter of '14-15  
 16 which Hardwoods would have been bridging us  
 17 through to get to the new CT.  
 18 GREENE, Q.C.:  
 19 Q. I understood that. My question was with  
 20 respect to documentation or analysis that  
 21 Hydro had done to reflect the considerations  
 22 it took into account when it came to how it  
 23 decided on its course of action.  
 24 MR. HENDERSON:  
 25 A. And I think I already answered that. There

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1 was no document with that analysis.  
 2 GREENE, Q.C.:  
 3 Q. Okay, thank you. So now if we come to the  
 4 need for new generation capacity, and Mr.  
 5 Humphries, rather than -- we did talk about  
 6 this last week. I think it was last week. It  
 7 seemed a long time ago.  
 8 MR. HUMPHRIES:  
 9 A. It was last week.  
 10 GREENE, Q.C.:  
 11 Q. At that time, again I don't think we need to  
 12 go to the transcript, but we certainly can if  
 13 -- as this develops.  
 14 MR. HUMPHRIES:  
 15 A. Yeah, that's fine.  
 16 GREENE, Q.C.:  
 17 Q. My recollection of where we were is that Hydro  
 18 had looked at the issue of adding new capacity  
 19 and when it would be required. There was a  
 20 2010 generation planning report that saw a  
 21 need for an additional capacity for 2014. Do  
 22 you recall that?  
 23 MR. HUMPHRIES:  
 24 A. Yes, I think that's correct.  
 25 GREENE, Q.C.:



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1 Q. And I understand Newfoundland Power has filed  
 2 the 2008 generation planning report for cross-  
 3 examination purposes and even back then, they  
 4 were talking about a need for generation  
 5 capacity as early as 2013, but I'll leave it  
 6 to them to take you to that one.  
 7 And then we see in the 2012 report, again  
 8 there was -- Hydro determined using its  
 9 existing planning criteria, at that time,  
 10 using that methodology, you identified a need  
 11 for new capacity in 2014 to avoid exceeding  
 12 your LOLH criteria. Is that correct?  
 13 MR. HUMPHRIES:  
 14 A. That's correct.  
 15 GREENE, Q.C.:  
 16 Q. And at that time, at the time of November 2012  
 17 generation planning report that we looked at  
 18 last week, Hydro had agreed to take the risk  
 19 of exceeding the LOLH in the winter of 2014  
 20 and to have the CT in place in 2015?  
 21 MR. HUMPHRIES:  
 22 A. That's correct.  
 23 GREENE, Q.C.:  
 24 Q. Okay. Also, we saw from that report, which  
 25 was filed in a number of spots and the one

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1 that I took you to was IC-NLH-016, your  
 2 response to that. At that time, Hydro was  
 3 indicating that it would take three years to  
 4 put that CT in place. Is that correct?  
 5 MR. HUMPHRIES:  
 6 A. That's correct.  
 7 GREENE, Q.C.:  
 8 Q. Okay. So now we just saw, through the  
 9 discussion primarily with Mr. Henderson and  
 10 Mr. LeDrew, Hydro also had found another  
 11 requirement for the new CT, not only for  
 12 generation capacity for the whole system, but  
 13 for having a black start capability at the  
 14 Holyrood plant. That also came to light in  
 15 2012. Is that correct?  
 16 MR. HUMPHRIES:  
 17 A. Yes, I think that given that there was a -- we  
 18 knew there was an eminent generation  
 19 requirement and the fact that there was a  
 20 requirement for a black start solution at  
 21 Holyrood. There was -- to use a word I guess  
 22 that was spoken last week, there were  
 23 synergies to considering an application to put  
 24 the unit at the Holyrood site.  
 25 GREENE, Q.C.:

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1 Q. So in looking at the information that Hydro  
 2 had available at the time in the winter of  
 3 2012, you knew that you had no black start  
 4 capability at the Holyrood plant. You knew  
 5 that you needed additional capacity for 2014  
 6 and you knew that it was going to take you  
 7 three years to put a new CT in place which  
 8 could solve your black start problem and give  
 9 you additional capacity. And I guess again,  
 10 looking at it from the outside, which looking  
 11 at those facts, I find it really hard to  
 12 understand why Hydro did not act more quickly  
 13 to make a decision to put in a new CT and I  
 14 wanted to ask you about that to give you the  
 15 opportunity to put forth Hydro's perspective.  
 16 MR. HUMPHRIES:  
 17 A. Well, I think, as I indicated on the stand  
 18 last week, through the 2012-2013 period, we  
 19 were looking at alternatives to get additional  
 20 generating capacity on the system. Up 'til I  
 21 would say the end of 2012 when the generation  
 22 issues report we spoke of was completed, we  
 23 were concentrated on new technologies. As we  
 24 moved into early 2013 and some of the events  
 25 that transpired in January 2013, we turned our

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1 focus to what other alternatives might be out  
 2 there in the market to get capacity on this  
 3 system in a more timely fashion, and that's  
 4 when we turned to grey market opportunities  
 5 and we ended up with the combustion turbine  
 6 that we do have today. That's how we got  
 7 there. But there's no question that up 'til  
 8 the end of 2012, we were considering new  
 9 solutions and the timelines that we were  
 10 looking at at that time were an in-service  
 11 sometime in the last second half of 2015.  
 12 GREENE, Q.C.:  
 13 Q. So in terms of looking at your need for 2014  
 14 and 2011 and 2012, the planning had been for a  
 15 CT that you would buy, not an existing one,  
 16 and it would take about three years. Did that  
 17 mean that you were willing to incur the risk  
 18 of outages or deficits, lack of capacity, not  
 19 only in the winter of 2014-2015, but maybe  
 20 2016 if you couldn't get the unit in place  
 21 earlier?  
 22 MR. HUMPHRIES:  
 23 A. If we couldn't get the unit in place earlier,  
 24 but we were confident that we would definitely  
 25 get it in by the end of 2015.

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1 GREENE, Q.C.:

2 Q. You were confident?

3 MR. HUMPHRIES:

4 A. Yes.

5 GREENE, Q.C.:

6 Q. We talked last week about the steps that you

7 were going to take. You said that you were

8 looking at the site for the new CT, and I

9 guess Mr. Henderson said there was -- that was

10 one of the issues with respect to black start

11 and it was determined that the site was going

12 to be at Holyrood. Is that correct?

13 MR. HUMPHRIES:

14 A. That's correct, and I guess that was a change.

15 Historically, the plans for the additional

16 combustion turbine was always to put a second

17 unit at Hardwoods. As we were moving into

18 2012, you have to realize, I guess, Hardwoods,

19 when it was established was sort of a no man's

20 land outside of the City and the Town of

21 Paradise has grown up around it. The station

22 is now pretty well in the middle of a

23 residential area. It's a couple thousand feet

24 from a new elementary school. So, there were

25 concerns that started to raise on the

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1 viability of adding additional generation

2 source in that area. So we started -- we

3 realized we would have to look at alternate

4 siting and which we did. We conducted a risk

5 assessment, of which Holyrood was one of the

6 alternatives, as well as there were other

7 alternatives, one in the east end, down around

8 the White Hills area.

9 (10:30 a.m.)

10 GREENE, Q.C.:

11 Q. So you were looking at a site. I just want

12 you to explain why it took from at least 2012

13 up until April of 2014 for Hydro to make the

14 decision to proceed with the CT that it asked

15 for approval?

16 MR. HUMPHRIES:

17 A. Well, as I think I indicated last week, we

18 were going through this process through 2013

19 in preparing our application. There were a

20 number of -- through 2013, we got into the

21 situation of -- where I guess we'll get to

22 somewhere in this process shortly of adding

23 the existing -- the new temporary black start

24 diesels that are on site. We paused for

25 thought a little bit there to sit back and

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1 look at what the addition of this 10,

2 potentially 16 megawatts of capacity would

3 have on the future requirement. We worked our

4 way through that and as I said, towards the

5 end of '13, we were preparing -- finalizing

6 the application. We got into the events of

7 early January 2014 and there was a

8 requirement. We sat back and looked at what

9 was driving the events of 2014, and based on a

10 review, both our own review, a review by our

11 own consultant and consultation with Liberty,

12 we agreed that there needed to be a change and

13 modification to our planning criteria in the

14 interim, between now and 2018, which we set

15 about to implement. And that resulted in the

16 delay in the application from late 2013 until

17 April 2014.

18 GREENE, Q.C.:

19 Q. I'm sorry, I didn't understand what -- what

20 resulted in that delay? You were looking at

21 your planning criteria?

22 MR. HUMPHRIES:

23 A. The analysis that we completed following the

24 2014 outage caused us to make a change in our

25 planning criteria vis-a-vis the P90 load

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1 forecast and the assumptions on availability

2 of generation, and that resulted in the new

3 application to acquire a larger combustion

4 turbine, which was filed in April 2014.

5 GREENE, Q.C.:

6 Q. So the changes in the planning criteria

7 exacerbated or accelerated the need for the

8 CT, made it more evident and the fact that you

9 needed more capacity than you had been

10 forecasting?

11 MR. HUMPHRIES:

12 A. It did, but also the evaluation of those

13 changes took time in completing the

14 application and getting it before the Board.

15 GREENE, Q.C.:

16 Q. Okay. So if we go back and look at where you

17 were in 2012, thinking -- knowing at that time

18 that what you were planning was the CT for

19 three years, that it would not have been in

20 place until the earliest would have been 2015,

21 even if you had acted promptly in the fall of

22 2012. Is that correct?

23 MR. HUMPHRIES:

24 A. That was our information at that time, yes.

25 GREENE, Q.C.:

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1 Q. Okay. So at the same time that this was going  
 2 on, you had the issues with new generation on  
 3 the island and you had the issue of black  
 4 start at Holyrood. There was also planning  
 5 going on for the Muskrat Falls project. Is  
 6 that correct?  
 7 MR. HUMPHRIES:  
 8 A. Yes, that's correct.  
 9 GREENE, Q.C.:  
 10 Q. And you personally were involved in providing  
 11 support to that in your role for system  
 12 planning, were you, Mr. Humphries?  
 13 MR. HUMPHRIES:  
 14 A. Yes, I was.  
 15 GREENE, Q.C.:  
 16 Q. And Mr. Henderson, in your role, your previous  
 17 role prior to being a Vice-President, you were  
 18 also involved with providing some support for  
 19 Lower Churchill with respect to integration?  
 20 Is that correct?  
 21 MR. HENDERSON:  
 22 A. My involvement with the Lower Churchill in 20  
 23 -- well, prior to 2013, was around the  
 24 operations readiness and the operations  
 25 elements of the agreements that were entered

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1 into at that time.  
 2 GREENE, Q.C.:  
 3 Q. So that would have included 2012 and 2013,  
 4 early 2013, as well as 2012? Is that correct?  
 5 MR. HENDERSON:  
 6 A. It would have, and you know, it would have  
 7 also been in 2011.  
 8 GREENE, Q.C.:  
 9 Q. I'd like now to go to PUB-NLH-013 in the black  
 10 start application. So this goes back -- the  
 11 question is that "Hydro states that there are  
 12 no formal studies discussing black start  
 13 capability" and that's, I think Mr. Henderson  
 14 has already confirmed that for us this  
 15 morning. So the question was "please provide  
 16 any internal memos or correspondence relating  
 17 to black start capability from January 2012  
 18 when it was determined that the Holyrood gas  
 19 turbine can no longer be available for use."  
 20 And what is attached in the attachments 1  
 21 through 12 are various email correspondence  
 22 between a number of parties at Hydro,  
 23 including Mr. Henderson and Mr. LeDrew and Mr.  
 24 Haynes and Mr. MacIsaac and I just want to  
 25 refer you to a couple of those to help us put

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1 in context your thinking back at the time.  
 2 The first one is Attachment No. 3, page  
 3 three. And this is a little bit hard to  
 4 follow actually because you have somebody  
 5 responding to a reply. So you get the same  
 6 email being repeated several times. That's  
 7 the way the flow goes. This is our modern  
 8 means of communication.  
 9 MR. HENDERSON:  
 10 A. One of the many.  
 11 GREENE, Q.C.:  
 12 Q. Pardon?  
 13 MR. HENDERSON:  
 14 A. I say it's one of the many.  
 15 GREENE, Q.C.:  
 16 Q. Yes, yes. But you end up getting the same  
 17 email several times because people just hit  
 18 reply. So Attachment 3, page three. Okay.  
 19 Can we scroll down a bit? This -- so this was  
 20 a January 19th email, page three, where there  
 21 was a recognition -- that's January 18th. I  
 22 was looking for -- it says in my notes January  
 23 19th. Can you scroll down, please? I seem to  
 24 have the wrong page number there. Let's try  
 25 the next page, page four. I didn't bring in

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1 my hard copy, but I have it noted. Okay. If  
 2 we see there, there was an email that said  
 3 that -- from Mr. Henderson to Mr. Goulding.  
 4 That's the one that I'm looking for. It's an  
 5 email from Mr. Henderson.  
 6 MS. GRAY:  
 7 Q. I'm just getting ready to go in another  
 8 screen, Ms. Greene, and see if I can find it.  
 9 GREENE, Q.C.:  
 10 Q. Yes. The black start application was made  
 11 part of the record for this proceeding for the  
 12 prudence review. I can do the question  
 13 without the reference to it, subject to Mr.  
 14 Henderson checking, but it was an email from  
 15 Mr. Henderson, Mr. Goulding where it was  
 16 recognized that -- in that email, Mr.  
 17 Henderson recognized, and I guess, that if the  
 18 transmission to the Holyrood plant was lost,  
 19 you would lose the ability to start Holyrood.  
 20 MS. GRAY:  
 21 Q. I think it's up there now, Ms. Greene.  
 22 GREENE, Q.C.:  
 23 Q. Yes, thank you. It was page one of four.  
 24 Sorry about that. And again, I'm just taking  
 25 you through the information that Hydro

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1 provided at the time which was some indication  
 2 of the thinking going on internally at Hydro  
 3 and here's you raising the concern. So that  
 4 was a concern of yours in your old role? Is  
 5 that correct?  
 6 MR. HENDERSON:  
 7 A. That's right.  
 8 GREENE, Q.C.:  
 9 Q. Okay.  
 10 MR. HENDERSON:  
 11 A. I was letting Mr. Goulding know so that he --  
 12 he was responsible for the engineering in the  
 13 system operations area, so I was giving this  
 14 to him so he could start thinking about  
 15 options, what we would do as an interim  
 16 solution until a permanent solution was  
 17 determined.  
 18 GREENE, Q.C.:  
 19 Q. Okay. And now we can go to Attachment 5.  
 20 When you look through the emails, while there  
 21 appear to be several because you get the  
 22 history with all of them, there weren't that  
 23 many emails exchanged back and forth, and this  
 24 was the only thing that was provided in  
 25 response to the internal review by Hydro when

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1 the Board asked the question.  
 2 So the next is Attachment 5 and it should  
 3 be an email from Mr. Haynes, who was your  
 4 predecessor in your -- as VP responsible for  
 5 the regulated business?  
 6 MR. HENDERSON:  
 7 A. That's correct.  
 8 GREENE, Q.C.:  
 9 Q. If you wanted to take a moment to read it, it  
 10 was an email to you. When I read the email, I  
 11 was struck by the fact that you were dealing  
 12 not only -- and trying to place this in the  
 13 context of the infeed and where a new CT would  
 14 be required and this was driving part of the  
 15 consideration with respect to what you would  
 16 do for new capacity on the island as well as  
 17 for black start at Holyrood.  
 18 MR. HENDERSON:  
 19 A. Can you just continue scrolling down? Thank  
 20 you.  
 21 GREENE, Q.C.:  
 22 Q. And then I'll take you to your response to  
 23 that email which is the next attachment.  
 24 MR. HENDERSON:  
 25 A. Okay.

