

1 Q. **Re: CBA, Rev. 1, vol. II, Wabush Terminal Station Upgrades, Attachment 3, Lab West System**  
2 **Expansion Study, Wabush Terminal Station Recommended Upgrades, page 5 (p. 451 pdf)**

3 Citation:

4 The following criteria were defined for the transmission system in western  
5 Labrador as part of the Labrador Interconnected System Expansion Study.

- 6 • No loss of load for:
  - 7 ○ Loss of a synchronous condenser;
  - 8 ○ Loss of a capacitor bank; and
  - 9 ○ Loss of a power transformer.
- 10 • Loss of load is permitted for:
  - 11 ○ Loss of a 230 kV transmission line.

12 With respect to transformer contingencies, the following Transmission Planning  
13 Criteria also applies to the transmission system in western Labrador:

14 Transformer additions at all major ( $\geq 230$  kV) terminal stations (i.e. two or more  
15 transformers per voltage class) shall be planned on the basis of being able to  
16 withstand the loss of the largest unit (i.e. installed spare transformer capacity)  
17 such that all firm loads can be supplied during system peak.

18 The reliability implications of these criteria are presented in this report.

19 a. Please explain where and when these criteria were determined, and by what process.

- 20 i. Where they reviewed and approved by Board?
- 21 ii. Are they mandatory or discretionary?
- 22 iii. Hypothetically, if Hydro were to determine that, with the loss of the largest unit, 1  
23 MW of firm load would have to be curtailed for one hour at system peak, and that  
24 avoiding that curtailment would require an investment of \$50 million, would it be  
25 able to exercise judgement about proceeding with that investment?

26 b. Please elaborate on the extent to which Hydro can and does exercise its judgment in  
27 comparing the costs and benefits of transmission investments.

1 A.

2 a. The criteria were developed by Newfoundland and Labrador Hydro (“Hydro”) in the analysis  
3 performed by the Labrador Interconnected Transmission System Expansion Study. This  
4 approach is explained in Section 2.3 of the study report:

5 Hydro’s prescribed Transmission Planning Criteria<sup>1</sup> are applied within the  
6 Newfoundland and Labrador Interconnected System (“NLIS”). However, these  
7 criteria are only applied to the portion of the NLIS that is defined as the Primary  
8 Transmission System (“PTS”). The PTS includes the portions of the NLIS that  
9 permit the bulk flow of electricity across the transmission system. This consists  
10 of the 230 kV transmission system on the island of Newfoundland, the LIL, and  
11 the 735 kV and 315 kV transmission systems in Labrador.

12 Hydro has modified its approach to transmission planning for the Labrador  
13 Interconnected System to balance reliability with customer costs as a result of  
14 the small number of customers bearing system costs. Historically, Hydro has not  
15 applied rigid transmission planning criteria for the transmission systems in  
16 eastern and western Labrador. The Labrador East transmission system is  
17 classified as a Radial Transmission System and the Labrador West transmission  
18 system is classified as a Local Network. In contrast to the PTS, these systems  
19 distribute power to specific customers and are designed to meet the reliability  
20 requirements and balance customer cost impacts. If there was a strict  
21 application of transmission planning criteria on the LIS, significant expansion of  
22 the transmission system would be required.

23 . . .

24 However, n-1 criteria,<sup>2</sup> which are applied in a PTS, are not applied to high  
25 voltage terminal stations and transmission lines in eastern and western  
26 Labrador. This is due to the significant expansion costs that would be borne by a  
27 small number of customers. As a result, an outage to a transmission line or  
28 station element (such as a bus) has the potential to result in a customer impact.<sup>3</sup>

29 As per the excerpt above, criteria for local networks and radial systems are developed at  
30 Hydro’s discretion in consideration of reliability and cost implications for affected  
31 customers.

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<sup>1</sup> “TP-S-007 – Transmission Planning Criteria, Hydro.”

<sup>2</sup> “The ability to withstand the loss of a system element without customer impact is referred to as n-1 criteria.”

<sup>3</sup> “Labrador Interconnected Transmission Expansion Study,” Newfoundland and Labrador Hydro, rev 2, April 3, 2019 (originally filed October 21, 2018, sec 2.3, p. 9/2 to p.10/2).

1 These criteria were presented in the Labrador Interconnected System Expansion Study  
2 report that was filed as directed by the Board of Commissioners of Public Utilities (“Board”)  
3 in Board Order P.U. 9(2018) and is being reviewed as part of the *Network Additions Policy*  
4 *and Transmission Expansion Study for the Labrador Interconnected System* proceeding.  
5 These criteria were not submitted for approval by the Board. Rather, the criteria serve to  
6 provide Hydro with a benchmark for reliable operation and a basis for analysis. When  
7 analysis outcomes include a requirement for system expansion, Hydro would develop a  
8 Capital Budget Application to justify the expansion project to the Board. The Board would  
9 then review the application as part of the normal regulatory process.

10 If faced with the described hypothetical scenario, Hydro would be able to exercise its  
11 judgement regarding whether to proceed with that investment. Hydro would assess the  
12 capacity shortfall in light of technical considerations including overload capacity,  
13 probabilistic reliability analysis, requirements for operational margin, forecasted customer  
14 growth, practical opportunities for customer interruption, and others. Hydro would only  
15 proceed with a recommendation for a capital investment when it is deemed to be a lowest-  
16 cost solution for customers, consistent with reliable service.

17 **b.** Hydro’s ability to exercise judgement when comparing the costs and benefits of  
18 transmission investments for local networks and radial systems is described in Hydro’s  
19 response to Part a.

20 Transmission system investment requirements for the PTS are assessed by the  
21 Newfoundland and Labrador System Operator (“NLSO”). Transmission Planning Criteria<sup>4</sup>  
22 would be strictly applied by the NLSO to ensure delivery of firm network loads and firm  
23 transmission service requests. When NLSO analysis outcomes include a requirement for  
24 system expansion, the analysis is submitted to the Transmission Operator. If upgrade  
25 requirements were identified in Hydro’s network, this analysis would accompany a capital  
26 budget application that would be developed by Hydro to justify the requirement to the

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<sup>4</sup> As per NLSO Standard “Transmission Planning Criteria – Doc # TP-S-007,” Newfoundland and Labrador Hydro, October 2, 2020, included as Attachment 3 to Hydro’s response to CA-NLH-019 of this proceeding.

1 Board. The Board would then review the application as part of the normal regulatory  
2 process.