

1 Q. **Reference: Volume 1, Attachment 7, Technical Note on the Labrador-Island Link**
2 **Reliability**

3 What would be the results of the analysis, as presented in the technical note, if the poorly
4 performing HVDC schemes had not been omitted and the upper and lower quartiles of the
5 Cigre reliability data had been used? In the response please include the following:

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7 a. What would be the upper and the lower reliability values?

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9 b. How would each of these reliability figures change the overall reliability of the
10 power supply?

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12 c. How many more UFLS events would there be if no action were taken?

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14 d. Would more generation be required and, if so, when and how much?

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17 A. a. The CIGRE¹ data was provided to serve as a reference point for the reliability of other
18 systems installed globally. The intent of the report was to provide the industrial average of
19 existing plants. It was not intended to represent the anticipated reliability of the Labrador-
20 Island Link, which has been specified and guaranteed by the Original Equipment
21 Manufacturer, GE.

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23 CIGRE data does not explicitly state upper and lower quartiles. For completeness of the
24 response, Nalcor has organized the CIGRE data as provided into quartiles. The results for
25 the upper and lower quartile are presented in Table 1.

¹ The International Council on Large Electrical Systems ("CIGRE").

Table 1: CIGRE Data into Quartiles

| Year | EA Base | EA 80% Cut-Off | Quartile Base | | Quartile 80% Cut-Off | |
|----------------|--------------|----------------|---------------|-------|----------------------|-------|
| 2005 | 94.49 | 96.77 | 0 | 91.82 | 0 | 95.27 |
| 2006 | 93.44 | 96.48 | 1 | 93.10 | 1 | 95.40 |
| 2007 | 93.2 | 95.62 | 2 | 93.44 | 2 | 95.81 |
| 2008 | 93.83 | 95.46 | 3 | 93.74 | 3 | 96.43 |
| 2009 | 92.99 | 95.29 | 4 | 95.02 | 4 | 96.77 |
| 2010 | 91.82 | 96.64 | | | | |
| 2011 | 95.02 | 96.37 | | | | |
| 2012 | 93.64 | 95.27 | | | | |
| 2013 | 93.27 | 96.02 | | | | |
| 2014 | 92.34 | 95.99 | | | | |
| 2015 | 93.59 | 95.51 | | | | |
| 2016 | 93.44 | 95.33 | | | | |
| Average | 93.42 | 95.9 | | | | |

0 = Minimum Value
 1 = Lower Quartile (25%)
 2 = Median
 3 = Upper Quartile (75%)
 4 = Maximum Value

1 b. The differences in the lower and upper quartiles are not significant and would not
 2 impact results of Nalcor’s Energy Availability analysis. The design reliability of the
 3 Labrador-Island Link is 98.5% Energy Availability, as specified and guaranteed by GE.

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6 c. and d. Please refer to Newfoundland and Labrador Hydro’s response to PUB-NLH-023,
 7 parts b and c.