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1 GREENE, Q.C.:  
 2 Q. So now if we go to Attachment 6, which is an  
 3 email back to you responding to his suggestion  
 4 that Hardwoods might be all right. And in  
 5 your first line where he had outlined the  
 6 options, you said "I don't think you're  
 7 missing anything. We are discounting  
 8 reliability for cost." And when -- again, in  
 9 response to the questions of what Hydro had  
 10 considered and these emails and to reflect  
 11 internal discussions or a review of the  
 12 matter, the emails came back and there's a lot  
 13 of discussion about new capacity, what it was  
 14 going to do for synchronous condensers tied to  
 15 the infeed, et cetera. And I'd like to ask  
 16 you, in your opinion, did your actions with  
 17 respect to either black start and new capacity  
 18 for the Island Interconnected system, how much  
 19 was it influenced by what was going on with  
 20 Muskrat Falls and the decisions required for  
 21 that?  
 22 MR. HENDERSON:  
 23 A. I don't think -- maybe just repeat that again.  
 24 I was just reading through the email as you  
 25 were asking the question, so I didn't quite

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1 get it clearly.  
 2 GREENE, Q.C.:  
 3 Q. Oh sorry, yeah. In looking at Hydro and what  
 4 it was looking at in 2012, okay, we've already  
 5 talked about system planning had said you  
 6 needed -- the Island Interconnected system  
 7 needed new capacity, certainly for 2014, maybe  
 8 even earlier, if you look at earlier  
 9 generation planning reports. So we see in  
 10 2012, you knew you needed new capacity. We  
 11 see in 2012 at Holyrood you no longer had  
 12 black start capability at the plant and you  
 13 had to go to a less desirable interim  
 14 solution, and we know that there was a lot of  
 15 planning going on that involved a number of  
 16 parties who were working for Hydro, also  
 17 providing support for Muskrat Falls. And my  
 18 question was, in your role at that time, do  
 19 you think that the activities associated with  
 20 Muskrat Falls, to what extent did they  
 21 influence your thinking and your decision  
 22 making process around the requirements of the  
 23 Island Interconnected system?  
 24 MR. HENDERSON:  
 25 A. I don't think there was any relevance there at

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1 all to what was going on with the Lower  
 2 Churchill. What I -- in terms of the -- what  
 3 was -- as I recall, in this email and what was  
 4 in my mind, at the time I had been a proponent  
 5 of saying we should be looking at a White  
 6 Hills or some other site in St. John's,  
 7 feeling there would be benefit to the system  
 8 and to reliability by having a more  
 9 distributed gas turbine generation in the  
 10 Avalon. So, I had -- and Jim knew that I was  
 11 suggesting we should talk to Newfoundland  
 12 Power about is there somewhere else on the  
 13 Avalon that would be benefit because there may  
 14 be benefits to having something in the east  
 15 end of St. John's, as opposed to the west end  
 16 of St. John's, and so that was part of it.  
 17 So, I thought that there was a reliability  
 18 benefit to having the new source elsewhere.  
 19 So, I was indicating there in the beginning of  
 20 this is that that would be where I would say  
 21 discounting reliability, because I saw the  
 22 reliability benefit perhaps of having more  
 23 distributed generation and -- but all things  
 24 being weighed, and I wasn't involved directly  
 25 with the analysis that was done, but as it

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1 says there I don't think there was anything  
 2 missed and I see the economic benefits to  
 3 having the plant at Holyrood, and you know,  
 4 obviously if the CT did not go at Holyrood,  
 5 then there would have had to have been another  
 6 black start solution being put in at Holyrood.  
 7 (10:45 a.m.)  
 8 GREENE, Q.C.:  
 9 Q. And I guess my question was a bit of a broader  
 10 question and I wanted your response to.  
 11 During 2012, we don't need to get into the  
 12 specifics, but there was a lot of activity and  
 13 planning going on with respect to the Lower  
 14 Churchill Project and the infeed to the island  
 15 and whether you needed additional capacity,  
 16 where the synchronous condensers were going to  
 17 be located, et cetera. Did that activity and  
 18 your involvement in it, Hydro's involvement in  
 19 it, affect in your opinion the schedule or the  
 20 decision making process related to additional  
 21 capacity required for the Island  
 22 Interconnected System and for black start?  
 23 MR. HENDERSON:  
 24 A. I'm not aware that there was anything. The  
 25 needs were identified by system planning. The

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1 timing was identified with respect to the  
 2 analysis that system planning had and also the  
 3 analysis that our engineering folks who were  
 4 doing the estimates with respect to new  
 5 resources and schedule. It would be all part  
 6 of that decision as to what were -- how long  
 7 would it take and how much would it cost, but  
 8 the need was identified through the system  
 9 planning analysis.  
 10 GREENE, Q.C.:  
 11 Q. Okay. I'd like to go back to page 51 of  
 12 Liberty's report to go back to the chronology  
 13 with respect to black start. So we're in  
 14 2012. We see that again a new CT was required  
 15 for additional capacity and also that was your  
 16 preferred solution for the Holyrood plant was  
 17 a local on-site CT I gather from your previous  
 18 answers. Is that correct?  
 19 MR. HENDERSON:  
 20 A. That's correct.  
 21 GREENE, Q.C.:  
 22 Q. Okay. And other than -- again, I don't want  
 23 to be unfair to Mr. Humphries and his  
 24 response. I'm still struggling with the delay  
 25 and why Hydro didn't act sooner. Am I correct

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1 in saying that you were looking at the site --  
 2 from 2012 up to 2014, you were looking at the  
 3 site. What else were you doing?  
 4 MR. HUMPHRIES:  
 5 A. We -  
 6 GREENE, Q.C.:  
 7 Q. I'm struggling with how long it took Hydro to  
 8 do something -- to move.  
 9 MR. HUMPHRIES:  
 10 A. Okay. We were at several stages through 2013.  
 11 This report came out, the generation issues  
 12 report came out at the end of 2012. I think  
 13 it's November 2012.  
 14 GREENE, Q.C.:  
 15 Q. But you also had one in November of 2010,  
 16 which was essentially the same information,  
 17 right?  
 18 MR. HUMPHRIES:  
 19 A. It was, yes.  
 20 GREENE, Q.C.:  
 21 Q. That's right.  
 22 MR. HUMPHRIES:  
 23 A. But back in 2010, we were at a stage where we  
 24 had two -- still carrying two expansion plans  
 25 and the level of certainty around Lower

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1 Churchill was much less back in 2010 and in  
 2 fact, the two expansion plans were different.  
 3 The CT was present in the interconnected  
 4 scheme, but the isolated scheme had a  
 5 different expansion plan. So, as we come  
 6 through 2010, there's no doubt that towards  
 7 the end of 2010, there was an additional level  
 8 of certainty probably around the Lower  
 9 Churchill with the signing of the term sheet  
 10 with Emera. Still nothing definite. We  
 11 progressed through 2011. Lower Churchill was  
 12 still advancing, still becoming even more like  
 13 -- more of a reality, but there was no  
 14 sanction and it wasn't until we really got  
 15 into mid to late 2012 that we, from a planning  
 16 perspective, really had a clear line of sight  
 17 on where we felt the expansion was going, and  
 18 at that time, when we redid the analysis, the  
 19 combustion turbine did come out in both  
 20 alternatives. But again, it was more timing  
 21 related and the fact that because the decision  
 22 took so long that we got down to a stage where  
 23 a combustion turbine was the only option in  
 24 both alternatives.  
 25 So moving into 2013, we looked at

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1 starting to move forward the combustion  
 2 turbine proposal. We got into the black start  
 3 analysis and looking at the synergies of how  
 4 this combustion turbine could be used to also  
 5 satisfy the black start. We went through the  
 6 siting analysis and landed on the fact that  
 7 Holyrood was by far the best site. And it was  
 8 at that time that the size of the combustion  
 9 turbine increased from 50 to 60 megawatts and  
 10 there was -- the reasoning for that was that  
 11 we had always considered the Holyrood black  
 12 start combustion turbine as part of the island  
 13 capacity and that provided ten megawatts, so  
 14 to keep the level of island capacity  
 15 consistent, the size of the combustion turbine  
 16 was increased from 50 to 60 megawatts.  
 17 And then we moved forward, and as I said,  
 18 I think the timing would have been in the fall  
 19 of 2013, the issue of the interim solution to  
 20 install the 8.2 megawatt black start diesels  
 21 came up. We, again, went back and looked at  
 22 the implications that that would have on our  
 23 recommendation moving forward and if the --  
 24 what the size of the gas turbine would be or  
 25 if we would keep those diesels or remove them

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1 once the gas turbine went in place. We did an  
 2 analysis on that, and that puts us into the  
 3 fall of 2013, and as I said last week, we had  
 4 an application functionally complete by the  
 5 fall of 2013, late 2013. We're talking  
 6 Christmas period. It did not get filed before  
 7 the end of the year.  
 8 And then we got into our January 2014  
 9 events and we sat back and took a whole new  
 10 look at the generation adequacy and that's  
 11 with -- as I said we involved external  
 12 consultants. Liberty came into the picture  
 13 and we had discussions with them and we landed  
 14 on this modified criteria that identified that  
 15 we would ultimately need a larger combustion  
 16 turbine or it was prudent to go with a larger  
 17 combustion turbine and we proceeded then to  
 18 prepare that application and get it before the  
 19 Public Utilities Board and that took us from  
 20 January-February 2014 to April 2014.  
 21 GREENE, Q.C.:

22 Q. And by January 2014 into April of 2014, given  
 23 the new planning criteria and the new  
 24 generation capacity required and the  
 25 timelines, Hydro really had no choice at that

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1 point but to go with a used machine, did they?  
 2 They couldn't go with purchasing and  
 3 installing and taking a three-year delay.  
 4 MR. HUMPHRIES:  
 5 A. Well, the option was there to do it and it  
 6 made sense to do it.  
 7 GREENE, Q.C.:

8 Q. Yes, and to do otherwise, you would have been  
 9 lacking in your capacity and no black start  
 10 for an additional three years. So you really  
 11 had no choice come the spring of 2014?  
 12 MR. HUMPHRIES:  
 13 A. No, well, at that stage, we wouldn't have been  
 14 lacking in black start because the diesels  
 15 were already there.  
 16 GREENE, Q.C.:

17 Q. Well, sorry about that. Yeah, but for - yeah,  
 18 you would have lacked capacity that you had  
 19 forecast, right?  
 20 MR. HUMPHRIES:  
 21 A. Yes.  
 22 GREENE, Q.C.:

23 Q. Okay.  
 24 MR. HENDERSON:  
 25 A. I just would like to -- Ms. Greene, just the -

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1 - you did say used and I -  
 2 GREENE, Q.C.:  
 3 Q. I'm sorry, yeah.  
 4 MR. HENDERSON:  
 5 A. You understand it's -  
 6 GREENE, Q.C.:  
 7 Q. What is the right term? It's a new -- it's an  
 8 older unit that's never been used?  
 9 MR. HENDERSON:  
 10 A. It was a new unit but it had been manufactured  
 11 early, so we were able to take advantage of  
 12 the fact that it had been manufactured but it  
 13 was a new unit that had never been used.  
 14 MR. LEDREW:  
 15 A. Never fired.  
 16 GREENE, Q.C.:  
 17 Q. No, I -- and is that what -- is it appropriate  
 18 to call that the grey market, which I've heard  
 19 that term as well, but I'm not sure what the  
 20 grey -  
 21 MR. HENDERSON:  
 22 A. I think the grey market would, in my  
 23 understanding, is it would reflect a range of  
 24 options which are related to units that were  
 25 owned by somebody who is no longer using them.

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1 So they could be used. They could be  
 2 something that somebody bought and decided  
 3 they weren't going to use and then had it  
 4 available for sale.  
 5 GREENE, Q.C.:  
 6 Q. So an existing unit, as opposed to a new unit?  
 7 MR. HENDERSON:  
 8 A. That's correct.  
 9 GREENE, Q.C.:  
 10 Q. We won't call it the grey market or the black  
 11 market, okay. So if we go back now to 2012  
 12 for black start, I just wanted to talk for  
 13 just a very short period about we see the  
 14 Newfoundland Power units being moved in and  
 15 they were moved in in 2013. And I wanted to  
 16 ask -- again, we can go to it if you want, but  
 17 the response to PUB-NLH-029 indicated that the  
 18 analysis that Hydro had done at that time  
 19 indicated that the results were marginal as to  
 20 the ability of the two NP units, because there  
 21 was two units for a total of ten megawatts,  
 22 their ability for black start. Is that  
 23 correct?  
 24 MR. HENDERSON:  
 25 A. There was analysis done on it and just in

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1 terms of the Newfoundland Power units, I think  
 2 the record is fairly clear that for the winter  
 3 of 2013, because the unit at Holyrood, Unit  
 4 One, was not available, there was an immediate  
 5 move to bring additional generation onto the  
 6 Avalon and so Newfoundland Power were asked if  
 7 they would relocate their gas turbine, their  
 8 mobile gas turbine on the Avalon, and we did  
 9 an assessment and decided that it would be --  
 10 the best place to put it would be at Holyrood  
 11 and it would be able to -- in combination with  
 12 the two and a half megawatt diesel unit, would  
 13 be a good option at Holyrood that may bring  
 14 additional benefits to the plant if we were to  
 15 have a repeat of what we had in January and  
 16 those benefits could be also black starting.  
 17 And so there was analysis asked and done by  
 18 the system planning department that showed  
 19 that it could work, but there was concerns  
 20 raised as to certain aspects, in particular  
 21 under voltage, as I recall, that the units may  
 22 not stay on long enough to get the motor  
 23 started because of the large dip in voltage.  
 24 So in terms of the marginality of it, that's  
 25 where that came into play. It was related to

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1 the drop in voltage that would occur on trying  
 2 to start a large motor.  
 3 GREENE, Q.C.:  
 4 Q. And they were removed shortly after they were  
 5 placed there? Is that correct?  
 6 MR. HENDERSON:  
 7 A. So we had put them in there. First of all,  
 8 there was some infrastructure that had to be  
 9 built in order to connect them in. So that  
 10 occurred. It was a considerable amount of  
 11 work to get that infrastructure in place and  
 12 so that in the end, it took 'til April to get  
 13 them connected and then we had to wait -- in  
 14 order to do the black start trial with them,  
 15 we had to wait until the plant was in a  
 16 circumstance that that could happen and that  
 17 occurred in May and Newfoundland Power  
 18 indicated to us that they needed the mobile  
 19 units to be able to execute their winter --  
 20 sorry, their maintenance work and so  
 21 immediately after the start test, they were  
 22 removed so that Newfoundland Power could use  
 23 them for that activity. It was our intention  
 24 to bring them back or bring back one of those  
 25 later that year for the following winter for

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1 the benefit that it would bring to having that  
 2 additional capacity there locally, which would  
 3 bring benefits, albeit not black start, but it  
 4 would bring other benefits related to running  
 5 other auxiliary equipment at the plant that  
 6 would enable -- if we did have a repeat of  
 7 January 2013 activities, it would bring that  
 8 additional warming benefit to a lot of the  
 9 auxiliaries, although it would not be able to  
 10 start the large boiler feed water pump motors.

11 GREENE, Q.C.:

12 Q. And they did return in 2014 for a short  
 13 period?

14 MR. HENDERSON:

15 A. So they were brought back in in -- they  
 16 actually got in service in around Christmas  
 17 time in 2013 and they were there and available  
 18 for us when we had the problems in January  
 19 2014.

20 GREENE, Q.C.:

21 Q. So going back to black start, in the fall --  
 22 after the outages in January of 2013 when  
 23 Holyrood -- when the Hardwoods option did not  
 24 work to start the Holyrood plant because of no  
 25 source of power, Hydro, after correspondence

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1 with the Board, did apply for the new current  
 2 black start option at Holyrood? Is that  
 3 correct?

4 MR. HENDERSON:

5 A. That's correct. In the fall, after we had  
 6 done an analysis that was requested by the  
 7 Board, the Board asked us to put in an  
 8 application, which we did.

9 GREENE, Q.C.:

10 Q. And the purpose of the application was to  
 11 recommend a least cost option for an on-site  
 12 black start capability? Is that correct?

13 MR. HENDERSON:

14 A. So the Board had asked us to look at options  
 15 for a local black start capability at Holyrood  
 16 and so we evaluated a number of options,  
 17 identified the least cost option and that was  
 18 the one that we put forward for approval.  
 19 (11:00 a.m.)

20 GREENE, Q.C.:

21 Q. And that was approved. That current black  
 22 start, that 8.2 megawatt unit, is still in  
 23 place at Holyrood? Is that correct?

24 MR. HENDERSON:

25 A. That's correct.

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1 GREENE, Q.C.:

2 Q. The plan had originally been to remove them  
 3 from service in mid-2015? Is that correct?

4 MR. HENDERSON:

5 A. When we put them in, we intended to take them  
 6 out in mid-2015, anticipating that we would  
 7 have the new CT in place in the fall of 2015,  
 8 and so it was all part of that. But when we  
 9 looked at that, we decided that we would not  
 10 remove them until we had proven the capability  
 11 of the new CT. So as a result, they remain,  
 12 because we have not done -- been able to  
 13 schedule, in a reliable manner, a black start  
 14 test using the new CT.

15 GREENE, Q.C.:

16 Q. Mr. Chair, I see it's 11.

17 CHAIRMAN:

18 Q. Okay. We will take the break.  
 19 (BREAK - 11:01 a.m.)  
 20 (RESUME - 11:36 a.m.)

21 GREENE, Q.C.:

22 Q. Coming back to where we left off, we were  
 23 still at Holyrood black start. The current  
 24 black start, the eight megawatt -- the eight  
 25 times two megawatt diesels that are there,

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1 they went in service in June of 2015? Is that  
 2 correct, Mr. Henderson?

3 MR. HENDERSON:

4 A. I think they went in service in maybe April  
 5 2013. I think we -- or '14 -- and the testing  
 6 to approve them was in midyear. So they were  
 7 available earlier, but we hadn't actually done  
 8 a test until later.

9 GREENE, Q.C.:

10 Q. Yes. And they were to be removed, as we  
 11 already discussed, in June -- the plan had  
 12 been June of 2015 to remove them. I  
 13 understood from evidence last week that there  
 14 is some uncertainty with respect to that plan  
 15 and I just wanted to very briefly talk about  
 16 the future of the black -- current black start  
 17 solution. I understood from Mr. Humphries  
 18 last week that the new CT has not been made  
 19 ready for black start and the earliest  
 20 opportunity will be mid-2016 it looks like  
 21 now. Is that correct?

22 MR. HENDERSON:

23 A. The new CT has not been put through a black  
 24 start -- it's been black started on its own.  
 25 It has its own black start. It has its own



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1 diesel and small gas turbine that is used to  
 2 start it. That's been tested. The test that  
 3 hasn't been done is using it to start a boiler  
 4 feed water pump motor and do the black  
 5 starting of Holyrood, and that won't be done  
 6 now until the spring because we weren't able  
 7 to get the window to do it reliably this past  
 8 summer.  
 9 GREENE, Q.C.:  
 10 Q. Right. And the other thing that there is  
 11 being reviewed by Hydro is whether the current  
 12 black start in place at Holyrood will be  
 13 considered for additional capacity for the  
 14 future. Is that still under review?  
 15 MR. HUMPHRIES:  
 16 A. Yes, it is.  
 17 GREENE, Q.C.:  
 18 Q. Okay. The Muskrat Falls (sic) plant will  
 19 continue to be in operation for a period of  
 20 time post interconnection with Muskrat Falls?  
 21 Is that correct?  
 22 MR. HENDERSON:  
 23 A. I think you meant the Holyrood plant.  
 24 MR. LEDREW:  
 25 A. Holyrood.

