

1 Q. **Newfoundland and Labrador Hydro - EFLA Consulting Engineers Report - *Structural Capacity***  
2 ***Assessment of the Labrador Island Transmission Link, April 30, 2020 ("EFLA" Report)***

3 With reference to pages 26 and 27 and Footnote 11 of the April 30, 2020 EFLA report, please:

- 4 a. Explain the justification for excluding unbalanced ice loads.
- 5 b. Explain the justification for assuming that wind directions are transversal, 45 degrees, or  
6 longitudinal to spans, thus excluding other possible worse case wind directions and  
7 unbalanced ice formations.
- 8 c. State whether global wind directions and unbalanced ice loads will be addressed in the  
9 November 15, 2020 reliability report. If not, explain.

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12 A. a. Please refer to Newfoundland and Labrador Hydro's ("Hydro") response to NP-NLH-020.

- 13 b. This assumption covers the basic wind load cases for tangent towers and are typically used  
14 by tower designers. These wind directions give the highest loading vector and are the critical  
15 load cases. The towers used in the construction of the Labrador-Island Link ("LIL") were not  
16 found to be sensitive for other loading directions.

17 In the design of the LIL, the towers were designed, reviewed and approved, and some  
18 towers were full-scale tested. Many more load cases were included in the design of the  
19 towers than those analyzed in the study. The LIL contains 3,223 towers and each tower was  
20 analyzed for the load cases as described in the EFLA Consulting Engineers ("EFLA") report.  
21 For the purpose of the study, it was decided to reduce the number of load cases and only  
22 focus efforts on studying the critical load cases for reliability of the LIL. The main reason for  
23 reducing the load cases was to reduce computational time required to run the analysis in  
24 order to complete the assessment in the allowed timeframe. EFLA reviewed all original load  
25 cases used in the original design of the towers and reduced accordingly based on  
26 professional experience and judgement.

1           c. The towers for the LIL have been designed using industry standard wind directions including  
2           longitudinal, transverse, and 45 degrees. Although for detailed design more global wind  
3           directions should be observed to identify any special cases, it was decided that for the  
4           purpose of the study the scenarios assessed were deemed to be generally the most critical  
5           and further analysis was not required.

6           With respect to unbalanced ice loading, EFLA found that the design of the LIL used a  
7           conservative load case for conductor break that was a much stronger requirement than  
8           requirements on non-uniform icing. As such, inclusion of unbalanced ice loads in the  
9           analysis was not required.

10          However, Hydro has planned to investigate the impact of global wind directions and  
11          unbalanced loading due to non-uniform ice formation on towers in more detail as part of  
12          the ongoing reliability study being completed by Haldar & Associates Inc.