

1 Q. Pg. 31, third full paragraph of Exhibit 106 states: *“Building the HVdc line to a very*  
2 *high reliability level (i.e. 1:500 year return period) while the connected ac*  
3 *transmission system has a lower reliability level (i.e. 1:25 year return period) is*  
4 *problematic as a 1:50 year weather loading will result in failures to the ac*  
5 *transmission system while the HVdc line is unaffected. The end result is that the*  
6 *HVdc line is intact but the converter station cannot function as there is insufficient*  
7 *ac system transmission strength and capacity to operate the station or transmit*  
8 *power to load centers.”*

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10 Recognizing that weather loading in excess of 1:50 year loading could also happen  
11 in an area of the Province, e.g. Long Range Mountains or Labrador where no other  
12 transmission would be affected, the end result would be that the HVdc line is out  
13 while all other transmission facilities are intact. How has Nalcor considered such  
14 potential occurrences in its analysis to support the above-noted statement?

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17 A. The potential for the situation described in the question exists. If the 1 in 50 year  
18 storm for the region were to pass over an area other than the Avalon Peninsula,  
19 then the dc line could be out while the ac facilities are unaffected.

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21 This potential, however, does not affect Nalcor’s analysis. Given that existing ac  
22 transmission infrastructure on the Island has a 1 in 25 year or less return period,  
23 the situation where a portion of the ac system is down and the HVdc remains  
24 standing would be the more probable and frequent event.

1 Q. Further to PUB-Nalcor-171, if such an event as described were to occur, please  
2 explain why having the HVdc line intact with only portions of the 230 kV system out,  
3 would not be a significant improvement with respect to total system restoration  
4 time.

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7 A. For the situation described, providing there is sufficient ac Island transmission intact  
8 to support operation of the Soldier's Pond converter station, there should be  
9 minimal unsupplied load on the Avalon Peninsula. In the event there is insufficient  
10 Island transmission to support converter station operation, the HVdc line will be of  
11 no benefit until the ac transmission has been restored. In each case restoration of  
12 the system is dependent on availability of ac transmission.

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14 There would be no significant benefit in total system restoration time unless the  
15 probability of an ac system failure is addressed.

1 Q. Pg. 32, last paragraph of Exhibit 106 states: *“While it may appear desirable to*  
2 *increase the return period for the Labrador-Island Link, the entire 230 kV grid east of*  
3 *Bay d’Espoir would need to be upgraded to a similar return period in order to*  
4 *achieve the desired reliability improvement.”*

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6 Please explain the basis for this statement given that the HVdc line is approximately  
7 1,100 km long and a weather related loading in excess of the 1:50 year return  
8 period could occur at any point in the line.

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11 A. The above statement is based on the 230 kV system generally having a lower design  
12 return period than the Labrador Island Transmission Link. Unless the return period  
13 of the 230 kV system is improved, 230 kV failures will be more likely than HVdc  
14 failures.

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16 Upgrading the 230 kV transmission system east of Bay d’Espoir will have a more  
17 significant improvement to reliability than increasing the design return period for  
18 the HVdc link, since more outages are expected in a given period on the 230 kV  
19 system than on the HVdc link.

1 Q. Pg. 32, third paragraph of Exhibit 106 states: *“Should the Maritime Link not*  
2 *materialize then the significance of the sudden loss of the Labrador-Island Link*  
3 *becomes more severe.”*

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5 Pg. 33, last paragraph of Exhibit 106 states: *“While the impact of these outage*  
6 *events could be further mitigated with the application of additional combustion*  
7 *turbines on the Island Interconnected System, given the low probability of the event*  
8 *and minimal impact on unsupplied energy, Nalcor, in the interest of minimizing*  
9 *overall cost to the customer, has opted to apply load rotation and other means to*  
10 *minimize the impact to customers should an event occur.”*

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12 Explain in detail what is meant by *“load rotation”* and what *“other means”* Nalcor is  
13 opting to apply? Please confirm that Nalcor does not intend to install standby  
14 generation for the Island Interconnected system without the Maritime Link.

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17 A. *“Load rotation”* would involve temporary load shedding on a rotating basis in order  
18 to balance load with available generation resources.

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20 Part III of the *Electrical Power Control Act, 1994* also permits the re-allocation of  
21 generation sources during a power emergency. It may be necessary to re-allocate  
22 other generation sources to meet utility demands in the event of an emergency.