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1 GREENE, Q.C.:  
 2 Q. What did I say?  
 3 MR. HENDERSON:  
 4 A. Muskrat.  
 5 GREENE, Q.C.:  
 6 Q. Yes, sorry about that. So the Holyrood plant  
 7 is to remain in service for a period of time  
 8 post Muskrat?  
 9 MR. HENDERSON:  
 10 A. So once we have the interconnection complete,  
 11 we will enter into a standby period with the  
 12 plant. It may not be operating very much at  
 13 all, but it will be a standby state out to --  
 14 right now our plan is to 2020-2021, in that  
 15 timeframe.  
 16 GREENE, Q.C.:  
 17 Q. And has that been affected by the announced  
 18 delay in the Muskrat Falls Project?  
 19 MR. HENDERSON:  
 20 A. We're looking at the impact of the delay right  
 21 now on how that will impact the operation of  
 22 the Holyrood units. We haven't completed that  
 23 and that's -- it's something that we're very  
 24 active on right now.  
 25 GREENE, Q.C.:

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1 Q. And when do you expect to complete that  
 2 analysis?  
 3 MR. HENDERSON:  
 4 A. That will not take very long. I would say --  
 5 well, it would certainly be this fall.  
 6 GREENE, Q.C.:  
 7 Q. You've mentioned this morning in your  
 8 evidence, Mr. Henderson, that the events that  
 9 would require black start are rare events. Is  
 10 that a correct characterization of how I  
 11 understood your evidence?  
 12 MR. HENDERSON:  
 13 A. That's correct.  
 14 GREENE, Q.C.:  
 15 Q. Okay. But I don't take from your answer you  
 16 mean that that -- because they're rare, that's  
 17 not something that Hydro should be planning  
 18 for?  
 19 MR. HENDERSON:  
 20 A. We have the units -- we have black start  
 21 capability to be able to take care of those  
 22 types of events. That's why we put the  
 23 Hardwoods plant in and ensured it was  
 24 available to do the testing and the training  
 25 of operators. It's for those rare events that

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1 you have certain facilities in place to assist  
 2 in restoring the system.  
 3 GREENE, Q.C.:  
 4 Q. And of course, that's why the existing CT --  
 5 the old CT had been placed at Holyrood was for  
 6 those rare events, wasn't it, to be able to  
 7 black start?  
 8 MR. HENDERSON:  
 9 A. That's correct.  
 10 GREENE, Q.C.:  
 11 Q. Okay. I just wanted to make sure I understood  
 12 your emphasis on the fact that they were rare  
 13 events. It doesn't mean that we don't plan  
 14 for them.  
 15 MR. HENDERSON:  
 16 A. No, that's right. The point of that is it's  
 17 the risk and cost considerations which led to,  
 18 you know, to the interim solution. So I was  
 19 talking in the context of an interim solution  
 20 for two winters for the Hardwoods option. We  
 21 looked at that and again, I wasn't the  
 22 decision person, but I would say it was all  
 23 around least cost to our customers that that  
 24 decision was made to use it as an interim  
 25 solution.

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1 GREENE, Q.C.:

2 Q. In the AMEC report that looked at the

3 condition of the CT, one of the options was to

4 refurbish the existing CT. That is correct,

5 isn't it?

6 MR. HENDERSON:

7 A. It is.

8 GREENE, Q.C.:

9 Q. And included in the cost for that

10 refurbishment, they had also included costs to

11 provide temporary diesels as an alternative

12 backup supply during the period of

13 refurbishment. Is that correct?

14 MR. LEDREW:

15 A. Yes.

16 GREENE, Q.C.:

17 Q. Pardon?

18 MR. LEDREW:

19 A. Yes, it is.

20 GREENE, Q.C.:

21 Q. Okay. Did Hydro consider placing temporary

22 diesels there when you had the stop work order

23 in 2010?

24 MR. LEDREW:

25 A. No, we did not.

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1 GREENE, Q.C.:

2 Q. You knew you wouldn't have black start

3 capability for that period of time.

4 MR. LEDREW:

5 A. No, I don't believe.

6 GREENE, Q.C.:

7 Q. But AMEC did recommend that if the unit were

8 to be refurbished that you would have

9 temporary diesels there to provide black start

10 capability?

11 MR. LEDREW:

12 A. Correct, yeah.

13 GREENE, Q.C.:

14 Q. So at any time in 2010 or '11, did Hydro do

15 the analysis or consider the appropriateness

16 of having temporary diesels there to provide

17 black start capability?

18 MR. HENDERSON:

19 A. Sorry, in which period did you say?

20 MR. LEDREW:

21 A. '10 and '11.

22 GREENE, Q.C.:

23 Q. 2010 when the stop work order was issued and

24 into 2011 when you knew you were having

25 problems with the condition of the unit.

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1 MR. HENDERSON:

2 A. I'm not aware, not to say that -- I didn't go

3 looking to see if that question had been asked

4 or answered back at that time. One of the

5 considerations certainly would have been how

6 quick the stop work order could be resolved

7 versus the cost of putting in something and

8 how quick you could put something in. So I

9 think all of that would have been in the

10 person's mind when looking at that because the

11 stop work order was not seen as something that

12 would remain forever. It was looked -- it was

13 a considerable amount of effort, I think, to -

14 MR. LEDREW:

15 A. To resolve it.

16 MR. HENDERSON:

17 A. - to resolve it.

18 GREENE, Q.C.:

19 Q. And Mr. LeDrew, you were plant manager at that

20 time. You would have participated in any

21 discussions had there been any, I assume, with

22 respect to the use of temporary diesels during

23 2010-11? Is that correct?

24 MR. LEDREW:

25 A. Yeah. I cannot recall any discussion on those

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1 matters.

2 GREENE, Q.C.:

3 Q. Thank you. I understand that any issues

4 dealing with the financial implications of

5 black start are to be dealt with in the second

6 panel. Is that correct?

7 MR. HENDERSON:

8 A. Yes, in terms if you're talking about the

9 dollars, yes.

10 GREENE, Q.C.:

11 Q. Right, okay. The next part I want to speak to

12 you about is Holyrood unit number one. And

13 Mr. LeDrew, you were also plant manager of the

14 plant at the time of that failure in January

15 2013? Is that correct?

16 MR. LEDREW:

17 A. Yes, I was.

18 GREENE, Q.C.:

19 Q. Again, just for the record and for the

20 understanding, I wanted to go through very

21 briefly on a very high level what actually

22 happened. So perhaps I'll have a go at seeing

23 if I'm explaining it correctly. My

24 understanding is that lube oil to the turbine

25 generator was inadequate and as a result there

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1 was a failure of the unit and major damage to  
 2 the unit. Is that correct?  
 3 MR. LEDREW:  
 4 A. Yes, it is, yeah.  
 5 GREENE, Q.C.:  
 6 Q. Okay. And the primary factor was determined  
 7 to be the failure of the third source of  
 8 supply for the lube oil, the DC lube oil  
 9 system. Is that correct?  
 10 MR. LEDREW:  
 11 A. That's correct.  
 12 GREENE, Q.C.:  
 13 Q. So again, as I said, I'll have a go at  
 14 explaining the source of supply for the lube  
 15 oil in my layman's terminology. My  
 16 understanding is there's three sources of  
 17 supply for that lube oil. Is that correct?  
 18 MR. LEDREW:  
 19 A. Yeah, I can explain it if you'd like.  
 20 GREENE, Q.C.:  
 21 Q. Sure.  
 22 MR. LEDREW:  
 23 A. Okay.  
 24 GREENE, Q.C.:  
 25 Q. The only thing, I was trying to speed it up a

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1 bit in terms of we don't need a whole lot of  
 2 detail about what happened from an engineering  
 3 perspective.  
 4 MR. LEDREW:  
 5 A. I hear you. Believe you me, I'd like to be  
 6 brief.  
 7 (11:45 a.m.)  
 8 GREENE, Q.C.:  
 9 Q. Good.  
 10 MR. LEDREW:  
 11 A. But there are three pumping -- one lube oil  
 12 system, but three pumping systems that support  
 13 it.  
 14 GREENE, Q.C.:  
 15 Q. Yes, okay.  
 16 MR. LEDREW:  
 17 A. There's a primary AC, a standby AC and a DC,  
 18 and when the unit is online, the primary AC is  
 19 providing lubricating oil to the bearings in  
 20 the turbine. When a trip happens or a system  
 21 lockout or anything upsets on the transmission  
 22 system, that unit would trip. The primary  
 23 system will drop because it's not generating  
 24 any energy to run its own motors and we would  
 25 use station services, which is your standby

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1 AC. On that storm in particular, the standby  
 2 voltages in the plant were low because of  
 3 issues in the yard and the storm conditions  
 4 and the standby AC for that unit did not start  
 5 and it then went to the DC motor to start to  
 6 deliver oil and the DC motor did start and it  
 7 did run, but unbeknownst to us, it was  
 8 delivering an inadequate amount of oil to  
 9 provide lubrication and cooling to the turbine  
 10 bearings and the unit bearings failed shortly  
 11 thereafter.  
 12 GREENE, Q.C.:  
 13 Q. Okay. So on that day, there was a winter  
 14 storm that caused the loss of supply to the  
 15 plant. Is that correct?  
 16 MR. LEDREW:  
 17 A. There was -- I think Rob mentioned earlier,  
 18 there was a severe winter storm localized  
 19 right in the Holyrood yard in the area and  
 20 wet, salt-laden snow, and that caused a number  
 21 of equipment failures and eventually the yard  
 22 went black at the station.  
 23 GREENE, Q.C.:  
 24 Q. Last week I learned besides Murphy's Law we  
 25 also have O'Brien's Law, so with respect to

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1 what happened at the Holyrood plant that day,  
 2 Mr. O'Brien was alive and well is the way I  
 3 would describe it. So we go through the  
 4 three sources of supply. You said the first  
 5 one, when the unit went off, the primary  
 6 source of supply was gone because it had lost  
 7 supply?  
 8 MR. LEDREW:  
 9 A. Correct, like the unit -- all systems are  
 10 supported by the energy that the unit itself  
 11 generates and that will run all the equipment.  
 12 So when the unit is tripped and out of  
 13 service, all those devices fault to their  
 14 standby.  
 15 GREENE, Q.C.:  
 16 Q. Now you also then with the second source is  
 17 from auxiliary station service and even if  
 18 that doesn't work, you have a backup for that,  
 19 don't you?  
 20 MR. LEDREW:  
 21 A. Well, your second from the oil system, you go  
 22 to your station services supply which takes  
 23 power internally in the plant and other  
 24 generating units in the plant can supply that  
 25 or alternatively, there are two feeds coming

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1 from the Holyrood yard that will take power  
 2 off the transmission grid and bring it down to  
 3 the plant to provide energy for standby  
 4 equipment.  
 5 GREENE, Q.C.:  
 6 Q. And that didn't work that day?  
 7 MR. LEDREW:  
 8 A. That worked -- on that day, we had a brown-out  
 9 condition, what's referred to a brown-out  
 10 condition, and the voltage in the yard was  
 11 depressed and it had the effect that it  
 12 inhibited the successful start of the standby  
 13 lube oil pump on that particular unit.  
 14 GREENE, Q.C.:  
 15 Q. And finally, the last source, the DC motor,  
 16 you mentioned that while that started, it  
 17 didn't provide adequate oil. The failure of a  
 18 unit is a catastrophic event. This particular  
 19 one had significant potential consequences.  
 20 Is that correct?  
 21 MR. LEDREW:  
 22 A. Yes, it did, to people working at the station  
 23 and our customers as well, yes.  
 24 GREENE, Q.C.:  
 25 Q. Liberty identified four issues for prudence

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1 related to this project and I wonder if we  
 2 could go to page 59 of their July 6th report,  
 3 please? Okay. So these -- and you're  
 4 familiar with these issues, are you, Mr.  
 5 LeDrew?  
 6 MR. LEDREW:  
 7 A. Yes, I am.  
 8 GREENE, Q.C.:  
 9 Q. Okay. I want to go to the third one first,  
 10 the weakness in the backup AC system that  
 11 prevented the system from functioning in a  
 12 degraded voltage situation. And I think you  
 13 already have described what happened, that  
 14 your second system, because of the brown-out  
 15 conditions, wasn't able to adequately supply  
 16 that day. Is that correct?  
 17 MR. LEDREW:  
 18 A. That's correct. I would say to you that the  
 19 sister unit that has the same pumping  
 20 arrangement did -- the voltage levels that  
 21 were seen on that brown-out condition coming  
 22 from our yard was adequate for the pump on  
 23 unit number two to start. So number one did  
 24 not start, but unit two did.  
 25 GREENE, Q.C.:

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1 Q. Okay. And Liberty did not determine that that  
 2 particular failure or weakness of that system  
 3 to start because of the low voltage was  
 4 imprudent, did they? Your actions and  
 5 relating to it were not imprudent?  
 6 MR. LEDREW:  
 7 A. Yes, I believe, yeah.  
 8 GREENE, Q.C.:  
 9 Q. Okay. And in fact, so when the unit tripped  
 10 and you lost power and the second system  
 11 didn't operate properly, Liberty reviewed  
 12 those and for various reasons, that I don't  
 13 think we need to go through, determined that  
 14 Hydro's actions prior to the incident with  
 15 respect to the discovery of those issues was  
 16 not imprudent, leaving the failure of the  
 17 third system, the DC system, which was the  
 18 basis and Hydro's actions concerning the DC  
 19 motor pump to be the basis for Liberty's  
 20 findings of imprudence. Is that correct?  
 21 MR. LEDREW:  
 22 A. Yes. I would add though, on the brown-out  
 23 condition, after suffering this loss, we  
 24 understood how long it takes for a loss of  
 25 supply to cause the damage that it did and it

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1 was inside of 30 seconds. So, in recovering  
 2 brown-out scenario, you'd need to have an  
 3 alternative source available to replace the  
 4 yard, switching happened, energized and back  
 5 in service inside of 30 seconds. So that is  
 6 technically a very challenging thing to be  
 7 able to accommodate in a standby AC system  
 8 when you suffer a brown-out failure.  
 9 GREENE, Q.C.:  
 10 Q. And again, for purposes of our discussion  
 11 today, that was not a factor that lead to  
 12 Liberty's findings of imprudence. So, all of  
 13 their work with respect to imprudence relates  
 14 to the DC motor, and if we could go to page 60  
 15 of Liberty's report, and if you look at the  
 16 top of the page, I understand from the  
 17 evidence on the record and from Liberty's  
 18 report, as well as Hydro's reply, that at the  
 19 time prior to the incident, there was actually  
 20 three problems with that DC motor. At the top  
 21 of the page, they are described by Liberty in  
 22 the third line, testing found that the motor's  
 23 brush boxes were offset, number one, and the  
 24 motor's neutral plane was misaligned, number  
 25 two, and then further down the page, they

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1 determined that there was a resister setting.  
 2 So those are the three issues with that motor  
 3 that I'm referring to. Do you recall those,  
 4 Mr. LeDrew?  
 5 MR. LEDREW:  
 6 A. Yes, I do.  
 7 GREENE, Q.C.:  
 8 Q. Okay. So there were -- and these problems  
 9 were existing prior to the incident of January  
 10 2013 is my understanding. Is that correct?  
 11 MR. LEDREW:  
 12 A. These problems were in existence prior to  
 13 2009. That's as far back as our record base  
 14 would go.  
 15 GREENE, Q.C.:  
 16 Q. Okay. So these were existing problems with  
 17 this motor?  
 18 MR. LEDREW:  
 19 A. Yes, that we did not know.  
 20 GREENE, Q.C.:  
 21 Q. Okay. And then we have an additional problem,  
 22 as I understand it. We had a fault -- I'll  
 23 call it a faulty motor to begin with, and then  
 24 we had testing of that motor. There were  
 25 three problems with the motor which made it

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1 unable to work. In my view, that's a faulty  
 2 motor. So that's why I'm calling it that, in  
 3 my layman's terms. And then we also have a  
 4 problem that the testing procedure that was  
 5 followed for the motor doesn't appear -- there  
 6 are issues with the testing procedure, and  
 7 we'll come to talk about that. So we have the  
 8 existing problems and then the testing. So,  
 9 when we come to the testing, how was testing  
 10 for the motors done at that time, Mr. LeDrew?  
 11 MR. LEDREW:  
 12 A. In terms of validating that it functions as it  
 13 should when installed in the unit, there are a  
 14 return to service test when it's removed from  
 15 the equipment and placed back in service  
 16 before you return the generating unit back to  
 17 production and there is a weekly online test  
 18 done to test that both the standby and the  
 19 emergency pumps will operate on falling  
 20 pressure. So those tests had been done and  
 21 were done on the frequency as required.  
 22 GREENE, Q.C.:  
 23 Q. Okay. And we'll come back to those tests.  
 24 And this particular motor had been sent to an  
 25 outside contractor for some work? Is that

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1 correct?  
 2 MR. LEDREW:  
 3 A. Yes. We have over 600 motors in the plant and  
 4 as they give indication of failure or have  
 5 trouble that we will remove them and send them  
 6 to a qualified contractor to have them  
 7 repaired.  
 8 GREENE, Q.C.:  
 9 Q. Okay. And that was done with this motor? Is  
 10 that correct?  
 11 MR. LEDREW:  
 12 A. Yes, this motor was sent out sometime previous  
 13 to a motor repair shop and overhauled and sent  
 14 back to us.  
 15 GREENE, Q.C.:  
 16 Q. Okay. If we could go to PR-PUB-NLH-182,  
 17 Revision 1? This describes the tests that  
 18 would have been done by the outside contractor  
 19 and perhaps, Mr. LeDrew, if you could tell us  
 20 what types of tests the outside contractor was  
 21 doing prior -- on your motors prior to January  
 22 1, 2013?  
 23 MR. LEDREW:  
 24 A. Well, there's a multi-year contract we would  
 25 let, publicly tendered through qualified

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1 contractors, service shops in the St. John's  
 2 area, and that, in addition to many motors,  
 3 would go through that standard servicing and  
 4 it's a three-step service program that's  
 5 outlined in that contract.  
 6 GREENE, Q.C.:  
 7 Q. And would the tests that have been done  
 8 included speed tests for the motor?  
 9 MR. LEDREW:  
 10 A. Yes. Polarity and speed tests is normally a  
 11 part of the exercise that gets done on all  
 12 these motors before they're sent back to our  
 13 facility to reinstall them.  
 14 GREENE, Q.C.:  
 15 Q. Okay. So did the contract at that time  
 16 require that the contractor's test results be  
 17 provided with the return of the motor?  
 18 MR. LEDREW:  
 19 A. Well, I guess, point of issue, but the  
 20 contract requires that the results from the  
 21 as-found and as-left conditions are documented  
 22 and shared with us, the owner, upon request.  
 23 GREENE, Q.C.:  
 24 Q. Okay. So the contract that is attached, and I  
 25 don't think we need to go to it, does require

