Q. **Reference: Bates White Addendum Report, June 5, 2026, page 42, paragraphs 103 and 104.**

> "Hydro concludes the preliminary results of its reactive power study highlight that transmission and voltage constraints are key factors in evaluating expansion alternatives and reinforce the importance of considering both generation location, diversity, and system operability in long-term planning.
>
> We agree, and while the reactive power study is not yet completed or provided in Hydro's Evidentiary Update, preliminary results seem to provide support for the Avalon CT's value in providing reactive power and voltage support for the Island Interconnected System. Hydro should provide the Board with the completed study as soon as practicable."

a) Provide a detailed explanation of how the Avalon CT could provide benefits in support of the issues raised in relation to voltage stability and transmission line thermal overloads during a bipole outage.

b) When will the Avalon Reactive Power Study be filed with the Board?

A. **a)** During a Labrador-Island Link ("LIL") bipole outage, power flow on the 230 kV transmission system between Bay d'Espoir ("BDE") and Soldiers Pond ("SOP") increases due to the loss of LIL imports directly into SOP. This situation presents two key challenges during high demand periods.

1. LIL Bipole Trip – Voltage Collapse in Sunnyside: During peak load conditions, Newfoundland and Labrador Hydro ("Hydro") operates generation on the Avalon Peninsula for two reasons: (i) to meet system reserve requirements; and (ii) to avoid voltage collapse in the event of a LIL bipole trip.

Hydro's Avalon Reactive Power Study – Phase 1 includes a review of the risk of voltage collapse following the retirement of the Holyrood Thermal Generating Station ("Holyrood TGS"). The study found that voltage collapse may occur in Sunnyside immediately due to the sudden increase in power transfer from BDE–SOP following a LIL bipole trip. The risk of this voltage collapse increases with the

retirement of Holyrood TGS, as BDE–SOP power flows are inherently higher without Holyrood TGS in service.

The Avalon Reactive Power Study – Phase 1 demonstrates that for scenarios involving the addition of BDE Unit 8 and the Avalon Combustion Turbine ("CT"), normal dispatch of the Avalon CT to meet reserve requirements is sufficient to ensure voltage stability. Further, Avalon CTs will also be equipped with synchronous condenser capability, providing an additional means of mitigating voltage collapse risk without the need to burn fuel, particularly at intermediate Island demand levels. Scenarios involving increased off-Avalon generation are being assessed as part of the Phase 2 study to evaluate the requirement of increased Avalon CT dispatch or the addition of reactive power support at Sunnyside.

2. **LIL Shortfall Scenario – Risk of Transmission Thermal Overloads:** During an extended LIL bipole outage ("LIL Shortfall Scenario") at high load conditions, Avalon demand is supplied by increased eastward power flow across the BDE–SOP transmission system. In this operating state, a contingency involving the loss of a 230 kV line between BDE and SOP results in unacceptable thermal overloads and/or low voltage levels. At present, Holyrood TGS operation naturally reduces BDE–SOP flow as it is needed to meet demand and reliability requirements during high load conditions. After the retirement of Holyrood TGS, there would not be enough downstream generation to avoid thermal overload conditions following 230 kV line trips. The Avalon CT would partially offset the loss of Holyrood TGS by reducing loading on the 230 kV transmission system; however, it would not provide sufficient relief to fully eliminate the thermal overloads. As a result, mitigation would require either (i) upgrades to the 230 kV transmission system or (ii) a Remedial Action Scheme ("RAS") involving the instant reduction of BDE–SOP transfers through downstream load shedding. These two approaches differ significantly in terms of required capital investment. Under the current minimum-investment assumption, transmission upgrades would include the addition of a third transmission line from Western Avalon Terminal Station to SOP Terminal Station, with an estimated cost of approximately $216 million. Hydro is also investigating the application of Dynamic

Line Rating technology to select 230 kV lines between BDE and SOP. Should Island demand exceed forecast levels, additional capital investment in the BDE–SOP transmission system may be required.

Hydro is currently collaborating with Newfoundland Power Inc. on the design of the Avalon RAS, the outcomes of which will inform the development of a cost estimate. However, Hydro expects the cost of the Avalon RAS to be considerably less than the transmission upgrades.

The need for transmission upgrades or the Avalon RAS is independent of the generation expansion plan and is primarily driven by the retirement of Holyrood TGS. While additional generation on the Avalon may provide partial mitigation, the underlying system constraints persist unless approximately 400–500 MW of new generation is added on the Avalon Peninsula. The Avalon CT would complement the Avalon RAS by reducing the magnitude of customer impacts when the RAS is activated. As a result, the combined implementation of these solutions is strongly recommended to address the LIL Shortfall Scenario.

b) The Avalon Reactive Power Study – Phase 1 has been completed and is currently undergoing Hydro's internal review process. Phase 1 focused on assessing transmission system impacts associated with a generation expansion scenario limited to the Avalon CT and BDE Unit 8 (or the minimum investment case). The study indicates that a generation expansion scenario consisting **solely** of the Avalon CT and BDE Unit 8 can be accommodated without the need for additional reactive power support on the BDE–SOP transmission system.

Hydro has determined that additional analysis is required beyond the scope of Phase 1 to assess further off-Avalon generation expansion. Accordingly, Hydro will proceed with a Phase 2 study that will focus on other potential off-Avalon generation expansion scenarios.

Hydro anticipates submitting the Phase 1 results by mid-July, with Phase 2 expected to be completed by December 2026.