Q. **Reference: Reliability and Resource Adequacy Study 2022 Update, Volume I, page 15, lines 5-6.**

Hydro states:

> A transmission constraint was revised for the Island Interconnected System and updated in the Reliability Model. From that analysis, it was determined that if the LIL experienced a bipole (i.e., total) outage, the eastward power flows from the Bay d'Espoir Hydroelectric Generating Facility would be limited to a maximum of approximately 750 MW. In the 2018 Filing, the eastward power flows from the Bay d'Espoir Hydroelectric Generating Facility were limited to a maximum of approximately 650 MW.

Explain how the emergency limit of 750 MW was determined and provide documentation of the 750 MW emergency limit east of Bay d'Espoir. Also discuss any limit on the time duration over which it is reasonable to apply the 750 MW emergency limit east of Bay d'Espoir and any relevant conditions or restrictions.

A. Newfoundland and Labrador Hydro ("Hydro") will apply Emergency Planning Criteria to reduce customer impact during an extended bipole outage of the Labrador-Island Link ("LIL"). The principle for the Emergency Planning Criteria is that lower transient voltages are deemed acceptable for rare contingency events; however, the system must remain stable. Such contingency events would include any three-phase fault on the BDE/SOP[1] corridor that would result in the violation of Hydro's transient under-voltage criteria.[2] The application of Hydro's transient under-voltage criteria under normal operation, with the LIL in service, would limit the BDE/SOP flow to approximately 650 MW. A power flow of 650 MW during normal operation with the LIL in service will not be restrictive.

[1] Bay d'Espoir/Soldiers Pond ("BDE/SOP").

[2] Newfoundland and Labrador Hydro (2021). NLSO Standard TP-S-007, *Transmission Planning Criteria*, p.6, <https://www.oasis.oati.com/woa/docs/NLSO/NLSOdocs/TP-S-007_Transmission_Planning_Criteria_UPDATED_08252021.pdf>, states, under normal operation, "post fault recovery voltages on the ac system shall be as follows:

* Transient under voltages following fault clearing should not drop below 70%.
* The duration of the voltage below 80% following fault clearing should not exceed 20 cycles."

Power system studies were performed with the LIL out of service to determine the 230 kV transfer limits east out of Bay d'Espoir. The worst-case contingency considered by the Emergency Planning Criteria would be the loss of TL267 during high-demand periods, resulting in steady state, under-voltage conditions (<0.9 pu). Transient instability is also avoided by limiting the power flow east of Bay d'Espoir to 750 MW. The thermal capability of the TL201/TL217 transmission corridor between the Western Avalon Terminal Station and Soldiers Pond could be more restrictive depending on the location of any new generation. Hydro is currently assessing potential low-cost options to increase the thermal ratings of TL201/TL217.

Given the rarity of three-phase faults and the assurance that system stability would be maintained, Emergency Planning Criteria are deemed acceptable for a LIL bipole outage that could extend up to six weeks in duration. There is an additional transfer capacity of approximately 125 MW[3] by applying Emergency Transmission Planning, which increases supply to customers on the Avalon Peninsula in such emergency circumstances.

[3] The BDE/SOP corridor must be limited to 623 MW during an extended LIL outage to avoid transient under-voltage following a three-phase fault between Bay d'Espoir and Soldiers Pond.