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1 that the contractor do these tests, including  
 2 the speed test, and that they contract to  
 3 provide the results of the tests to Hydro? Is  
 4 that correct?  
 5 MR. LEDREW:  
 6 A. That's correct.  
 7 GREENE, Q.C.:  
 8 Q. Okay. With respect to this particular motor,  
 9 did the contractor provide the test results to  
 10 Hydro?  
 11 MR. LEDREW:  
 12 A. We went back -- as part of the investigation,  
 13 we went back to the service provider and asked  
 14 to go back through their records. At that  
 15 point, we were only able to determine an  
 16 invoice with a test run and okay, and I  
 17 believe that's on the record as well to give  
 18 indication that they had test run the motor  
 19 before they shipped it back to us.  
 20 GREENE, Q.C.:  
 21 Q. Okay. And if you like, we can go to that now,  
 22 PUB-NLH-082, Attachment 2.  
 23 MS. GRAY:  
 24 Q. Sorry, Ms. Greene, can you say that again?  
 25 GREENE, Q.C.:

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1 Q. I think it's PUB-NLH-082, I have written down,  
 2 which was a copy of the invoice.  
 3 MS. GRAY:  
 4 Q. It might actually be 182.  
 5 GREENE, Q.C.:  
 6 Q. And as you indicated, Mr. LeDrew, there was an  
 7 invoice and the notation on it was test run.  
 8 Sorry, it's 182, okay. So there we see on the  
 9 invoice "assemble with new bearings, ran and  
 10 test okay".  
 11 MR. LEDREW:  
 12 A. Correct.  
 13 GREENE, Q.C.:  
 14 Q. Was the contractor able to find a copy of the  
 15 actual test that was done and the results of  
 16 that test?  
 17 MR. LEDREW:  
 18 A. No, they did not.  
 19 GREENE, Q.C.:  
 20 Q. The contract required that a copy of those  
 21 test results be provided to Hydro. Was Hydro  
 22 able, in its records, to find the copy that  
 23 should have been provided to it by the  
 24 contractor?  
 25 MR. LEDREW:

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1 A. No. We went back through our records at plant  
 2 and through our purchasing group, we were  
 3 unable to find other than that invoice. That  
 4 was the only document.  
 5 GREENE, Q.C.:  
 6 Q. Okay. If the test had been done, would they  
 7 have detected the three problems, certainly  
 8 the two problems that we talked about, the  
 9 motor -- the first two, the motor brush boxes  
 10 and the motor's neutral planes?  
 11 MR. LEDREW:  
 12 A. Well, we send these motors out and I have to,  
 13 I guess, mention there's over 600 motors in  
 14 that facility. So there are 40 or 50 motors  
 15 go out every year for service requirements to  
 16 these licensed vendors. And we do not have  
 17 the capabilities to execute these repairs, so  
 18 these centres have the capabilities, the test  
 19 equipment, the balancing equipment, the  
 20 machining equipment and the parts required and  
 21 the dip and baking process. So that's all  
 22 done underneath a standard QA standard that  
 23 they're required to operate under to offer  
 24 this service to ourselves and many other  
 25 industrial customers in the Province.

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1 (12:00 p.m.)  
 2 GREENE, Q.C.:  
 3 Q. Yes, and I guess at the time, when the  
 4 contract was designed and drafted and put out  
 5 to tender, it was deemed important enough that  
 6 the test results be provided. Why would Hydro  
 7 be interested in seeing the test results?  
 8 MR. LEDREW:  
 9 A. Well, I guess, as validation of the work that  
 10 was done, but you have to take into  
 11 perspective that there are many, many motors  
 12 that go out and all of these motors have come  
 13 back without incident, gone back in service  
 14 and performed as expected. So, we had no  
 15 reason to believe that their work was going to  
 16 be sub par or done improperly. That's not  
 17 been our experience.  
 18 GREENE, Q.C.:  
 19 Q. We'll blame it on Mr. O'Brien, will we, that  
 20 the -- this particular motor didn't work, did  
 21 it?  
 22 MR. LEDREW:  
 23 A. This motor did not reach rated speed.  
 24 GREENE, Q.C.:  
 25 Q. And it wasn't able -

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1 MR. LEDREW:  
 2 A. It started and operated.  
 3 GREENE, Q.C.:  
 4 Q. And it wasn't able to provide the lube oil  
 5 supply which led to the failure?  
 6 MR. LEDREW:  
 7 A. That's correct.  
 8 GREENE, Q.C.:  
 9 Q. So coming back as to the importance of these  
 10 testings, again as a layperson I assume  
 11 they're fairly important. I also assume that  
 12 because of the significance of a potential  
 13 failure that might be one of the reasons why  
 14 Hydro would want the contractor to actually  
 15 provide the test results and to validate that  
 16 they had actually been done. Is that correct?  
 17 MR. LEDREW:  
 18 A. Yes.  
 19 GREENE, Q.C.:  
 20 Q. And if the test had been done, would the test  
 21 have most likely been able to detect the  
 22 problems with the motor we already talked  
 23 about?  
 24 MR. LEDREW:  
 25 A. Well, executing a ran and tested okay, you

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1 know, tests could be output voltage. Tests  
 2 could be impedance level. Tests could be  
 3 insulation levels and speed is another  
 4 variable as well. So to measure all these  
 5 variables, you need to have a device that's  
 6 calibrated and standardized as well so that  
 7 all happens inside their world and so if  
 8 calibration -- there could be many reasons in  
 9 the shop, incoming voltage low, anything, that  
 10 could throw off the speed reading at the time.  
 11 So it may very well have been a correct speed  
 12 when it was shipped to us.  
 13 GREENE, Q.C.:  
 14 Q. But of course, without the test results, we  
 15 don't know, do we?  
 16 MR. LEDREW:  
 17 A. I think you'd need more than the results.  
 18 You'd have to probably go and do an autopsy in  
 19 the service centre to try to understand what  
 20 may have failed in their world and -  
 21 GREENE, Q.C.:  
 22 Q. But without the actual results of the test, we  
 23 really don't know when it says "ran and test  
 24 okay" what that means or even if -  
 25 MR. LEDREW:

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1 A. Correct, but have to realize many motors, long  
 2 standing contract, hadn't had problems before.  
 3 Other industries use them. We believed that  
 4 the motor would come back suitable for  
 5 operation.  
 6 GREENE, Q.C.:  
 7 Q. The contract required that Hydro have a copy  
 8 of these test results. Why would that have  
 9 been in the contract?  
 10 MR. LEDREW:  
 11 A. For that reason, maintaining maintenance  
 12 records going forward.  
 13 GREENE, Q.C.:  
 14 Q. And oversight of your quality provided by your  
 15 outside contractor as well?  
 16 MR. LEDREW:  
 17 A. In a small part. I think more to do if you  
 18 have trouble to try to go back and find out  
 19 when trouble arrived to help you diagnose what  
 20 may be wrong with that system.  
 21 GREENE, Q.C.:  
 22 Q. Now since then, Hydro has changed its  
 23 procedures. Is that correct?  
 24 MR. LEDREW:  
 25 A. Yes, our in-plant return to service procedures

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1 have changed and our weekly testing procedures  
 2 have changed.  
 3 GREENE, Q.C.:  
 4 Q. And those changes, can you explain what you  
 5 have changed since January 1, 2013?  
 6 MR. LEDREW:  
 7 A. Well, the original procedures that we used to  
 8 operate and maintain the plant for the first  
 9 45 years of its history were based on the OEM  
 10 recommendations that were in the manuals at  
 11 the time. As a result of this failure and the  
 12 four or five months of analysing what  
 13 happened, we revised the procedures to  
 14 actually validate that we're getting adequate  
 15 pressure coming out of the DC pump and we  
 16 actually checked for motor speed through a new  
 17 process we've implemented to be able to  
 18 validate that when in plant.  
 19 GREENE, Q.C.:  
 20 Q. And we'll come back to that in a moment, but  
 21 when the motor was returned to the plant, I  
 22 understand -- after it had come back from the  
 23 contractor, after the failure, and it was  
 24 passed, and you went to install it, it still  
 25 was unable to reach speed. Is that correct?

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1 On the top of page 60 of Liberty's report is  
 2 probably the easiest place to find that, if  
 3 you want to find the reference.  
 4 MR. LEDREW:  
 5 A. Yeah. I guess while Jennifer's looking there,  
 6 there were a host of -- the investigation  
 7 effort took four and a half months. It went  
 8 through the pumping systems, the valving  
 9 systems, the power distribution systems.  
 10 There was a lot of effort here to narrow down  
 11 that we actually had a problem with the motor,  
 12 not the pump, not the coupling, not any of the  
 13 piping arrangement. So, it was many months  
 14 later after the failure before we actually  
 15 took the motor out to have it serviced and  
 16 validated at an external service provider,  
 17 independent of the one that we were currently  
 18 using.  
 19 GREENE, Q.C.:  
 20 Q. And when it did come back after that, that is  
 21 when again it didn't come back to full load?  
 22 MR. LEDREW:  
 23 A. We sent it out then with an expectation we've  
 24 eliminated everything. There's something  
 25 wrong with this motor. Please go back and

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1 interrogate this motor. So it went into that  
 2 service provider knowing that we have narrowed  
 3 down trouble with this motor and we need you  
 4 to go through this with a fine tooth comb.  
 5 GREENE, Q.C.:  
 6 Q. And when it came back to the plant, even  
 7 though it had passed tests at the outside  
 8 contractor, and when it returned, it wasn't  
 9 able to reach full load because of a resister  
 10 setting? Is that correct?  
 11 MR. LEDREW:  
 12 A. Correct. So there was two problems found at  
 13 the independent investigation at another  
 14 service centre, and those corrections were  
 15 made. It was sent to us. We installed it  
 16 back in the unit and test run the unit and we  
 17 were still delivering a low speed, showing a  
 18 low speed on that DC pump.  
 19 GREENE, Q.C.:  
 20 Q. And that was because of an improper resister  
 21 setting at the plant? Is that correct?  
 22 MR. LEDREW:  
 23 A. Correct. There's a resister setting, rheostat  
 24 it's called, in the starter cubicle for that  
 25 motor and that had to be adjusted to get the

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1 motor speed where we would need it.  
 2 GREENE, Q.C.:  
 3 Q. And after that was done, the motor worked  
 4 properly? Is that correct?  
 5 MR. LEDREW:  
 6 A. After that was done, it was pumping adequate  
 7 fluid.  
 8 GREENE, Q.C.:  
 9 Q. Okay.  
 10 MR. LEDREW:  
 11 A. That's all we were concerned about was  
 12 adequate fluid.  
 13 GREENE, Q.C.:  
 14 Q. Right.  
 15 MR. LEDREW:  
 16 A. Motor speed -  
 17 GREENE, Q.C.:  
 18 Q. But they need the speed of the motor to get  
 19 the adequate flow.  
 20 MR. LEDREW:  
 21 A. That's correct.  
 22 GREENE, Q.C.:  
 23 Q. And if they don't have adequate flow, the unit  
 24 blows up, right?  
 25 MR. LEDREW:

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1 A. If your flow is low, yeah, you can starve  
 2 bearings, yeah.  
 3 GREENE, Q.C.:  
 4 Q. Okay. So we've talked about the motor that  
 5 failed and the testing you had done on the  
 6 motor. Now we're talking about once the motor  
 7 was returned, the testing that Hydro had done  
 8 for the lube oil supply system at the plant,  
 9 and at the time, you mentioned here the  
 10 standard that you were relying on had been  
 11 provided when the plant was commissioned back,  
 12 what, 45 years ago you said?  
 13 MR. LEDREW:  
 14 A. Correct, yeah.  
 15 GREENE, Q.C.:  
 16 Q. Okay. So the testing that Hydro was doing for  
 17 the motors prior to January 1, 2013, did that  
 18 testing test for whether it -- it tested for  
 19 whether the pump started. Is that correct?  
 20 MR. LEDREW:  
 21 A. The test as outlined by the OEM on a weekly  
 22 basis, we had no indication there was a hidden  
 23 failure in that DC system and it passed the  
 24 test and there was weeks and weeks and weeks  
 25 of tests done, validated and as far as we were



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1 aware, we were okay with our DC system.  
 2 GREENE, Q.C.:  
 3 Q. Okay. So it started, but you didn't at that  
 4 time check for whether there was adequate flow  
 5 to start the motor, did you?  
 6 MR. LEDREW:  
 7 A. Correct. The test sets up that on falling  
 8 pressure, which could be loss of power or  
 9 something else, but when pressure drops off,  
 10 it would call for the second pump to start and  
 11 recover pressure.  
 12 GREENE, Q.C.:  
 13 Q. And here I'd like to go to page 61 of  
 14 Liberty's report and I just want to read this  
 15 and ask a question about it, and when you look  
 16 at the second paragraph it says "good utility  
 17 practice and basic common sense dictates that  
 18 any system test sequence should be designed  
 19 and executed on the primary criterion that the  
 20 system function as intended. Other immediate  
 21 criteria, eg. relays, operating temperature  
 22 maintained, current remain reasonable  
 23 vibration acceptable may be included. The  
 24 fundamental question that testing should  
 25 answer however remains whether the system work

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1 as it supposed to and whether it will do so  
 2 when needed. Hydro did not design or execute  
 3 its testing to answer these central questions.  
 4 The consequences proved severe." This goes  
 5 back to the testing that was done before  
 6 January 2013. And I understand that since  
 7 that, you have changed your testing procedure  
 8 to determine adequate oil flow. Is that  
 9 correct?  
 10 MR. LEDREW:  
 11 A. Yes. Now we -- the testing procedure now  
 12 looks for a step change in discharge pressure  
 13 when you start your second pump.  
 14 GREENE, Q.C.:  
 15 Q. Okay, and in your evidence this morning, and  
 16 also in the documentation you have filed, you  
 17 have relied upon a standard that was given to  
 18 you when the plant was first commissioned back  
 19 in 1945, is that - 45 years ago, 1960,  
 20 whatever?  
 21 MR. LEDREW:  
 22 A. 1968, yes. It was based off the  
 23 manufacturer's documentation and there was an  
 24 in plant procedure written around that, yes.  
 25 GREENE, Q.C.:

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1 Q. Okay, so coming back to the quote that I  
 2 asked, would you agree with Liberty's  
 3 statement there, that the purpose of doing a  
 4 test is to make sure it works as you need it  
 5 to work?  
 6 MR. LEDREW:  
 7 A. You know, now our testing - the original  
 8 testing was testing that your backup pump  
 9 would start on falling pressure. Now our test  
 10 is determining that we're actually seeing a  
 11 step change in increase in pressure when we  
 12 start that pump. So we've changed the - from  
 13 the learnings from this investigation, we've  
 14 changed the weekly test to look ahead to see  
 15 that we actually have the contribution of a  
 16 second pump when it's called on to start.  
 17 That was not the basis of the test that was  
 18 based from the OEM 45 years ago.  
 19 GREENE, Q.C.:  
 20 Q. So the reliance on an OEM procedure that was  
 21 given several years ago, Liberty also has  
 22 determined - reviewed that as well, and have  
 23 determined that in their opinion that is not  
 24 adequate, given your knowledge of the plant?  
 25 MR. LEDREW:

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1 A. Well, I don't know if I fully agree with that.  
 2 There are many systems in that plant and your  
 3 foundation point for all of this is to start  
 4 with the OEM recommendations who have designed  
 5 and provided the equipment. So many of the  
 6 procedures we have there today beyond just the  
 7 CD lube oil system are based on manufacturer  
 8 recommendations. I mean, if we were to accept  
 9 that, you'd probably toss a lot of them out  
 10 and start - I don't think that's a prudent way  
 11 to go, to be quite honest.  
 12 GREENE, Q.C.:  
 13 Q. Liberty also says on page 62, that the testing  
 14 of a lube oil system is not complex, so we're  
 15 not talking about something that was a very  
 16 sophisticated system that you needed special  
 17 expertise for?  
 18 MR. LEDREW:  
 19 A. I would suggest to you that it's a double  
 20 redundancy system, we don't have many in our  
 21 fleet today, and that there are many little  
 22 bits and pieces in that system that could fail  
 23 and could cause the same issue to replicate  
 24 itself. You know, as I suggested, we spent  
 25 four months diagnosing piping, orifices, trip

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1 protection devices, starter circuits, battery  
 2 bank capacities, pump capacities, pump  
 3 impellers. I mean, there's a long, long list,  
 4 until we narrow it down to a CD motor that had  
 5 been serviced was actually running at a slower  
 6 speed than planned. You know, I wouldn't call  
 7 it, yes, they're not complex, but there's a  
 8 lot of pieces.

9 GREENE, Q.C.:

10 Q. Okay, and you do recognize that at the time  
 11 that Liberty did its prudence review, it did  
 12 apply the standard of no hindsight information  
 13 known to Hydro at the time of the incident and  
 14 prior to?

15 MR. LEDREW:

16 A. Yes, I believe that to be the principle.

17 GREENE, Q.C.:

18 Q. Liberty in its report starting on page 63 also  
 19 raised concerns with respect to the overall  
 20 reliability of the three lube oil systems  
 21 there, and this did not relate to their  
 22 findings of imprudence related to the Unit 1  
 23 failure, but they raised a concern with  
 24 respect to the vulnerability of that system  
 25 for future failures. So the questions here

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1 relate to the future as opposed to the  
 2 findings of imprudence, and Liberty had  
 3 suggested that given the fact that we had a  
 4 loss of power to the plant which took out the  
 5 two primary sources, we were relying on one  
 6 only, the third DC motor pump system which  
 7 didn't work at that time, and they suggested  
 8 that the potential for a common mode failure  
 9 should be further examined by Hydro. Now  
 10 Hydro in its reply, the August 7th reply on  
 11 page 29, didn't think that was necessary. I  
 12 guess, why I'm asking the question is with the  
 13 level of comfort that Hydro can provide to the  
 14 stakeholders and to the Commissioners that the  
 15 risk of common mode failure raised by Liberty  
 16 is being properly addressed by Hydro. So  
 17 would you like - I'm not sure if it's Mr.  
 18 Henderson or Mr. LeDrew, but can you answer  
 19 that question, given the concern raised by  
 20 Liberty in Hydro's reply, what level of  
 21 comfort should be taken from the potential for  
 22 lack of common mode - that there might be a  
 23 common mode failure and loss of the third  
 24 redundant system again for lube oil?  
 25 (12:15 p.m.)