23  
24 Given the low probability of this event and the substantial cost of standby  
25 generation, Nalcor does not intend to install standby generation for the Island  
26 Interconnected system without the Maritime Link, as the expansion plan offers a  
27 similar level of reliability to that currently provided to the Island grid.

1 Q. With reference to pg. 23, Table 5 of Exhibit 106, please provide a CPW sensitivity  
2 analysis with standby combustion turbines being added to the Island  
3 Interconnected scenario (without Maritime Link) assuming a bipole outage such  
4 that the unsupplied energy for the worst two week window is approximately  
5 equivalent to that of the Isolated Island scenario with a TL202/206 outage. The  
6 analysis should cover the years 2017 to 2037, be presented in a format similar to  
7 Table 5 and include the comparative results of the CPW calculations.

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10 A. The table below summarizes the results of the requested analysis. In total the  
11 addition of the equivalent of eleven 50 MW combustion turbines<sup>1</sup> would need to be  
12 advanced in the Interconnected Island scenario to make the level of unsupplied  
13 energy comparable to the Isolated Island case. The expansion would include:

14

- 15 • 5 x 50 MW CT's by 2022
- 16 • 3 x 50 MW CT's by 2027
- 17 • 3 x 50 MW CT's by 2032

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19 The CPW for the Island Interconnected scenario with the advanced installation of  
20 combustion turbines would increase to \$ 7,016 million (2010\$) from \$ 6,652 million  
21 (2010\$), an increase of \$364 million (2010\$).

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<sup>1</sup> The advancement results in CTs displacing CCCTs in the generation expansion plan.

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Level of Exposure and Unsupplied Energy								
Year	Load Forecast		Island Standby Generation MW	Level of Exposure Load Exceeds Generation		Availability %	Unsupplied Energy Worst 2 wk Window	
	MW	GWh		Annual Hours	Annual %		MWh	% of Annual
<b>Isolated Island – TL202/206 Outage</b>								
2012	1571	7850	635.1	4318	49.29	98.02	79,969	1.02
2017	1704	8666	965.2 <sup>1</sup>	865	9.87	99.605	13,435	0.16
2021	1757	8967	965.2	1206	13.67	99.449	19,838	0.22
2022	1776	9065	1085.2 <sup>2</sup>	200	2.28	99.909	2,622	0.029
2027	1856	9464	1185.2 <sup>3</sup>	50	0.57	99.977	553	0.006
2032	1934	9860	1235.2 <sup>4</sup>	0	0	100.0	0	0
2037	2006	10228	1277.7 <sup>5</sup>	58	0.66	99.974	649	0.006
<b>Island Interconnected – Bipole Outage With Additional CT's</b>								
2017	1704	8666	1468.5	637	7.27	99.85	14,384	0.16
2022	1776	9065	1668.5 <sup>6,7</sup>	83	0.94	99.981	1,278	0.014
2027	1856	9464	1768.5 <sup>8,9</sup>	48	0.54	99.989	820	0.008
2032	1934	9860	1918.5 <sup>10</sup>	4	0.04	99.999	38	0.0004
2037	2006	10228	1918.5	42	0.48	99.990	765	0.075
Notes								
1: 230 kV transmission line Bay d'Espoir to Western Avalon is built prior to 2017 increasing transfer to east coast for loss of TL202 and TL206.								
2: 170 MW CCCT in 2022 at Holyrood								
3: 50 MW CT in 2024 and 50 MW CT in 2027 both assumed on Avalon Peninsula								
4: 50 MW CT in 2030								
5: Holyrood units replaced with 170 MW CCCT (1&2 in 2033 + 3 in 2036)								
6: Hardwoods 50 MW CT retired in 2022								
7: 5 x 50 MW CT in 2022								
8: Stephenville 50 MW CT retired in 2024								
9: 3 x 50 MW CT in 2027								
10: 3 x 50 MW CT in 2032								

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1 Q. With reference to pg. 23, Table 5 of Exhibit 106, do the results for Island  
2 Interconnected scenario (with and without Maritime Link) include the 230 kV  
3 transmission line from Bay d’Espoir to Western Avalon being built before 2017?  
4 (Footnote 1 is missing from both these scenarios). If not, why not?

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7 A. The Island Interconnected scenario (with or without the Maritime Link) assumes the  
8 new 230 kV transmission line is built from Bay d’Espoir to Western Avalon before  
9 2017.

