

1 Q. On p. 55 of Exhibit 101, a table is provided of the Forced Outage Rates (“FOR”) used  
2 by Nalcor in its analysis. Key finding 29 on p. 55 states: *“The...outage rates used by*  
3 *Nalcor in its analysis of the generation expansion alternatives were reasonable.”*

4 How did Navigant determine that a FOR for LIL of .89% was reasonable?

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7 A. Navigant made this determination based on its experience with other HVdc  
8 projects. In addition, in connection with other HVdc projects, Navigant has met  
9 with the major HVdc component suppliers and has reviewed documentation  
10 concerning the operation of such projects. Such information has been provided to  
11 Navigant under various projects on a confidential basis. However, it is this base that  
12 enables Navigant to determine the reasonableness of forced outage rate  
13 assumptions.

1 Q. On p. 58 of Exhibit 101, it is stated that Navigant understands that Nalcor will be  
2 undertaking further work to further define the factors affecting the power purchase  
3 price for Muskrat Falls Energy and the "*degree of volumetric flexibility*". Specifically,  
4 what work is Nalcor undertaking on this issue and what does "*degree of volumetric*  
5 *flexibility*" mean in this context?  
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8 A. As indicated in Nalcor's response to PUB-Nalcor-50, the terms of the PPA between  
9 Nalcor and NLH have not been established and will be finalized for DG3. For the  
10 purposes of DG2 analysis (and consistent with the Terms of Reference for the  
11 Board's Review), Nalcor has assumed that all costs associated with the  
12 development of Muskrat Falls and the Labrador Island Transmission Link will be  
13 recovered from Island Interconnected customers. Nalcor has also completed a  
14 variety of sensitivity analyses to determine the effects of changing energy  
15 requirements on the CPW analysis.  
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17 Nalcor is considering export opportunities, including arrangements with Emera,  
18 which would provide a level of flexibility in sales volumes to NLH by providing a  
19 means to monetize energy that might not be required by NLH.

1 Q. Did Navigant or Nalcor determine the sensitivity analyses to be completed, as  
2 outlined in Section 5 of Exhibit 101? Were other sensitivities completed by either  
3 Navigant or Nalcor that are not outlined in Section 5? If yes, please provide them.

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6 A. The sensitivity cases outlined in Section 5 of Exhibit 101 were primarily identified by  
7 Navigant based on its review of the system planning analysis. No additional  
8 sensitivities were carried out for the Independent Supply Decision Review by  
9 Navigant or Nalcor.

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11 Other sensitivities that have carried out separately from the Navigant review are  
12 contained in MHI-Nalcor-41, PUB-Nalcor-54, and PUB-Nalcor-118.

1 Q. On p. 69 of Exhibit 101, Generation Expansion Variants, Table 15, it is stated that for  
2 two of the variants (the first and third), Nalcor assumed an early replacement of the  
3 Holyrood facility in 2017 with a CCCT. What was the rationale for this assumption  
4 on this early retirement date?

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7 A. The assumption of early replacement of the Holyrood facility in 2017 with a CCCT  
8 was included in the first sensitivity in order to test the consequence of the  
9 assumption to continue operation of the existing facility at Holyrood until 2041.  
10 This result may be considered along with the result of the sensitivity analysis  
11 provided in the response to RFI MHI-Nalcor-3, which indicated the CPW preference  
12 for the Interconnected Island alternative over continued use of Holyrood until 2041  
13 to be \$1,283 million.

14A

15 The third sensitivity analysis was intended to confirm that installing pollution  
16 controls on the Holyrood facility was justified in the Island Isolated scenario rather  
17 than replacing Holyrood with a new CCCT facility at the outset.

1 Q. On page 70 of Exhibit 101, Section 5.2.1, Security of Supply and Reliability, it states  
2 *"Nalcor has investigated the level of exposure and unserved energy due to*  
3 *transmission failures in both alternatives. Based on the Nalcor analysis, in the worst*  
4 *case scenarios (transmission failures occurring in the worst two week window in*  
5 *terms of system load and available generation) both alternatives yield unsupplied*  
6 *energy of less than 1 percent of the annual energy forecast which represents*  
7 *increased security of supply and reliability as compared to the current situation.*  
8 *Further, with inclusion of the Maritime Link to the Interconnected Island alternative,*  
9 *the security of supply and reliability for this alternative will be substantially*  
10 *improved. "* Please provide a copy of Nalcor's analysis and describe in detail what  
11 process Navigant followed to confirm the results of Nalcor's analysis. As a result of  
12 Nalcor's analysis, what was the percent unsupplied energy under the "current  
13 situation" and for each of the Interconnected Island and Isolated Island options?