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1 MR. LEDREW:

2 A. I'll make the first stab at it, but on the day  
 3 of this storm, we suffered what was considered  
 4 a brown out condition, and that brown out  
 5 condition had the effect of inhibiting the  
 6 successful start of the standby lube oil pump  
 7 on Unit 1. It also inhibited the start of 600  
 8 volt emergency diesels. We have two 600 volt  
 9 diesels in the station as well, and they did  
 10 not start. In all things being equal, if the  
 11 yard had went to a blackout state immediately,  
 12 which it did three and a half minutes later,  
 13 but if it had went to a blackout state, the  
 14 emergency diesels would have started and your  
 15 standby AC pump would have started and  
 16 recovered that inadequate scenario with the DC  
 17 pump on oil supply. So there's a couple of  
 18 other scenarios that happened on that  
 19 particular storm on that day.

20 MR. HENDERSON:

21 A. In terms of what we have done as a result of  
 22 the incident is we undertook, as Terry is  
 23 explaining, an extensive review of the event  
 24 and came up with recommendations of things to  
 25 change, and the DC lube oil system has gone

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1 through - we now have different test  
 2 procedures that we follow that ensures that  
 3 the DC system is running adequately through  
 4 out weekly tests. So that's your primary  
 5 source of, I'll say, your last resource for  
 6 providing a lubrication oil system and we're  
 7 confident that the changes that we've  
 8 implemented will identify any problems with  
 9 that system. The test now identifies on a  
 10 weekly basis whether that system delivers  
 11 adequate oil. So the critical piece is that  
 12 that is the way that it works and that's the  
 13 understanding that I have is that's a very  
 14 common design is the DC system is your last  
 15 line of defence. In addition to that, we  
 16 undertook changes to the AC motor such that  
 17 the AC motor would perform more consistently  
 18 across all units for the brown out condition  
 19 that we experienced that day. As Terry  
 20 mentioned, Unit 2 AC motor continued to - it  
 21 operated on the loss of supply to the station  
 22 and provided the lube oil required, and then  
 23 the DC pump would have kicked in after the  
 24 total blackout of the plant, but we made those  
 25 same changes to the AC motor on Unit 1 so that

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1 it has a more robust operation. So they were  
 2 the primary changes that we made to the system  
 3 to ensure its reliable operation, which in  
 4 essence has served that plant very well over  
 5 its 40 odd years of operation. So doing that  
 6 was what we put in place. We did investigate  
 7 starting the diesels on an under voltage and  
 8 our engineering review of that indicated that  
 9 the complexity and the time that it would take  
 10 to react to a brown out situation would not  
 11 bring about - by starting up the diesels would  
 12 not bring about the adequate lube oil pressure  
 13 on the AC system quickly enough to be of  
 14 value. So that solution was reviewed and not  
 15 followed up because of that issue, but the  
 16 things that we did, as I mentioned, were  
 17 making sure that the systems work under the  
 18 brown out condition, the type of brown out  
 19 condition we experienced that day, and the DC  
 20 pumps testing is thoroughly done, and as we  
 21 said, we've had those units operating  
 22 successfully with that system for many years,  
 23 and we believe that those enhancements are  
 24 appropriate to ensure that adequate lube oil  
 25 system will provide the lubrication that's

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1 required to safely shut down the unit.  
 2 GREENE, Q.C.:  
 3 Q. So in Hydro's opinion, no additional work is  
 4 required with respect to this concern raised  
 5 by Liberty?  
 6 MR. HENDERSON:  
 7 A. Our view is that this is what would be - in  
 8 order to introduce - we could introduce  
 9 another DC lube oil system, a pumping system,  
 10 which would be a pretty complex change, I  
 11 would think, but Terry would be able to talk  
 12 about that, but in terms of going that way or  
 13 what other solutions you put in there, in  
 14 order to have a backup to the DC backup, you  
 15 know, you can design such systems and, you  
 16 know, I would say that that's something that  
 17 we could consider, but it's a cost and you  
 18 have to assess the risk associated with that,  
 19 and with us, given the history and the  
 20 frequency of these things, and the actions  
 21 that we've taken to ensure that the DC system  
 22 operates properly as it should, we consider  
 23 that would be sufficient for the remaining  
 24 life of the facility.  
 25 GREENE, Q.C.:

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1 Q. And perhaps this is something we'll follow up  
 2 with Liberty, but I just wanted to make sure  
 3 we understood your current position with  
 4 respect to this issue, which is no further  
 5 work is required, okay. Moving now to another  
 6 project, the Sunnyside replacement equipment,  
 7 the outages that occurred in January of 2014  
 8 were caused by two - at a very high level, two  
 9 primary reasons. One was insufficient  
 10 generation which led to the rotating outages  
 11 in the early part of the period, and then we  
 12 had the equipment failures that started on  
 13 January 4th, and this is what I want to talk  
 14 about now. So again at a very high level,  
 15 just to put this in perspective, on January  
 16 4th, we had a failure at the Sunnyside  
 17 terminal station, and without getting too  
 18 technical, Mr. Moore, could you explain for us  
 19 what happened at Sunnyside that day?  
 20 MR. MOORE:  
 21 A. What happened on the morning of January 4th in  
 22 Sunnyside, we knew in the days prior that  
 23 there was a winter storm forecasted, and after  
 24 having been involved with the period of  
 25 generation shortages, we took active

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1 preparation to ensure that we had appropriate  
 2 maintenance personnel stationed in some of our  
 3 key terminal stations to prepare for the storm  
 4 on the morning of January 4th, and what  
 5 happened that morning we had a failure of a  
 6 power transformer, Sunnyside T1. We had  
 7 personnel stationed there. I think it was  
 8 just shortly after 9 a.m. on January 4th we  
 9 had the transformer fail, and eventually to  
 10 the point where the transformer caught fire, a  
 11 catastrophic failure of that transformer.  
 12 That's the events that happened. We had, like  
 13 I say, personnel on site and then proceeded to  
 14 safely isolate the burning transformer from  
 15 the system and continued to work towards  
 16 restoring customers.  
 17 GREENE, Q.C.:  
 18 Q. So when the transformer failed early in the  
 19 morning around 9 a.m., the breaker that was  
 20 supposed to operate to isolate it from the  
 21 system didn't work, did it?  
 22 MR. MOORE:  
 23 A. That's correct. There were five breakers  
 24 required to safely isolate that transformer  
 25 from the power system that morning. Four of

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1 the five operated correctly, but Sunnyside  
 2 BIL03 failed to open to adequately clear the  
 3 fault in time.  
 4 GREENE, Q.C.:  
 5 Q. Okay, and that was an air blast circuit  
 6 breaker, is that correct?  
 7 MR. MOORE:  
 8 A. That's correct.  
 9 GREENE, Q.C.:  
 10 Q. And if it had operated properly, it would have  
 11 isolated the transformer from the system, and  
 12 we probably wouldn't have had a fire, is that  
 13 correct?  
 14 MR. MOORE:  
 15 A. In our estimate, if the break had have  
 16 operated when it should have, and safely  
 17 cleared the transformer from the power system,  
 18 we're surmising that the fault would have been  
 19 appropriately isolated using that protection  
 20 and we wouldn't have experienced a  
 21 catastrophic failure of that transformer.  
 22 GREENE, Q.C.:  
 23 Q. Okay, so we had two things going on early in  
 24 the morning. We had the transformer failed  
 25 and we had a stuck, I'm going to use that

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1 term, mis-operated air blast circuit breaker  
 2 that didn't work either, and we also had  
 3 another problem at Sunnyside later in the  
 4 afternoon, didn't we, around 3:30, and what  
 5 was that?  
 6 MR. MOORE:  
 7 A. At that time later on in the afternoon when we  
 8 were in the process of restoring customers,  
 9 there was some protection modifications that  
 10 were required and we had personnel on site,  
 11 and we also had a team in Bishop Falls that  
 12 were helping support restoring the station and  
 13 restoring our customers, and at that time  
 14 there was still a protection relay that was  
 15 latched in the station at the time, and during  
 16 the process of restoring customers, that relay  
 17 caused another outage while we were in our  
 18 restoration process to customers.  
 19 GREENE, Q.C.:  
 20 Q. Now I'd like to go to Liberty's interim report  
 21 of April, 2014, which was circulated last  
 22 week, so we need to enter that on the record  
 23 and mark it as an information item. Number 26  
 24 is the number for the - in terms of what we're  
 25 discussing here, I just wanted to take you to

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1 page 41 under Bii, "Hydro equipment outages",  
 2 and here in the very first sentence we see,  
 3 "Two of the three major power outage events of  
 4 January 4th resulted from causes consisting of  
 5 the transformer failure, the circuit breaker  
 6 malfunction, the protective relay design  
 7 issue, and an issue related to operator  
 8 knowledge of the protective relay scheme at  
 9 Hydro's Sunnyside terminal station". Mr.  
 10 Moore, that sentence is talking only about  
 11 what happened at Sunnyside that morning that  
 12 you just described, isn't it?  
 13 MR. MOORE:  
 14 A. That's right, that refers to the outage at  
 15 Sunnyside on January 4th.  
 16 GREENE, Q.C.:  
 17 Q. Okay, and we see Liberty is - for the two  
 18 events, one in the morning and the one in the  
 19 afternoon, we see that Liberty is saying that  
 20 there were four reasons for that, and just to  
 21 put this in perspective, I wanted to talk  
 22 first about the design issue, the protective  
 23 relay design issue. Can you tell us what that  
 24 was at that time?  
 25 MR. MOORE:

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1 A. Essentially what's being referenced there is  
 2 what we would call a breaker fail scheme, and  
 3 essentially what happened was we had a fault  
 4 on the power transformer Sunnyside T1 that  
 5 morning, and one of the five breakers that we  
 6 talked about which would be required to clear  
 7 that fault and to try to prevent further  
 8 catastrophic damage to that transformer,  
 9 failed to open, and a breaker fail scheme is a  
 10 protective relay design scheme that if that  
 11 breaker did not open to clear the fault on  
 12 that transformer, it would initiate another  
 13 series of events that would open further  
 14 breakers to adequately clear the fault in  
 15 time, and that protection and control design  
 16 was not built into that breaker for that  
 17 transformer.  
 18 (12:30 p.m.)  
 19 GREENE, Q.C.:  
 20 Q. And at that time prior to this incident, Hydro  
 21 didn't provide that breaker failure protection  
 22 for the 230 KV, did it?  
 23 MR. MOORE:  
 24 A. That breaker fail protection was not in  
 25 Sunnyside for that breaker on that

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1 transformer, and that's basically the original  
 2 design of the station.  
 3 GREENE, Q.C.:  
 4 Q. And Liberty recommended that Hydro look at  
 5 that protective relay design and assess  
 6 implementing it where - two terminal stations  
 7 for the 230 KV transformers, is that correct?  
 8 MR. MOORE:  
 9 A. That's in their recommendation, yes.  
 10 GREENE, Q.C.:  
 11 Q. And Hydro accepted that recommendation, is  
 12 that correct?  
 13 MR. MOORE:  
 14 A. That's correct.  
 15 GREENE, Q.C.:  
 16 Q. And that has been done now at Sunnyside, is  
 17 that correct?  
 18 MR. MOORE:  
 19 A. Yes.  
 20 GREENE, Q.C.:  
 21 Q. The fourth issue there, operator knowledge of  
 22 the protective - going back to page 41, the  
 23 fourth listed issue there was, "Operator  
 24 knowledge of the protective relay system".  
 25 Here Liberty was talking about the second

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1 outage at Sunnyside, or the second incident, I  
 2 should say, at Sunnyside in the afternoon of  
 3 January 4th, 2014, is that correct?  
 4 MR. MOORE:  
 5 A. Yes, that's correct.  
 6 GREENE, Q.C.:  
 7 Q. And Hydro accepted - and they recommended  
 8 further that qualified P & C technologists be  
 9 with the crews when restoring service, is that  
 10 correct? Liberty made that recommendation?  
 11 MR. MOORE:  
 12 A. They did make that recommendation, yes.  
 13 GREENE, Q.C.:  
 14 Q. And Hydro has accepted that recommendation?  
 15 MR. MOORE:  
 16 A. Yes, we have. What happened on the January  
 17 4th outage was, like I mentioned earlier, we  
 18 did preparation in the days leading up to the  
 19 forecasted storm on January 4th, and had  
 20 personnel stationed in our key terminal  
 21 stations where we expected that storm to hit,  
 22 and at the time when we made preparations, we  
 23 didn't actually have protection and control  
 24 technologists available to be on site on that  
 25 January 4th day, on Saturday. We did have our

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1 protection and control supervisor on site and  
 2 we did have support staff from our Bishop  
 3 Falls office working through the restoration  
 4 process that day, but what Liberty are  
 5 referring to there with respect to  
 6 knowledgeable operators, I think is the term  
 7 they used, is that we didn't have available  
 8 and didn't have on site protection and control  
 9 technicians that day.  
 10 GREENE, Q.C.:  
 11 Q. Who knew the relay system and how to operate  
 12 it?  
 13 MR. MOORE:  
 14 A. And what we have done since is our storm  
 15 preparation protocol that we have in place,  
 16 you know, and have further enhanced requires  
 17 that any event like that in the future, we  
 18 would ensure that we do have protection and  
 19 control technicians on site that day.  
 20 GREENE, Q.C.:  
 21 Q. Okay. So those two issues, the protective  
 22 relay design issue, and the issue of the  
 23 knowledge of the onsite personnel, have now  
 24 been dealt with by Hydro who has accepted  
 25 Liberty's recommendations and they did not

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1 form part of Liberty's analysis or imprudence  
 2 findings, so we won't talk about those any  
 3 more.  
 4 MR. MOORE:  
 5 A. Okay.  
 6 GREENE, Q.C.:  
 7 Q. So if you come back to - I just want to again,  
 8 because when we get to the cost - the next  
 9 panel we have to deal with, the fact that some  
 10 of those cost numbers included the protective  
 11 relay design improvements which Liberty found  
 12 prudent.  
 13 MR. MOORE:  
 14 A. Okay.  
 15 GREENE, Q.C.:  
 16 Q. So if we come back to the two issues which is  
 17 the failure of the transformer and the air  
 18 blast circuit breaker being stuck, the two  
 19 issues that happened at Sunnyside in the  
 20 morning, can we talk first about the  
 21 transformer. T1 at Sunnyside at that time was  
 22 about 36 years old, is that correct?  
 23 MR. MOORE:  
 24 A. That would be about right, subject to check  
 25 the exact age.

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1 GREENE, Q.C.:

2 Q. And what were Hydro's maintenance practices at

3 that time for preventative maintenance for

4 transformers?

5 MR. MOORE:

6 A. The preventative maintenance practices for

7 power transformers for Hydro is fully

8 explained in PUB-NLH-174, I believe it is,

9 which talks about the things that we do in

10 terminal stations anywhere from, I'll say, a

11 monthly air system check right up to a six

12 year full preventative maintenance check on a

13 power transformer, and the things that we do

14 in our stations on an annual basis and on a

15 quarterly basis each year in stations.

16 GREENE, Q.C.:

17 Q. And with respect to the transformers, the

18 preventative maintenance cycle at that time

19 was a six year cycle, is that correct?

20 MR. MOORE:

21 A. That's right. The full preventative

22 maintenance check was on a six year cycle for

23 power transformers. That's where we actually

24 do a full inspection and like a double test

25 which is an ongoing test to - over time with

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1 the life of a transformer, it's a condition

2 assessment test of the insulation of the

3 bushings where you monitor it over time and

4 look for changes over time to help you do your

5 long term asset planning for those assets.

6 GREENE, Q.C.:

7 Q. Okay. In coming up with the standard for a

8 six year cycle for transformers for

9 preventative maintenance, why would Hydro have

10 come up with that standard?

11 MR. MOORE:

12 A. Hydro uses a six year standard for power

13 transformers. Our maintenance and power

14 transformers goes back some time now, right

15 back from the OEM recommendations as Terry

16 talked about for some of the assets in the

17 Holyrood plant. So we would have built our

18 preventative maintenance program originally

19 based on what the original equipment

20 manufacturer would have recommended for

21 maintenance on power transformers. Then over

22 time, you know, based on experience that we've

23 had and known condition of our assets, we

24 would have - back in, I think the early 2000s

25 it was, we did a full maintenance review of

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1 our systems where we would have compared to

2 best practices with other utilities and

3 checked again with the original equipment

4 manufacturer, and we validated then that a six

5 year cycle was appropriate for that asset.

6 When we compared to other utilities, they were

7 somewhere between four and eight year range

8 when it comes to maintenance intervals for

9 power transformers. We validated that again

10 and this is documented in an RFI, I don't

11 recall the number, back in around 2012 where

12 we did a full asset maintenance review again

13 and again checked with other utilities and the

14 original equipment manufacturers just to look

15 at what the acceptable cycle should be for

16 that preventative maintenance check on power

17 transformers.

18 GREENE, Q.C.:

19 Q. And the six year cycle was found by Liberty to

20 be a prudent standard, is that correct?

21 MR. MOORE:

22 A. Liberty agreed that that was an acceptable

23 time frame for maintenance.

24 GREENE, Q.C.:

25 Q. Now I'm going to ask you a question, it's a

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1 very basic question, why would you do

2 preventative maintenance, what's the purpose

3 of it?

4 MR. MOORE:

5 A. The purpose of preventative maintenance is to

6 do an ongoing condition assessment of your

7 assets to collect data and condition

8 assessment data, so that you can first of all

9 look for any defects with that asset that may

10 need to be corrected either in the near term

11 or to be planned for the longer term, and it's

12 also that you gather condition data so you can

13 trend that asset over time to determine what

14 you may need to address your long term asset

15 management plan.

16 GREENE, Q.C.:

17 Q. Would you agree that one of the reasons may be

18 to prevent customer outages and failures, you

19 detect the problem before it happens?