1 Q. Please provide a CPW analysis for the Interconnected Island Option assuming a full  
2 Cost of Service methodology is used to determine the power purchase price of  
3 Muskrat Falls power and energy to be paid by Hydro to Nalcor over the period 2017  
4 to 2067 rather than the PPA approach.

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7 A. Whether the pricing for Muskrat Falls energy follows a cost of service approach or  
8 an escalating PPA approach, the CPW result for the Interconnected Island  
9 alternative will be the same. As noted in PUB-Nalcor-46, the financial parameters in  
10 the annual cost of service model were set to provide return on rate base of 8.4% in  
11 order to be comparable to the PPA pricing approach. As a result, the present values  
12 of the Muskrat Falls revenue streams under either case are the same.



1 Q. What financial expenditures are expected to be incurred on the Infeed Option  
2 Development from DG2, November, 2010 to DG3? Please provide in the response  
3 actual expenditures to December 31, 2011 and forecast expenditures from  
4 December 31, 2011 to DG3.

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7 A. The total expenditures incurred for the period from DG2 (November 2010) to  
8 December 31, 2011 was approximately \$82,800,000. The forecasted expenditures  
9 from January 1, 2012 up to DG3 are estimated at approximately \$12,000,000 to  
10 \$15,000,000 per month.

1 Q. The response to Undertaking No.7 filed on February 24, 2012 provided information  
2 on work packages for the Muskrat Falls Project on the SNC Lavalin and Nalcor's  
3 websites. On February 15, 2012 Jason Kean stated that the total value of tenders  
4 already awarded and ready to be awarded was \$4.5 million. (Transcript, February  
5 15, 2012, pgs. 94-95) Please explain how, or if, the information provided by Mr.  
6 Kean is consistent with information provided in the response to Undertaking No. 7.  
7 In the response explain the deviation of the \$4.5 million provided by Mr. Kean.

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10 A. The response provided by Mr. Kean on February 15 and Nalcor's response to  
11 Undertaking U-7 are responses to different questions.

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13 Mr. Harrington was asked on February 14:

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15 I wonder if you could just describe some of the tenders that are  
16 outstanding, whether this list is up to date, and to give us an  
17 indication of the total value of the tenders that are ready to be  
18 awarded?<sup>1</sup>

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20 On the invitation of Mr. O'Reilly, the response to the undertaking was  
21 provided by Mr. Kean on February 15:

22

23 The total value is approximately \$4.5 million.<sup>2</sup>

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<sup>1</sup> Transcript, February 14, 2012, page 61

<sup>2</sup> Transcript, February 15, 2012, page 95

1 Further clarification of the question was provided by Ms. Greene on  
2 February 16:

3  
4 And at one stage I may have said, contracts ready to award, but the  
5 intent of the question and what we would like Nalcor to provide is an  
6 order of magnitude of the total value of all of the packages that are  
7 listed on the website. So, Mr. Kean had replied that it was four and a  
8 half million dollars, but I believe he interpreted that as ready, of  
9 contracts to award.<sup>3</sup>

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11 With the clarification provided by Ms. Greene on February 16, Nalcor interpreted  
12 “all tenders, contracts, work packages, as shown in the Nalcor website on a  
13 particular date”<sup>4</sup> broadly and provided a comprehensive summary of all packages  
14 listed, whether the contracts were ready to award or not, in response to the  
15 broadly rephrased question.

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17 Nalcor therefore interprets the two questions referenced in this RFI as two different  
18 questions:

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- 20 1) The first question asks the value of construction contracts awarded or ready to  
21 be awarded  
22 2) The second question asks the value of all work packages listed on Nalcor’s web  
23 site, with no qualification as to whether they are ready to be awarded.

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<sup>3</sup> Transcript, February 16, 2012, page 77

<sup>4</sup> Transcript, February 23, 2012, page 68

1           The answer provided in Undertaking 7 is the response to the broadly phrased  
2           question asked on February 16.

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4           \$2.4 million of the amount referenced in Mr. Kean’s specific answer is the amount  
5           in paragraph 2 of the answer to Undertaking 7, and the remaining \$2.1 million was  
6           associated with an RFP that had already been awarded for the supply of a power  
7           transformer, but is not listed in Undertaking 7 as the RFP for the power transformer  
8           was not posted to a web site.