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15  
16 A. The Technical Note Labrador – Island HVdc Link and Island Interconnected System  
17 Reliability filed as Exhibit 106 provides the analysis performed by Nalcor with  
18 respect to the level of exposure and unserved energy due to transmission line  
19 failures. Navigant reviewed a draft of this document as part of its independent  
20 review of the Muskrat Falls DG2 decision.

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22 Exhibit 106 Table 5 summarizes the percent unsupplied energy for the worst two  
23 week window in terms of system load and available generation.

24  
25 For the current situation loss of TL202 and TL206 in 2012 would result in 79,969  
26 MWh of unsupplied energy for a two week repair window. This represents 1.02% of  
27 the 2012 annual energy forecast.

1 For the Interconnected Island option without the Maritime Link the loss of the  
2 Labrador – Island Link in 2017 would result in 14,384 MWh of unsupplied energy for  
3 a two week repair window. This represents 0.16% of the 2017 annual energy  
4 forecast. Analysis indicates that the level of unsupplied energy will reach 93,744  
5 MWh in 2036 for loss of the Labrador – Island Link. This represents 0.92% of the  
6 2036 annual energy forecast. Beyond 2036 the level of unsupplied energy is  
7 reduced as new capacity sources are added to the Interconnected Island option (i.e.  
8 170 MW CCCT in 2037 and future CTs).

9  
10 For the Isolated Island option the analysis indicates a decline in unsupplied energy  
11 levels for the loss of TL202 and TL206 when compared to the current system given  
12 the addition of transmission to the Avalon Peninsula and on Island generating  
13 capacity. Assuming the addition of the new 230 kV transmission line between Bay  
14 d’Espoir and Western Avalon in the Isolated Island option, the loss of TL202 and  
15 TL206 in 2017 would result in 13,435 MWh of unsupplied energy for a two week  
16 repair window. This represents 0.16% of the 2017 annual load forecast.

17  
18 Tables 6 and 7 of Exhibit 106 summarizes the impact that the addition of 50 MW  
19 CTs can have on the level of unsupplied energy for the Interconnected Island option  
20 and the Interconnected Island with Maritime Link option respectively.

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22 Navigant has reviewed the methodology presented in Exhibit 106 and agrees with  
23 the conclusions presented.

1 Q. Further to PUB-Nalcor-115 reference is made to a "worst case" scenario in the  
2 quote from the report. Did Navigant or Nalcor determine this scenario and how  
3 was it determined to be appropriate?  
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7 A. The reference to "worst case scenarios" was made in respect of an extended  
8 transmission outage on page 70 of Exhibit 101.

9 Nalcor and Navigant are in agreement that the scenarios presented are worst case,  
10 as an outage on the transmission lines on the Avalon Peninsula reflect an outage on  
11 the Island Interconnected system that results in the maximum amount of unserved  
12 energy. The two week period was deemed to be reasonable based on previous  
13 experience with line restoration, as indicated on Page 27 of Exhibit 106.

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15 As indicated in Table 2 of Exhibit 35, the probability of iceberg damage to the SOBI  
16 cables is much lower than the 1 in 50 years return period used for the overhead  
17 line. At a probable iceberg rolling rate and a seabed piercing depth of 70 metres or  
18 greater, the probability of an iceberg impact on one of the cables is 1 in 1,000 years,  
19 and given the Labrador Island Transmission Link has a spare cable installed across  
the SOBI, this event will result in no unserved energy.

1 Q. Further to PUB-Nalcor-115, what analysis of the Maritime Link did Navigant  
2 complete to allow them to conclude that the Maritime Link would "*substantially*  
3 *improve*" the security of supply and reliability of the Interconnected Island  
4 alternative? Please provide a copy of this analysis.

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7 A. Navigant's conclusion was based on the fact that the Maritime Link is able to serve  
8 as an alternate source of supply in the event of a contingency on the Labrador –  
9 Island Transmission Link. Given the capacity of the Maritime Link, its availability as  
10 an alternate source of supply is expected to substantially improve the security of  
11 supply and reliability for the Island.