20 MR. MOORE:

21 A. Yes, our preventative maintenance program

22 definitely is focused in on maintaining our

23 assets in a suitable manner to provide that

24 reliable service to our customers.

25 GREENE, Q.C.:

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1 Q. And it would also help identify the corrective  
 2 maintenance required and to be able to do that  
 3 in a cost effective way, is that correct?  
 4 MR. MOORE:  
 5 A. That's correct, yes.  
 6 GREENE, Q.C.:  
 7 Q. So it's important to do preventative  
 8 maintenance obviously. I'm stating the  
 9 obvious.  
 10 MR. MOORE:  
 11 A. Hydro is certainly very committed to our  
 12 preventative maintenance program. That being  
 13 said, like, when we develop an annual work  
 14 plan with the preventative maintenance that's  
 15 due in that year, if other higher priority  
 16 work comes into that year that draws upon our  
 17 existing resources, and bearing in mind that  
 18 we're balancing costs as well - we talked  
 19 about how we want to manage to our operating  
 20 budgets, very committed to do so, and there's  
 21 been a fair bit of evidence about how we  
 22 develop our operating budgets and manage those  
 23 operating budgets, and they play into things  
 24 like trying to manage the rural deficit, for  
 25 example. We are very committed to least cost,

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1 but at the same time very committed to  
 2 completion of our preventative maintenance  
 3 program, but will make decisions and balance  
 4 higher priority work that does come into play  
 5 during that year that was unaccounted for when  
 6 we developed our initial annual work plan.  
 7 GREENE, Q.C.:  
 8 Q. And we're going to talk about how you did that  
 9 and how it happened. So we know from your  
 10 evidence that the cycle that Hydro had agreed  
 11 upon and which is found to be a prudent  
 12 utility standard was six year cycles for the  
 13 transformers. We also know that Hydro had not  
 14 been able to do all this preventative  
 15 maintenance, and I believe from your evidence  
 16 previously, last week or the week before, you  
 17 had said that Hydro had identified that it  
 18 wasn't able to do its preventative maintenance  
 19 and in 2009 came up with a six year plan to  
 20 start tackling the problem, is that correct?  
 21 MR. MOORE:  
 22 A. That's right, we started our six year recovery  
 23 plan just for terminal stations, just to make  
 24 sure that's clear, back in 2010. For the  
 25 other assets that we're accountable for, we

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1 were doing very well when it comes to  
 2 completing the maintenance in the appropriate  
 3 cycles.  
 4 GREENE, Q.C.:  
 5 Q. Yes, and, I guess, we're looking at  
 6 transformers because we had a transformer that  
 7 failed.  
 8 MR. MOORE:  
 9 A. Yes.  
 10 GREENE, Q.C.:  
 11 Q. So can we go to PR PUB-NLH 169, Revision 1,  
 12 please, and we looked at this when you  
 13 testified before, Mr. Moore.  
 14 MR. MOORE:  
 15 A. Yes.  
 16 GREENE, Q.C.:  
 17 Q. So we have had some discussion around it  
 18 already. The question was, the number of  
 19 terminal station transformers that were  
 20 overdue for their six year maintenance cycle  
 21 which was Hydro's standard for doing this  
 22 preventative maintenance, and it was about  
 23 2009, was it, you said, you looked at the plan  
 24 to try to catch up and to bring up - to get  
 25 your maintenance up to date?

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1 MR. MOORE:  
 2 A. That's right. The first year of the six year  
 3 plan started in 2010.  
 4 GREENE, Q.C.:  
 5 Q. Okay, and we can see from this little table  
 6 here in the middle that talks about - the  
 7 numbers in the table indicate the numbers that  
 8 were outstanding at the end of each year for  
 9 preventative maintenance that was not  
 10 completed, is that correct?  
 11 MR. MOORE:  
 12 A. That's right, that's what the table is  
 13 indicating, yes.  
 14 GREENE, Q.C.:  
 15 Q. Okay, so if we look at that table after you  
 16 decided in 2009 you needed a plan to catch up,  
 17 we do see in 2010, it was 18, 2011 it was 17,  
 18 2012, 17, still not completed, and, of course,  
 19 then we see in 2013 it jumps to 27. I guess,  
 20 you'd have to agree with me that Hydro did not  
 21 make much progress in catching up on its  
 22 preventative maintenance up to January, 2014?  
 23 MR. MOORE:  
 24 A. When I look at - that's basically the first  
 25 four years of our six year recovery plan

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1 there, 2010 to 2013, and, I guess, to put it  
 2 in perspective, Hydro has 105 power  
 3 transformers in its fleet, and I do agree the  
 4 numbers there in 2013 are higher four years  
 5 into our six year recovery plan. Now we've  
 6 indicated in another RFI as well the huge  
 7 volume, I'll say, of break in work that we  
 8 experienced in 2013. We talked about - Rob  
 9 already spoke about the infrastructure that we  
 10 put in place out in Holyrood to accommodate  
 11 the Newfoundland Power mobiles. That was done  
 12 with the crews that would have been assigned  
 13 to these maintenance tactics. We had to take  
 14 into account the severe winter storm that we  
 15 had in Holyrood the winter of 2013, and as a  
 16 result of that, we made a decision to provide  
 17 an RTV coating on the insulators for the  
 18 breakers in the station to help prevent  
 19 further risk of failures from winter storms in  
 20 the Holyrood yard. We were also still working  
 21 on a rewind, which is another example, of the  
 22 Stephenville gas turbine generator, and we  
 23 also embarked upon an unplanned or unbudgeted  
 24 capital program in 2013 to replace the  
 25 generator on the Hardwoods gas turbine, which

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1 was a huge draw on our resources. I think  
 2 when we added it all up for 2013, the crews  
 3 that would normally be working on our  
 4 preventative maintenance items, I think there  
 5 was 10,000 hours or regular time and 10,000  
 6 hours of overtime, that drew us away from our  
 7 planned work that year. I do agree the number  
 8 is high, and that's just some of the reasons  
 9 as to why that number is what it is.  
 10 GREENE, Q.C.:  
 11 Q. And you talked about why it was high in 2013,  
 12 and we're going to come back to how Hydro made  
 13 the decision to defer preventative  
 14 maintenance, but even before 2013 now, the  
 15 numbers didn't really decrease. We see 18 in  
 16 2010, which was an increase from 2009, but  
 17 it's still much higher than 2007, for example.  
 18 No progress really in 2011 or 2012, and I  
 19 wanted to ask you about those years first, and  
 20 we'll come back to 2013.  
 21 MR. MOORE:  
 22 A. Okay.  
 23 GREENE, Q.C.:  
 24 Q. You were the manager responsible at that time  
 25 as well, were you?

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1 MR. MOORE:  
 2 A. I moved into this position and became the  
 3 manager responsible midway through 2011.  
 4 GREENE, Q.C.:  
 5 Q. Okay.  
 6 MR. MOORE:  
 7 A. So we were half way through the second year  
 8 when I took this position.  
 9 GREENE, Q.C.:  
 10 Q. So when you were looking at this information  
 11 with respect to - you had a plan, you were  
 12 going to catch up on your preventative  
 13 maintenance, you were going to do it with your  
 14 own resources over a period of time. You were  
 15 going to start in 2009, was it?  
 16 MR. MOORE:  
 17 A. 2010 would have been the first year.  
 18 GREENE, Q.C.:  
 19 Q. And did you look at that and say at any point  
 20 we're going to have difficulty in meeting our  
 21 plan?  
 22 MR. MOORE:  
 23 A. When I took the position back in 2011, I  
 24 recognized at the time and in consultation  
 25 when I moved into a new role with the people

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1 that make our - like, when we develop our  
 2 annual work plan, what we look at, and I'll  
 3 talk about power transformers, what we would  
 4 look at is all our power transformers in our  
 5 fleet and when developing the annual work  
 6 plan, we would have our long term asset  
 7 planning people, our work execution people,  
 8 and our short term planning and scheduling  
 9 teams developing the annual work plan, and  
 10 they would look at power transformers and the  
 11 first assessment would be we want to make sure  
 12 that we include in our plan the most overdue  
 13 transformers first into the plan that year  
 14 based on the resources that we have available  
 15 in our teams throughout TRO. So that's how  
 16 that plan would have been developed each year.  
 17 Like I say, I took the job back in 2012, so my  
 18 first involvement would have been the  
 19 development of the 2012 annual work plan. So  
 20 we built a plan in 2012 based on the most  
 21 overdue transformers, built that into our  
 22 plan, with the idea of catching up on at least  
 23 1/6th of what was overdue in 2012, still  
 24 trying to meet our target of the end of 2015  
 25 to achieve the catch up program. That's how



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1 the plan would have been developed starting  
 2 with the most overdue. At the time, we didn't  
 3 have a formal asset criticality ranking such  
 4 that we submitted to the board on June 2nd,  
 5 2014, for power transformers. So what our  
 6 folks would have done at that time, they would  
 7 have looked at any transformers associated  
 8 with generating facilities as being the  
 9 highest priority. So if there's a transformer  
 10 associated with a generating unit and the most  
 11 overdue, that would have been definitely  
 12 included in that plan into 2012. So that's  
 13 how it was developed, but that was based on  
 14 the resources that we had at the time and the  
 15 operating budget that we were managing too at  
 16 the time.

17 GREENE, Q.C.:

18 Q. And that would have been the same for your  
 19 predecessor, would it?

20 MR. MOORE:

21 A. My assumption would be that they would have  
 22 followed the same process for developing the  
 23 annual work plan.

24 GREENE, Q.C.:

25 Q. And who was your predecessor?

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1 MR. MOORE:

2 A. In 2011, when I moved into the general  
 3 manager's role, that was actually a new  
 4 position for Hydro at that time to take on  
 5 full accountability for all three TRO regions.  
 6 Prior to that time, that would have been the  
 7 three regional managers that would have taken  
 8 on that role. The regional manager for TRO  
 9 Central, for the Northern Peninsula and for  
 10 TRO Labrador.

11 GREENE, Q.C.:

12 Q. And you mentioned there was a new position, I  
 13 guess Hydro had had that a number of years  
 14 before that, though, somebody responsible for  
 15 all over TRO?

16 MR. MOORE:

17 A. No, when I took the position in 2011, that was  
 18 a new position that was accountable for--I  
 19 think if we go back, much further there were  
 20 directors at the time, right.

21 GREENE, Q.C.:

22 Q. The early 2000s, right, there was a TRO  
 23 director.

24 MR. MOORE:

25 A. Yes.

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1 GREENE, Q.C.:

2 Q. You said that you did the work plan based on  
 3 the available resources and your budget for  
 4 the year. My question is when looking at this  
 5 plan, did you consider the need for additional  
 6 resources or either manpower, additional FTE  
 7 bodies or additional resources to hire an  
 8 external contractor?

9 MR. MOORE:

10 A. When we developed a plan looking into 2012,  
 11 that wasn't a consideration at the time  
 12 because based on our existing resources at the  
 13 time, plus an allotment for, we always in our  
 14 annual work plan allot a certain amount of  
 15 time for unknowns or corrective maintenance  
 16 work that we do find during our preventative  
 17 maintenance, so when we developed our plan in  
 18 2012, the plan itself looked like we could  
 19 achieve an adequate amount of recovery PMS in  
 20 2012, but what we experienced in 2012, not so  
 21 much as 2013, but there was a number of very  
 22 customer focused activities that took us away  
 23 from some of our planned activities in 2012 as  
 24 well. One example I can think of is when we  
 25 were installing the new power supply for Vale

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1 out in Long Harbour, the actual installation  
 2 of that new terminal station with two  
 3 transformers ended up drawing upon our  
 4 resources that would be working on PMS for  
 5 power transformers in a much higher amount, I  
 6 think we've documented this in RFIs as well,  
 7 than would have been claimed for that capital  
 8 job. So then when we were going into 2013, we  
 9 realized that we've accomplished some  
 10 maintenance in 2012, but looking at the  
 11 numbers here in the RFI, we completed our base  
 12 plan, but we didn't get any further ahead on  
 13 our recovery plan, shall we say, for power  
 14 transformers, and then going into 2013 when we  
 15 developed our plan, again looking at the most  
 16 overdue first, we would have looked at the  
 17 base amount that normally would be allocated  
 18 to each shop, plus a portion of recovery and  
 19 then--but we just talked about some of the  
 20 things in 2013 that again took us off plan, so  
 21 it wasn't until we put together the 2014 or  
 22 the June 2nd, 2014 reports to the Board and  
 23 the 2014, 2015 test year as part of the  
 24 amended GRA that we had an opportunity to  
 25 identify the additional resources that were

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1 required to achieve our 2015 objective to be  
 2 fully recovered.  
 3 GREENE, Q.C.:  
 4 Q. So when you came in to your new position, were  
 5 you concerned that Hydro was not meeting the  
 6 important six-year preventative maintenance  
 7 cycles for the power transformers?  
 8 MR. MOORE:  
 9 A. Yes, that would be obviously a huge concern,  
 10 our preventative maintenance program certainly  
 11 is our foundation for verifying our assets are  
 12 in good condition and that we identify any  
 13 defects that may affect reliability to our  
 14 customers and that we can correct those  
 15 defects.  
 16 GREENE, Q.C.:  
 17 Q. But you did not identify a need for additional  
 18 resources to complete it?  
 19 MR. MOORE:  
 20 A. Not going into 2012, because when we did our  
 21 planning going into 2012, and laid out our  
 22 annual work plan based on the most overdue,  
 23 the plan itself--if we were able to achieve  
 24 our plan without any break-in work, we would  
 25 have been further along in our recovery plan.

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1 GREENE, Q.C.:  
 2 Q. Has Hydro ever had a year without break-in  
 3 work?  
 4 MR. MOORE:  
 5 A. That's a good question. We do a lot for a  
 6 certain amount of break-in work. I'll say  
 7 it's been up and down over the years, but the  
 8 levels that we seen in 2012 and 2013, I would  
 9 call much higher than we've normally seen.  
 10 GREENE, Q.C.:  
 11 Q. Coming back to Liberty's interim report, at  
 12 that time when Liberty did recommend that  
 13 Hydro look at completing a plan that would  
 14 have all of the critical transformers'  
 15 preventative maintenance done by the end of  
 16 2014 and made plan to have all of it done by  
 17 2015, do you recall that recommendation?  
 18 MR. MOORE:  
 19 A. Yes, I do.  
 20 GREENE, Q.C.:  
 21 Q. Do you recall that the Board, in its May 2014  
 22 interim report, directed Hydro to do that, is  
 23 that your recollection?  
 24 MR. MOORE:  
 25 A. Yes.

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1 GREENE, Q.C.:  
 2 Q. And Hydro did submit a plan which did do all  
 3 of the critical preventative maintenance for  
 4 critical transformers that you had identified  
 5 by the end of 2014, is that correct?  
 6 MR. MOORE:  
 7 A. That's right. In our plan that we submitted  
 8 to the Board on June 2nd, there is a section  
 9 in the report that outlines the asset  
 10 criticality ranking and the tool we used for  
 11 our power transformers so that we could  
 12 determine which were the most critical to  
 13 complete in 2014 and which were to be done in  
 14 2015 to be fully completed our six-year  
 15 preventative maintenance recovery plan.  
 16 GREENE, Q.C.:  
 17 Q. And in order to do that, you did require  
 18 additional resources, is that correct?  
 19 MR. MOORE:  
 20 A. That's correct.  
 21 GREENE, Q.C.:  
 22 Q. And the additional cost to complete your 2014  
 23 of additional preventative maintenance and  
 24 your 2015 plan, those additional costs,  
 25 certainly with respect to 2015, Hydro is

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1 proposing to recover that from rate payers  
 2 over a five-year period?  
 3 MR. MOORE:  
 4 A. That's correct.  
 5 GREENE, Q.C.:  
 6 Q. And any additional costs, you're not the  
 7 person to ask how much is in the 2014 revenue  
 8 deficiency account with respect to the extra  
 9 work in 2014, are you?  
 10 MR. MOORE:  
 11 A. I think the detail of the costs would be,  
 12 certainly when the next panel, when we talk  
 13 about finance, but I do know what the cost was  
 14 based on and the estimate that was in our June  
 15 2nd, 2014 reports, for air blast circuit  
 16 breakers and power transformers it was  
 17 estimated that we need a million dollars in  
 18 2014 and 1.2 million in 2015 to be fully  
 19 recovered. Those were the estimates that we  
 20 developed that the, in my understanding, the  
 21 test year will be based on.  
 22 GREENE, Q.C.:  
 23 Q. Okay, and we can follow up the numbers with  
 24 the other panel. So if we come back from your  
 25 actual standard for your six-year maintenance

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1 cycle to the actual transformer, the T1 at  
 2 Sunnyside that failed on January 4th, 2014.  
 3 At that time that transformer, which was 36  
 4 years old, was behind in its maintenance, is  
 5 that correct, Mr. Moore? Its preventative  
 6 maintenance.  
 7 MR. MOORE:  
 8 A. Yes, well like I mentioned earlier in PUB-NLH-  
 9 174 we talk about all the maintenance  
 10 activities that are carried out in terminal  
 11 stations and the six-year PM, I guess being  
 12 the longest duration PM for power  
 13 transformers, the six-year date since the last  
 14 preventative maintenance check on that  
 15 transformer, would have required--the six  
 16 years was up in September, I think it was, in  
 17 2013.  
 18 GREENE, Q.C.:  
 19 Q. So it was approximately three months or so  
 20 past due for its six-year cycle?  
 21 MR. MOORE:  
 22 A. That's right, when the transformer failed on  
 23 June 4th.  
 24 GREENE, Q.C.:  
 25 Q. Now with respect to the failure of the

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1 transformer, my understanding is that it  
 2 failed because of a bushing failure, is that  
 3 correct?  
 4 MR. MOORE:  
 5 A. That's the opinion we have from the OEM that  
 6 they--the most probable cause of the failure  
 7 that day was a bushing failure on the power  
 8 transformer.  
 9 GREENE, Q.C.:  
 10 Q. Okay, and in the tests that would have been  
 11 done as part of the six-year preventative  
 12 maintenance cycle, would there have been power  
 13 factor testing done?  
 14 MR. MOORE:  
 15 A. Part of the preventative maintenance check,  
 16 yes, there's a power factor test. That test  
 17 is actually done by, well the manufacturer of  
 18 the equipment is called Doble Engineering and  
 19 we do that test and the idea of that test is  
 20 to do, mainly to do condition monitoring over  
 21 time of the bushings on power transformers, so  
 22 that you can look for degradation of the  
 23 insulation in the bushing and monitor that  
 24 data over time so that you can, you know, plan  
 25 future capital replacements or maintenance

