

1 Q. **Reference: Hydro’s April 30, 2020 letter Re: Reliability and Resource Adequacy Study Review**
2 **– Assessment of As-Designed Capacity of the Labrador-Island Link.**

3 *“EFLA’s report will be used together with the Assessment of LIL Reliability in Consideration of*
4 *Climatological Loads, currently underway by Haldar & Associates Ltd., to inform Hydro’s*
5 *probabilistic failure analysis in determining overall line reliability.”*

6 Please provide a detailed overview of the work being undertaken by Haldar & Associates
7 including: (i) the scope of the work assigned by Hydro; (ii) the methodology being employed; (iii)
8 the use of local weather data; (iv) similar assessments that Haldar & Associates, or its principals,
9 have undertaken in the past; and (v) how Haldar & Associates’ methodology compares to
10 industry standards for assessing transmission line reliability.

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13 A. i) The scope of the work assigned by Newfoundland and Labrador Hydro (“Hydro”) includes
14 the reliability assessment of the Labrador-Island Link (“LIL”) considering local conditions,
15 including two predominant types of icing exposures; (1) glaze icing due to freezing
16 precipitation and (2) rime icing due to in-cloud precipitation. A sensitivity study will be done
17 to determine the impact of some key parameters on the expected reliability level of the as-
18 built LIL. The line reliability will be provided considering various scenarios in terms of line
19 exposures.

20 ii) The methodology used for the reliability study will be based on the probabilistic failure
21 assessment of transmission line components considering load and strength variations along
22 the length of the LIL line. The study will use the information from the structural capacity
23 assessment report prepared by EFLA Consulting Engineers (“EFLA”) with the as-built LIL
24 information in terms of use factors and assess the probability of failure of key critical line
25 components for these two types of loading hazards. The study will be based on parameters
26 outlined within best industry practice including CSA 60826-10 but will also consider more
27 than 50 years of Hydro’s historical operating experiences of 4,000 km of high voltage
28 transmission lines in Newfoundland and Labrador.

- 1 iii) Please refer to Hydro’s response to PUB-NLH-087.
- 2 iv) Asim Haldar of Haldar & Associates Inc. is a leader in the utility engineering industry. Dr.
- 3 Haldar has published more than 90 technical papers and reports in his field of expertise,
- 4 overhead line design issues and behavior of offshore structures; many of the reports have a
- 5 worldwide circulation. Dr. Haldar has worked in the utility industry with Hydro for over 35
- 6 years and intimately understands the existing Hydro transmission line system from his
- 7 experience as a lead engineer in the design and upgrading of more than 1,500 km of existing
- 8 and new high voltage lines. He has extensive knowledge and experience on the subject of
- 9 probabilistic analysis and strength assessment of overhead lines.

10 Due to the extensive and lengthy career in the field of transmission line design and

11 assessments as noted, it is not practical to provide a full *detailed* overview of the work

12 completed by Dr. Halder in the past. As a general overview, throughout his career, Dr.

13 Haldar has been involved in ice accretion models, their application in extreme ice load

14 prediction on transmission line, as well as risk-based line design. Through his work on

15 numerous operations projects, construction projects, and several major transmission line

16 icing events, Dr. Haldar has been engaged in all aspects of transmission line design for all

17 voltage classes in the provincial grid. Dr.Haldar has a strong background of applied Research

18 and Development, specifically with respect to the transmission line engineering within

19 Newfoundland and Labrador.

20 Dr. Haldar continues to work in these areas today through his consulting firm and is

21 presently a leading advisor of CEATI International’s Transmission Overhand Design and

22 Extreme Mitigation (TODEM) group, which consists of 30 leading international electrical

23 utilities from four continents, with a common goal to discuss, benchmark and share

24 knowledge on transmission line design.

- 25 v) The approach taken by Haldar & Associates Inc. will be aligned with industry standard for
- 26 transmission line assessment within the utility industry. Mr. Haldar is a leader in the utility
- 27 engineering industry and has extensive knowledge of reliability based assessment of high
- 28 voltage and extra high voltage overhead transmission lines. Mr. Haldar recently completed a
- 29 completed a study report (in publication) on GUIDELINES TO DETERMINE THE RELIABILITY

1 OF EXISTING TRANSMISSION LINES CONSIDERING DETERIORATION (AGING) ISSUES CEATI
2 REPORT No. T153700-33104, 2020 on behalf of CEATI International, and is also currently
3 involved in another study for Calibration of Overhead Line Design considering Deterministic
4 and Reliability Based Methods. These two projects are supported by 30 utilities across the
5 globe, including all major Canadian Utilities, as part of the CEATI Overhead Line Design &
6 Extreme Event Mitigation (TODEM) interest group.