12 This expectation is reinforced by the analysis completed by Nalcor. The results of  
13 the analysis are summarized in Table 5 of Exhibit 106, "Technical Note: Labrador –  
14 Island HVdc Link and Island Interconnected System Reliability". Table 5 indicates  
15 significant reductions in the number of hours of exposure, the corresponding  
16 quantities of unsupplied energy and subsequent improvements in energy  
17 availability when the Maritime Link is considered in the analysis.



1 Q. Provide a sensitivity analysis assuming the capital costs of the Muskrat Falls facilities  
2 and the HVdc Labrador-Island Link facilities are increased by 50% each and compare  
3 this sensitivity to the Isolated Island and Labrador Interconnected base cases.

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6 A. The requested sensitivity and comparison to the base cases is shown below:

	Cumulative Present Worth (\$ M)		
	Isolated Island	Interconnected Island	Difference
<b>Base Case (October 2010):</b>			
Fixed charges	1,402	1,750	(348)
Fuel	6,049	1,170	4,879
Power purchases	743	3,358	(2,615)
Operating	616	374	242
	8,810	6,652	2,158
<b>Muskrat Falls and LIL Capital Costs Increased by 50%:</b>			
Fixed charges	1,402	2,546	(1,144)
Fuel	6,049	1,170	4,879
Power purchases	743	4,525	(3,782)
Operating	616	374	242
	8,810	8,616	194

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8 The in-service capital cost for the Labrador-Island Link was increased by 50%. The  
9 50% increase in Muskrat Falls capital costs resulted in an increase for the power  
10 purchase rate for the Island from the \$2010 escalating supply rate of \$76/MWh,  
11 used for the reference case, to approximately \$109/MWh.

12

13 The result of this sensitivity analysis is that there continues to be a CPW preference  
14 for the Labrador Interconnection alternative where capital costs for the Lower  
15 Churchill Project are 50 percent higher, relative to the reference case. The CPW  
16 preference however is reduced by \$1,964 million relative to the reference case.

1 Q. Further to PUB-Nalcor-7, PUB-Nalcor-8 and PUB-Nalcor-9, what other financial  
2 commitments have been made, or are anticipated to be made, from August 1, 2011  
3 to the planned date of project sanction, i.e. passing through DG3? Please provide a  
4 detailed list of all such commitments, e.g. studies, testing, construction, etc., their  
5 individual anticipated costs and schedule for completion.

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8 A. Nalcor anticipates that project sanction (DG3) will occur in the first half of 2012;  
9 greater certainty is not possible given the dependency on the completion of  
10 prerequisite activities that are beyond Nalcor's control.

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12 Currently the following expenditures are anticipated up to the end of Q2/2012:

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14 1. Ongoing project carrying costs of \$8 million per month, which include the  
15 Nalcor Project Management Team, the EPCM consultant (SNC Lavalin), other  
16 third party costs, offices, travel and other expenses  
17 \$72.0 million to end of Q2/2012

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19 2. Legal, commercial, financing and regulatory costs of \$3.0 million per month  
20 including Nalcor's financial and legal advisors  
21 \$27.0 million to end of Q2/2012

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23 3. Horizontal Directional Drilling pilot hole engineering and site Investigation  
24 work at SOBI. Planned completion in Q1 2012  
25 \$6.0 million

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- 1           4. SOBI coring program. Planned completion in Q1 2012
- 2                 \$1.5 million
- 3
- 4           5. Geotechnical analysis of SOBI site investigation. Planned completion in Q2
- 5                 2012
- 6                 \$1.6 million
- 7
- 8           6. SOBI nearshore and deepwater data acquisition and survey specialist
- 9                 services. Planned completion in Q4 2011
- 10                \$3.7 million
- 11
- 12           7. SOBI sea current monitoring, iceberg monitoring and associated studies.
- 13                Ongoing beyond sanction
- 14                \$1.8 million to Q2 2012
- 15
- 16           8. Lidar, permitting and metocean reporting and smaller contacts at SOBI
- 17                \$0.4 million to Q2 2012
- 18
- 19           Total: \$114 million

- 1 Q. Please provide a high resolution electronic version of the latest up-to-date  
2 *“Provincial Generation and Transmission Grid”* graphic as depicted on p. 17 of  
3 Exhibit 101.  
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6 A. Please see Exhibit 102 provided in both .jpg and .pdf formats.