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1 based on the results of those tests.  
 2 GREENE, Q.C.:  
 3 Q. And Hydro has identified potential bushing  
 4 failures for the use of those tests, is that  
 5 correct?  
 6 MR. MOORE:  
 7 A. That Doble test, yes, has identified issues  
 8 with bushings, I guess, on other power  
 9 transformers that we have been able to address  
 10 over time through our asset management  
 11 program.  
 12 GREENE, Q.C.:  
 13 Q. And so you identify the problem, correct it  
 14 before the transformer fails?  
 15 MR. MOORE:  
 16 A. Normally the way a Doble test works, I  
 17 wouldn't really call it really say a pass/fail  
 18 type test. It's a condition monitoring test  
 19 which looks at the insulation integrity of the  
 20 bushings on a power transformer, so the intent  
 21 of the test is to get a data reading, I guess,  
 22 and do a test of the insulation on the bushing  
 23 and then you can monitor those levels over  
 24 time to see how well the insulation is  
 25 performing and if you do notice degradation in

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1 the readings, and we have, you know, expertise  
 2 in Doble that our equipment engineers consult  
 3 with to discuss any tests that start to look  
 4 like they're showing, say degradation over  
 5 time so we can address it in our planning  
 6 process or asset management process.  
 7 GREENE, Q.C.:  
 8 Q. And can we go to PR-PUB-NLH-073 please? So  
 9 here you are asked the question if you detect  
 10 a bushing defect by doing the power factor  
 11 testing and so we see that since 2000 you have  
 12 been able to identify 14 and yes, you point  
 13 out that that's only 2 percent of the power  
 14 transformer bushings, but those tests do  
 15 reveal whether there's problems with the  
 16 bushings before they fail, is that correct?  
 17 MR. MOORE:  
 18 A. That's right, the intent of a Doble test is to  
 19 test the condition of a bushing on a power  
 20 transformer, but again, it's a longer term  
 21 condition monitoring test, as opposed to a  
 22 pass/fail test.  
 23 GREENE, Q.C.:  
 24 Q. Now there was something else going on with  
 25 that transformer as well, it was the gas

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1 levels were increasing with that transformer,  
 2 is that correct?  
 3 MR. MOORE:  
 4 A. On that power transformer, and we do have  
 5 similar transformers in our system of the same  
 6 age and design of that power transformer, some  
 7 are in Stony Brook Terminal Station out in the  
 8 Central part of the island, there was a level  
 9 of acetylene gas that we've been monitoring  
 10 since the early '90s on that power transformer  
 11 and that level has been within an acceptable  
 12 window through consultation with the original  
 13 equipment manufacturer, has been tracking  
 14 within that acceptable window and we've been  
 15 monitoring that over time, so we took action  
 16 to make sure that we, you know, closely  
 17 monitor the levels in this power transformer  
 18 over time, say going right back to the 1990s  
 19 and they've been stable since that time.  
 20 GREENE, Q.C.:  
 21 Q. Can we go to page 44 of Liberty's April 2014  
 22 report?  
 23 MS. GRAY:  
 24 Q. Sorry, Ms. Greene, page 24?  
 25 GREENE, Q.C.:

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1 Q. Page 44, sorry. And under "Transformer Fault  
 2 Causes", I'd like to just bring your attention  
 3 to the first paragraph under that and if we  
 4 begin halfway down. "This transformer had a  
 5 history of elevated acetylene gas for many  
 6 years prior to the events of early January  
 7 2014." I guess that's what you're saying, is  
 8 it Mr. Moore?  
 9 MR. MOORE:  
 10 A. That's what we are saying, there was acetylene  
 11 gas levels in that transformer back to the  
 12 early 1990s since we've been doing monitoring  
 13 that have been at a stable level since that  
 14 time.  
 15 (1:00 p.m.)  
 16 GREENE, Q.C.:  
 17 Q. Okay, I'd like to go on to the next sentence,  
 18 "Hydro's dissolve gas analysis reports show  
 19 that the level of acetylene gas increased from  
 20 7 parts per million in March of 2012 to 11  
 21 parts per million in September of 2013.  
 22 Acetylene should comprise no more than two  
 23 parts per million in the oil of a transformer,  
 24 internal arcing generates acetylene gas. The  
 25 September 2013 lab analysis report stated

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1 significant increase in C2H2 (acetylene),  
 2 consider investigative more often DGA  
 3 sampling." So that was a report Hydro  
 4 received, is that correct?  
 5 MR. MOORE:  
 6 A. That's correct, that's our lab analysis that  
 7 we did receive.  
 8 GREENE, Q.C.:  
 9 Q. And that recommended because of the increase  
 10 in gas that there be additional testing, is  
 11 that correct?  
 12 MR. MOORE:  
 13 A. That's what was recommended there. We do, the  
 14 gas analysis--in PUB-174 I think it indicates  
 15 that for that type of transformer, we take an  
 16 oil sample on an annual basis.  
 17 GREENE, Q.C.:  
 18 Q. Here we had a report in September saying that  
 19 there was an increase in it and there should  
 20 be testing, was any testing done in the fall  
 21 of 2013?  
 22 MR. MOORE:  
 23 A. The September 2013 would have been the last  
 24 test that was done on that transformer before  
 25 it failed, but like I--you know, we're

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1 indicating a level there of 11 versus 7, but I  
 2 indicated that going back to the early '90s  
 3 the level of acetylene gas inside that  
 4 transformer had been somewhat up and down but  
 5 stable within a certain band, and we did  
 6 consultation with the--the action we took was  
 7 to talk to the transformer manufacturer and  
 8 talk about the readings that we have been  
 9 trending for decades and get their expert  
 10 opinion as to, you know, why were we seeing  
 11 these levels of gas in that transformer and  
 12 their opinion, you know, as to how this is  
 13 happening. Like, when you look at a power  
 14 transformer, there's an oil reservoir which  
 15 contains the main part of the transformer and  
 16 there's an oil reservoir that contains the  
 17 unload tap changer, it's called, and the tap  
 18 changer itself is designed to adjust the  
 19 voltage on the power system and because it has  
 20 moving contacts in that reservoir, you will  
 21 get normal arcing which is indicated here  
 22 arcing does cause acetylene gas. So this is a  
 23 normal phenomena in the tap changer  
 24 compartment because of the operation of the  
 25 tap changer and the opinion of the

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1 manufacturer of that transformer is that there  
 2 was some form of leakage happening between the  
 3 two oil reservoirs that was causing some of  
 4 the acetylene gas from the tap changer to  
 5 migrate into the main transformer tank and  
 6 these are the levels that we have been  
 7 trending and very actively reviewing and  
 8 monitoring since the early 1990s and we  
 9 confirmed with the manufacturer that that was  
 10 their opinion. Now since that time, we've had  
 11 the opportunity actually to go in and do a  
 12 pressure test on a transformer of a similar  
 13 design, age, that are showing very similar  
 14 levels that this transformer was exhibiting in  
 15 Stony Brook and we actually did the test when  
 16 we had the ability to plan and schedule the  
 17 test in our annual work plan, because if you  
 18 look at 2013, we've already talked about the  
 19 huge volume of work that took us off our  
 20 preventative maintenance work in 2013, so our  
 21 ability to go in and dismantle and inspect a  
 22 transformer back in 2013 based on levels that  
 23 we've been trending for decades was, you know,  
 24 the resources just weren't there to do it, you  
 25 know, the same reasons why we couldn't get

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1 some of our preventative maintenance done in  
 2 2013. So we actually have validated the  
 3 opinion that the manufacturer has been--given  
 4 to us as to why we're seeing these low levels  
 5 of gasses over a long period of time in the  
 6 main transformer compartment.  
 7 GREENE, Q.C.:  
 8 Q. Okay, so with respect to gas coming from the  
 9 tap changer, is that a simple thing to  
 10 correct? You can go in and you can repair  
 11 that to prevent it, can't you? That's my  
 12 understanding.  
 13 MR. MOORE:  
 14 A. I wouldn't call it simple to correct, it's a  
 15 very--it's a fairly time consuming extensive  
 16 job.  
 17 GREENE, Q.C.:  
 18 Q. But it is possible to correct it.  
 19 MR. MOORE:  
 20 A. It is possible, but you do need to actually,  
 21 you know, just to sort of somewhat walk  
 22 through it, you would have to remove the top  
 23 of the transformer, so remove the transformer,  
 24 you've got to pump the oil level down and then  
 25 you've got to go in and do intrusive

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1 maintenance and try to repair any seal between  
 2 the two chambers, shall we say, so it's a--I  
 3 know we just, you know, we're looking at an  
 4 estimate now to do an internal inspection on a  
 5 transformer out in Vale to validate some of  
 6 the readings and these jobs end up somewhere  
 7 anywhere between 250,000 to a \$500,000 job to  
 8 go in and, you know, take apart a transformer,  
 9 drain the oil down and do internal work.  
 10 GREENE, Q.C.:  
 11 Q. But you can repair that to see if that was the  
 12 actual cause and we come back, you asked the  
 13 OEM their opinion as to what might be causing  
 14 it and at the same time, you had a lab  
 15 analysis report which showed an increase in  
 16 the gas and recommended testing, and you  
 17 didn't do any additional work in the fall of  
 18 2013, did you?  
 19 MR. MOORE:  
 20 A. Not since that September 2013, we would have  
 21 gone back and done further testing in early  
 22 2014, had the transformer not failed, that  
 23 would have been our normal course of action  
 24 based on that recommendation, but we didn't  
 25 get the opportunity, I guess, to go back and

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1 do further sampling and analysis on that  
 2 transformer.  
 3 GREENE, Q.C.:  
 4 Q. Now you've mentioned that since then you've  
 5 had it validated to a, I'll call it a sister  
 6 transformer out in Stony.  
 7 MR. MOORE:  
 8 A. Right.  
 9 GREENE, Q.C.:  
 10 Q. And your position is because it happened at  
 11 the Stony Brook transformer, it must have  
 12 happened at the Sunnyside one?  
 13 MR. MOORE:  
 14 A. Our conclusion would be based on what the  
 15 manufacturer has been telling us and their  
 16 expert opinion, plus an opportunity to  
 17 physically verify this, I'll call it a  
 18 phenomena for lack of a better word, happens  
 19 in these power transformers. We're a hundred  
 20 percent confident that this was what was  
 21 occurring on the Sunnyside transformer and the  
 22 other part of that is, there's nothing  
 23 conclusive through our root cause analysis or  
 24 any of our reviews to indicate that the levels  
 25 of gassing that we've been seeing since the

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1 early '90s were because of the failure that we  
 2 had in January 2014.  
 3 GREENE, Q.C.:  
 4 Q. No, but we know there was a bushing failure  
 5 and we know that increased gas indicates  
 6 problems with the bushings and we have a lab  
 7 report that showed there was increased gas and  
 8 you should do more testing. Now, I want to go  
 9 back to the fact that you're relying on a  
 10 failure at another transformer for a cause for  
 11 the Sunnyside transformer, would that be  
 12 normal?  
 13 MR. HENDERSON:  
 14 A. You made a statement there and I just have to  
 15 interrupt because you're making a conclusion  
 16 that I don't think is right.  
 17 GREENE, Q.C.:  
 18 Q. Feel free.  
 19 MR. HENDERSON:  
 20 A. So I just wanted to indicate that we have--I  
 21 want to emphasize the fact that we have very  
 22 qualified engineers who have been working with  
 23 this equipment for many years, they've been  
 24 monitoring it, they have--they consulted with  
 25 the manufacturer to identify to see what was,

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1 what could be causing this. They were very--  
 2 they did that very considerably and as a  
 3 result, through that discussion with the  
 4 manufacturer, the manufacturer said this is  
 5 the most likely scenario that this is  
 6 occurring and to go in and do an intrusive  
 7 test with costs and schedule and everything,  
 8 the decision was made by our engineers to look  
 9 at that, that's been happening since the  
 10 1990s, to continue to monitor it and so they  
 11 continue that monitoring through that whole  
 12 period of time and it stayed within a band, a  
 13 level of 11 parts per million had been  
 14 experienced in the past and it was still  
 15 within that band and it was highly probable  
 16 that it was coming from the tap changer  
 17 compartment. There was nothing that indicated  
 18 that the acetylene was indicating a problem  
 19 with a bushing. The tests for identifying  
 20 bushing problems is the Doble testing method,  
 21 it's not the--acetylene would indicate that  
 22 there's arcing somewhere happening inside the  
 23 transformer that would cause the acetylene gas  
 24 to appear in the oil, and there's been no  
 25 suggestion that the acetylene level was

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1 indicating a problem with a bushing and so I  
 2 just wanted to correct that because I think  
 3 you made that statement that the acetylene was  
 4 indicating a problem with the bushing and I  
 5 don't think there's anything on record to say  
 6 that acetylene level was saying that it  
 7 identified a problem with the bushing, it  
 8 identifies arcing inside the transformer which  
 9 is an electrical arcing that could be  
 10 happening due to some kind of break down  
 11 aside, but in these transformers, our  
 12 experience over many years is that these types  
 13 of transformers do experience that level of  
 14 acetylene and we monitored that and took  
 15 appropriate action without doing an intrusive  
 16 test which would require consider effort and  
 17 time to do it and the proof was that that was  
 18 the case. When we did the test at Stony  
 19 Brook, subsequent to that, it validated that  
 20 that is--the way in these transformers that  
 21 can happen and so we are confident that the  
 22 level of acetylene that we are seeing in that  
 23 transformer was as a result of leakage coming  
 24 from the compartment.  
 25 GREENE, Q.C.:

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1 Q. So coming back to the gas, you do monitor for  
 2 the level of gas in the oil as part of the  
 3 preventative maintenance test to show you the  
 4 condition of the transformer, that's what I  
 5 understood you just--not for the bushing, but  
 6 the transformer overall.  
 7 MR. MOORE:  
 8 A. That's correct.  
 9 GREENE, Q.C.:  
 10 Q. Okay, I also, because again, to me, not being  
 11 an engineer, I'm puzzled by you did a test at  
 12 another transformer and you're using the  
 13 results from that to validate for another  
 14 piece of equipment. To me, that seems to be a  
 15 little puzzling to me, that you would use what  
 16 happened at Stony Brook as evidence it must  
 17 have happened at Sunnyside, but that is what  
 18 you are doing, that is--I'm understanding you?  
 19 MR. MOORE:  
 20 A. That is the observation of that manufacturer's  
 21 transformers in our experience we've been  
 22 seeing levels of acetylene that have been the  
 23 result of creeping or leaking acetylene from  
 24 the tap changer compartment and so the  
 25 manufacturer had told us that that was the

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1 likely scenario. We were monitoring it and we  
 2 did the test which validated that that type of  
 3 transformer has that type of phenomena.  
 4 GREENE, Q.C.:  
 5 Q. But they're not sure what happened at  
 6 Sunnyside because you -  
 7 MR. MOORE:  
 8 A. At Sunnyside I think that the manufacturer did  
 9 a thorough investigation on our behalf and  
 10 they identified that the most likely failure  
 11 of that transformer was a bushing fault.  
 12 GREENE, Q.C.:  
 13 Q. But again we don't know what happened with  
 14 respect to the increased gas at the Sunnyside  
 15 transformer because that--anyway, so if we go  
 16 on to the air blast circuit breakers, again  
 17 just coming back to Sunnyside that we're  
 18 talking about, Mr. Moore, you indicated that  
 19 it didn't operate properly, so it didn't  
 20 isolate the transformer when it failed, is  
 21 that correct?  
 22 MR. MOORE:  
 23 A. That's correct.  
 24 GREENE, Q.C.:  
 25 Q. Now the preventative maintenance standard for

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1 air blast circuit breakers, what was it at  
 2 that time, prior to 2014?  
 3 MR. MOORE:  
 4 A. For that particular air blast circuit breaker  
 5 in Sunnyside?  
 6 GREENE, Q.C.:  
 7 Q. Or for--what was Hydro's standard for  
 8 preventative maintenance cycles for the air  
 9 blast circuit breakers?  
 10 MR. MOORE:  
 11 A. Our air blast circuit breakers up to that time  
 12 was on a six-year cycle, the same as our power  
 13 transformers.  
 14 GREENE, Q.C.:  
 15 Q. Okay. And again, I understand that Hydro had  
 16 not been able to complete all of the  
 17 preventative maintenance for the air blast  
 18 circuit breakers and here we go to PR-PUB-167.  
 19 MS. GRAY:  
 20 Q. Revision 1, Ms. Greene?  
 21 GREENE, Q.C.:  
 22 Q. Yes, please. So here, Mr. Moore, we're going  
 23 to talk about the same information we just  
 24 looked at for the transformers. So I think  
 25 you said you had, was it 105 transformers that

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1 you were trying to do these maintenance cycles  
 2 on and how many air blast circuit breakers?  
 3 MR. MOORE:  
 4 A. At that time when the RFI was written it was  
 5 63 air blast circuit breakers.  
 6 GREENE, Q.C.:  
 7 Q. And you've since replaced some of them with  
 8 the new, a new version, so you're down to 50  
 9 at the current time, is that about it?  
 10 MR. MOORE:  
 11 A. We're not right, I'm not sure if 50, subject  
 12 to check, I don't think it's exactly 50, but  
 13 around there.  
 14 GREENE, Q.C.:  
 15 Q. In that neighbourhood, okay, nothing turns on  
 16 that, okay. So again we see--and is it the  
 17 same plan you developed in 2009 to catch up  
 18 your preventative maintenance for the breakers  
 19 as you had for the transformers over, by 2015,  
 20 is that correct?  
 21 MR. MOORE:  
 22 A. That's correct, the air blast circuit breakers  
 23 were a part of that same six-year recovery  
 24 plan.  
 25 GREENE, Q.C.:

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1 Q. And again we see that by the end of 2013 that  
 2 you still had a number outstanding, is that  
 3 correct?  
 4 MR. MOORE:  
 5 A. That's correct, those numbers are correct  
 6 there in the RFI.  
 7 GREENE, Q.C.:  
 8 Q. Okay, now in January 2014 when we had the  
 9 outages, we had three of these breakers didn't  
 10 work properly, is that correct? We had the  
 11 one at Sunnyside we're talking about?  
 12 MR. MOORE:  
 13 A. That's right.  
 14 GREENE, Q.C.:  
 15 Q. We had the one at Western Avalon we're going  
 16 to talk about probably tomorrow.  
 17 MR. MOORE:  
 18 A. Okay.  
 19 GREENE, Q.C.:  
 20 Q. We had the one at Holyrood that didn't work as  
 21 well, is that correct?  
 22 MR. MOORE:  
 23 A. That's correct.  
 24 GREENE, Q.C.:  
 25 Q. Okay. And what happened in January 2013 at

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1 Holyrood, was that another problem with  
 2 another air blast circuit breaker?  
 3 MR. MOORE:  
 4 A. Back in January 2013 in Holyrood the failures  
 5 were associated with air blast circuit  
 6 breakers, but it wasn't necessarily a failure  
 7 of an air blast circuit breaker, that event  
 8 was, you know, as described earlier, a severe  
 9 weather event with, you know, a fair amount of  
 10 snow and moisture and salt accumulation on the  
 11 insulators that are on the air blast circuit  
 12 breakers themselves, which caused, you know,  
 13 electrical faults to ground just because of  
 14 the high salt and weather contamination.  
 15 GREENE, Q.C.:  
 16 Q. So in 2014, we did have three of these air  
 17 blast circuit breakers that stuck, didn't  
 18 operate properly?  
 19 MR. MOORE:  
 20 A. We had three air blast circuit breakers in the  
 21 January 2014 events that didn't perform as  
 22 they should have.  
 23 GREENE, Q.C.:  
 24 Q. Okay. Again, I guess you didn't treat the air  
 25 blast circuit breakers with respect to

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1 catching up on the preventative maintenance  
 2 cycles any differently than you did the  
 3 transformers, did you?  
 4 MR. MOORE:  
 5 A. When we developed our annual work plan, as I  
 6 described earlier, we would have looked at air  
 7 blast circuit breakers in the same manner as  
 8 power transformers and we would have ensured  
 9 that we would have addressed the most overview  
 10 in our annual work plan for any given year,  
 11 plus paying attention to priority based on  
 12 anything associated with a generating station  
 13 or on the high voltage transmission system.  
 14 GREENE, Q.C.:  
 15 Q. And again in its interim report, Liberty did  
 16 recommend, as it did with the transformers,  
 17 that Hydro complete preventative maintenance  
 18 on the circuit breakers by 2014 and have a  
 19 plan to have them all completed by 2015 and  
 20 Hydro accepted that recommendation, is that  
 21 correct?  
 22 MR. MOORE:  
 23 A. That's right, Hydro outlined a very similar  
 24 plan as we did for power transformers in the  
 25 June 2nd, 2014 reports that we submitted to

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1 the Board with respect to an estimate and  
 2 resources required to complete the critical  
 3 air blast circuit breakers in 2014 based on  
 4 the asset criticality ranking that we  
 5 completed and then the remainder in 2015.  
 6 (1:15 p.m)  
 7 GREENE, Q.C.:  
 8 Q. And again that was done in response to a  
 9 direction from the Board in its May report to  
 10 do so, is that correct?  
 11 MR. MOORE:  
 12 A. That's correct.  
 13 MR. HENDERSON:  
 14 A. I'm going to just add to that, that that was  
 15 in the plan, but Hydro was also planning to do  
 16 that, we are continuing to work towards the  
 17 2015 completion of the maintenance that was  
 18 behind, continue to have a high priority on  
 19 that, so just to emphasize that yes, that did  
 20 come out, that was part of our review was  
 21 looking at the maintenance and where we were  
 22 with that and so we had in our plan and the  
 23 Board reiterated in its order to do that. I  
 24 just wanted to make it clear to the Board that  
 25 that was our plan after our review to ensure

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1 that we were making quick progress on the  
 2 maintenance that was outstanding.  
 3 GREENE, Q.C.:  
 4 Q. If we could go to the particular breaker at  
 5 Sunnyside, B1L03, Mr. Moore, my understanding  
 6 is it was about 48 years old in 2014, is that  
 7 correct?  
 8 MR. MOORE:  
 9 A. That's about what the age of that breaker at  
 10 that time, yes.  
 11 GREENE, Q.C.:  
 12 Q. My understanding from the evidence on the  
 13 record is that the maintenance last completed  
 14 on that was in 2007, is that correct?  
 15 MR. MOORE:  
 16 A. That's correct.  
 17 GREENE, Q.C.:  
 18 Q. So that maintenance should have been done by  
 19 June of 2013 if it was completed on a six-year  
 20 cycle, is that correct?  
 21 MR. MOORE:  
 22 A. That's correct, the six-year cycle for that  
 23 breaker would have been due in 2013. Now like  
 24 I mentioned, when we developed our 2013 annual  
 25 work plan, we would have definitely focussed



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1 on the most overdue and most critical,  
 2 anything related to a generating station for  
 3 our 2013 annual work plan.  
 4 GREENE, Q.C.:  
 5 Q. With respect to when these were going to be  
 6 completed, were they actually scheduled to--  
 7 this air blast circuit breaker, did Hydro have  
 8 a date scheduled for the preventative  
 9 maintenance that was overdue on that to have  
 10 been completed at the time of its failure?  
 11 MR. MOORE:  
 12 A. That breaker itself, when we look back at our  
 13 records now looking at, again, like I talked  
 14 about how we develop our annual work plan and  
 15 when I checked back through some of the  
 16 records looking at when we were developing our  
 17 2013 annual work plan, there were other  
 18 breakers that were more overdue and of a  
 19 higher priority than B1L03 in Sunnyside, so  
 20 the schedule for that breaker at the time  
 21 would have been in the 2014 annual work plan  
 22 due to higher priority and more overdue  
 23 breakers when we developed our 2013 annual  
 24 work plan.  
 25 GREENE, Q.C.:

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1 Q. Okay, and at the time it failed in January of  
 2 2014, you're 2014 work plan, was it developed?  
 3 MR. MOORE:  
 4 A. We were in the process or would have been in  
 5 the process of developing our 2014 annual work  
 6 plan at that time.  
 7 GREENE, Q.C.:  
 8 Q. And if we look at what we have here on the  
 9 monitor, PUB-NLH-167, we see at the end of  
 10 2013 you had 18 other breakers that were  
 11 overdue, not including or including that one.  
 12 MR. MOORE:  
 13 A. That would have been including that breaker,  
 14 yes.  
 15 GREENE, Q.C.:  
 16 Q. Okay, so Hydro had made no assessment as to  
 17 when it would have done that breaker or the  
 18 other 17 that were on that -  
 19 MR. MOORE:  
 20 A. No, we did an assessment actually and looked  
 21 at the data which is included in the RFI, I  
 22 think the last couple of times that we  
 23 actually did the preventative maintenance  
 24 check on our air blast circuit breakers, and  
 25 when I looked back at the assessment and

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1 talked to the, our long-term asset planning  
 2 people and our short-term planning and  
 3 scheduling folks and work execution, and we  
 4 look at the data which shows for 2014 the  
 5 breakers that would have been most overdue and  
 6 most critical, B1L03 would have been in the  
 7 2014 annual work plan based on that criteria.  
 8 GREENE, Q.C.:  
 9 Q. And does Hydro, do you have any documentation  
 10 with respect to that determination? You  
 11 didn't have the work plan completed, you had  
 12 no -  
 13 MR. MOORE:  
 14 A. Right, no we don't have documentation other  
 15 than based on that criteria, if we look at the  
 16 RFI which shows the last two times that we did  
 17 preventative maintenance on air blast circuit  
 18 breakers, based on looking at the most overdue  
 19 and the number that we would have assigned to  
 20 each shop based on a total of 63 throughout  
 21 the power system, it would have been in the  
 22 2014 annual work plan. The other thing about  
 23 that breaker was, you're right in saying that  
 24 in 2013 would have been the six-year timeframe  
 25 for that breaker and I explained how we look

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1 at the most overdue and highest priority when  
 2 we develop our annual work plan, with the end  
 3 goal of achieving by the end of 2015 our  
 4 preventative maintenance recovery plan. There  
 5 were other things that were done on that  
 6 breaker in 2013 to validate that it operated  
 7 properly. We checked back through our records  
 8 and based on the outages in 2013, it was  
 9 recommended that on an annual basis that we do  
 10 what we call an exercise of our air blast  
 11 circuit breakers, which is to operate the  
 12 breaker, open and close it just to validate  
 13 that everything works okay and that, you know,  
 14 your contacts remain lubricated and those type  
 15 things, so that breaker was actually opened  
 16 and closed in 2013 successfully. We also,  
 17 back in 2013, knowing that, you know, we still  
 18 had two years left in our recovery plan. We  
 19 brought in and this report is part of the  
 20 record as well, we brought in AMEC to do a  
 21 winter readiness assessment going into the  
 22 winter of 2013-2014, just to look at the, you  
 23 know, the high voltage 230 kV system and some  
 24 of our critical generating infrastructure  
 25 basically from Bay d'Espoir to the Avalon

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1 Peninsula, so knowing that we still had two  
 2 years left in our PM recovery program, we  
 3 wanted to bring in a third party, unbiased  
 4 assessment just to look at our readiness going  
 5 into that winter period just to help mitigate  
 6 any risks going into that winter, knowing that  
 7 we still had two years left in our recovery  
 8 program.  
 9 GREENE, Q.C.:  
 10 Q. Now you mentioned earlier today and previously  
 11 that preventative maintenance got deferred  
 12 because you had more corrective maintenance  
 13 work than you had provided for in the work  
 14 plan, is that correct?  
 15 MR. MOORE:  
 16 A. That's correct, plus capital work.  
 17 GREENE, Q.C.:  
 18 Q. And increased capital work, okay. And we  
 19 talked a little bit about this when you gave  
 20 evidence before, Mr. Moore, how the decisions  
 21 were made to defer preventative maintenance to  
 22 do corrective maintenance work or to do  
 23 capital and I just wanted to briefly review  
 24 with you what we had talked about before. And  
 25 if you wish, we can certainly go to the

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1 transcript when we go through this.  
 2 MR. MOORE:  
 3 A. Okay.  
 4 GREENE, Q.C.:  
 5 Q. I understand that it's people who are in the  
 6 areas, and I may have the wrong titles, the  
 7 long-term asset planners and the work  
 8 execution managers, is that right for the -  
 9 MR. MOORE:  
 10 A. That's correct, plus we have another team  
 11 called short-term planning scheduling, that's  
 12 the group that develops the annual work plan  
 13 and plus does all the weekly scheduling and  
 14 backlog monitoring for our execution of our  
 15 work program.  
 16 GREENE, Q.C.:  
 17 Q. Okay. So these three different groups that we  
 18 just talked about, they're the ones who would  
 19 have looked at the preventative maintenance  
 20 schedule and how it fit into the work plan and  
 21 they're also the ones who looked at doing the  
 22 corrective maintenance, are they?  
 23 MR. MOORE:  
 24 A. That's right, they were--that would be the  
 25 group that would be looking at developing the

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1 annual work plan which would eventually be,  
 2 you know, reviewed and signed off, I'll say,  
 3 by the regional manager and myself once the  
 4 annual work plan is established, and they  
 5 would be the people that would be monitoring  
 6 the progress throughout the year of the annual  
 7 work plan, so tracking progress of, you know,  
 8 actual completion versus what is planned and  
 9 when things arise, like I had mentioned, like  
 10 2013 was an extremely exceptional year with, I  
 11 think I talked about over 20,000 person hours  
 12 of break-in work, so those would be the groups  
 13 that would be looking at when these work items  
 14 come up and we realize that we need to apply  
 15 our resources now to complete these break-in  
 16 items, they would look at, well what's in our  
 17 annual work plan now that will need to be,  
 18 I'll say reprioritized to a later date to  
 19 allow for the break-in work to happen. So  
 20 that would be the people that would look at  
 21 that and in consultation as well with our  
 22 system operations' group when it comes to, you  
 23 know, planned outages for these, the work  
 24 items as well.  
 25 GREENE, Q.C.:

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1 Q. You mentioned another reason for the deferral  
 2 of the preventative maintenance was your  
 3 increased capital program, would those  
 4 individuals that you've just described were  
 5 involved with the annual work plan, what role  
 6 would they have with respect to capital budget  
 7 planning execution?  
 8 MR. MOORE:  
 9 A. They would be accountable for, I guess  
 10 monitoring the execution of capital projects  
 11 in the annual work plan where, I'll say their  
 12 own resources were executing capital work for  
 13 whoever the project manager be, maybe for a  
 14 particular capital project.  
 15 GREENE, Q.C.:  
 16 Q. Okay, and when we talked about this back in  
 17 September, if I understand that no guidelines  
 18 were given to these individuals who were  
 19 assessing what work was to be done with  
 20 respect to the deferral on how to assess  
 21 whether it was appropriate to defer  
 22 preventative maintenance, is that correct? No  
 23 written guidelines were given? That's the  
 24 transcript of September 23rd.  
 25 MR. MOORE:

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1 A. Yeah, I know we talked about it at the time  
 2 that, you know, at the time there was no  
 3 actual form in use, I guess, to document the  
 4 decisions that were made, but there was very,  
 5 I guess, prudent and considered decisionmaking  
 6 when it comes to these people tracking, you  
 7 know, these are very experienced operations'  
 8 engineering managers who are very familiar  
 9 with the assets, very familiar with the  
 10 operational history of the assets and  
 11 certainly very familiar with our preventative  
 12 maintenance and asset management program and  
 13 thoroughly understand the priority of work and  
 14 where we need to focus the attention of our  
 15 resources to ensure reliable customer supply,  
 16 so when they have a plan that they're tracking  
 17 throughout the year, they do--it's a very  
 18 considered decisionmaking process when a work  
 19 item comes up that our resources need to  
 20 address that is of a higher priority for our  
 21 customer supply and reliability, so it is a  
 22 very considered extensive decisionmaking  
 23 process. What we've done moving forward is  
 24 that we actually have a form in use now and  
 25 all the same people that are in this

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1 decisionmaking capability are using this form  
 2 now to document if any of these decisions need  
 3 to be made going forward so that we have a  
 4 record, but the rigor of the decisionmaking,  
 5 I'll say, is just as strong now as it was back  
 6 then, it's just that the documentation going  
 7 forward has been improved and plus the weekly  
 8 monitoring of our annual work plan, using a  
 9 tool called S Curves, and each regional  
 10 manager actually looks at their weekly  
 11 progress of the annual work plan where we're  
 12 actual against plan, and if any adjustments  
 13 need to be made to make sure that we recover  
 14 and we stay on plan, that's documented on a  
 15 weekly basis as well and that's reported right  
 16 up to the CEO level, so -  
 17 GREENE, Q.C.:  
 18 Q. And that was implemented after January 2014?  
 19 MR. MOORE:  
 20 A. That's correct, but the rigor around the  
 21 decisionmaking when we do see break-in work  
 22 coming into our annual work plan and when we  
 23 need to redeploy our resources to higher  
 24 priority work for our customers, it's always  
 25 been very strong and very consultative between

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1 all the senior very experienced people that  
 2 are accountable for those assets.  
 3 GREENE, Q.C.:  
 4 Q. It's 1:30, Mr. Chair.  
 5 CHAIRMAN:  
 6 Q. Okay, we'll adjourn until tomorrow morning.

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1 CERTIFICATE  
 2 I, Judy Moss, hereby certify that the foregoing is a true  
 3 and correct transcript of a hearing in the matter of  
 4 Newfoundland and Labrador Hydro's General Rate  
 5 Application heard on the 27th day of October, A.D., 2015  
 6 before the Commissioners of the Public Utilities Board,  
 7 St. John's, Newfoundland and Labrador and was transcribed  
 8 by me to the best of my ability by means of a sound  
 9 apparatus.  
 10 Dated at St. John's, Newfoundland and Labrador  
 11 this 27th day of October, A.D., 2015  
 12 Judy Moss

<p><b>-\$-</b></p> <p><b>\$13,400.00</b> [1] 6:3 <b>\$14,301.00</b> [1] 6:3 <b>\$500,000</b> [1] 179:7 <b>\$527,740.00</b> [2] 5:19 5:22</p> <hr/> <p><b>-&amp;-</b></p> <p><b>&amp;</b> [1] 146:8</p> <hr/> <p><b>-'-</b></p> <p><b>'10</b> [1] 102:21 <b>'11</b> [2] 102:14,21 <b>'12</b> [2] 56:4,12 <b>'12-13</b> [1] 56:16 <b>'13</b> [1] 71:5 <b>'13-14</b> [1] 63:15 <b>'14</b> [1] 96:5 <b>'14-15</b> [1] 63:15 <b>'90s</b> [3] 173:10 176:2 181:1 <b>'94</b> [1] 17:21 <b>'til</b> [3] 67:20 68:7 92:12</p> <hr/> <p><b>-0-</b></p> <p><b>002</b> [2] 28:1 30:16 <b>003</b> [1] 17:14</p> <hr/> <p><b>-1-</b></p> <p><b>1</b> [12] 11:1 30:16 74:20 115:17,22 124:5 128:17 133:22 135:7 136:25 155:11 186:20 <b>1.2</b> [1] 168:18 <b>1/6th</b> [1] 160:23 <b>10</b> [3] 5:18 16:4 71:1 <b>10,000</b> [2] 158:5,5 <b>105</b> [2] 157:2 186:25 <b>10:00</b> [1] 46:4 <b>10:15</b> [1] 57:23 <b>10:30</b> [1] 70:9 <b>10:45</b> [1] 82:7 <b>11</b> [6] 54:18 55:2 95:16 174:20 176:1 182:13 <b>11-hour</b> [2] 54:7 55:20 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