Q. **Reference Avalon Capacity Study:**

Please:

a. Confirm that Hydro intends to keep the generation plant on the Avalon Peninsula operational until the LIL has been proven to operate reliably. In the response indicate whether Hydro has studied the implications of the extended operation of generation plant on the Avalon Peninsula beyond 2020. If yes, describe the extended period Hydro believes such plant can operate reliably. If Hydro does not intend to keep all existing generation plants on the Avalon operational after the LIL is in service, please explain in detail why not.

b. Provide Hydro's proposed criteria for reliable operation of the LIL.

A. a. As indicated in Newfoundland and Labrador Hydro's ("Hydro") response to PUB-NLH-026, the Holyrood Thermal Generating Station ("Holyrood TGS") is not required for base load generation once the Muskrat Falls project is deemed reliably in service. Hydro's current intention is to operate the Holyrood TGS until full in-service of the Muskrat Falls Generating Units, with standby service for one winter season after full in-service. The expected end of standby service is April 1, 2021 and spending on assets with no future value would cease at that time. In its response to PUB-NLH-050, Hydro indicated that the Holyrood TGS could continue to operate with continued capital investment; however, a number of considerations would have to be further examined and implemented to ensure that it could be operated reliably beyond 2021. Hydro is monitoring the Labrador-Island Link ("LIL") and Muskrat Falls progress and is evaluating through summer and into fall 2019 if a short term extension to the planned end of standby service date is required. If such a decision is taken, Hydro will inform the Board of Commissioners of Public Utilities (the "Board") at that time and seek any required approvals to enable this decision.

Hydro is examining the human resource implications, as well as the operating and capital implications for such a decision. Additional details regarding the annual capital investment and operation and maintenance costs for maintaining Avalon Peninsula generation (Holyrood TGS and Hardwoods Gas Turbine) out to 2026, detailed by generation unit and plant, are provided in Hydro's response to PUB-NLH-069. With human resources maintained, as well as the operating and capital investments detailed, Hydro believes Holyrood TGS can continue operation for the medium term (up to an additional approximate five years beyond the current plan), forecasting reliability outcomes up to 15% DAFOR,[1] with also the potential for a more material, but lower probability of occurrence, DAFOR.

As noted in Hydro's response to PUB-NLH-026, assumptions are currently under review as a normal part of the project planning for the Holyrood TGS transition and decommissioning. While the Holyrood TGS remains an aged asset with limitations on start-up times and age-related reliability risks, the steam generation functions of all three units could be extended, at least for a short period in the near term, with additional capital and operating funding. Hydro's response to PUB-NLH-048 provided information on the incremental capital investment and operational costs to keep the plant in service and operating reliably through 2023. As indicated in that response, a third-party study would be required to verify scope and improve estimate quality.

In addition to the Holyrood TGS, Hydro maintains gas turbine facilities at Hardwoods and Holyrood and diesel units at Holyrood on the Avalon Peninsula. Hydro intends to keep the Holyrood Gas Turbine (commissioned in 2015) and diesel units in service in the long term. With respect to Hardwoods, as stated in Hydro's response to PUB-NLH-026:

> Hydro also has gas turbine generation at the Hardwoods Terminal Station on the Avalon Peninsula; this 50 MW plant also functions as a synchronous condenser. Hydro's plan for this plant has been to run out the remainder of its life. The generator has been replaced and the engines are at end of life;

[1] Derated Adjusted Forced Outage Rate ("DAFOR").

> new direct replacements for the engines are not available thereby requiring the use of refurbished spares, which has limited long term success of reliability. Recently, the unit has experienced higher generation requirements thus drawing down the remaining engine life faster than originally expected. Hydro has been reviewing the future requirement for the Stephenville Gas Turbine and the potential to repurpose it as spares to support the extended operation of the Hardwoods Gas Turbine.

Hydro does not plan to maintain Holyrood TGS in generation mode or keep the Hardwoods Gas Turbine operational for any extended period once the LIL and Muskrat Falls are operating reliably. This has been the provincial plan since the LIL and Muskrat Falls were sanctioned as a replacement for Holyrood. The "Reliability and Resource Adequacy Study" (the "Study")[2] details Hydro's operational and long-term planning criteria for post-Muskrat Falls and LIL once integration of the new assets into the provincial electrical system are complete. The Study further details how the system functions in respect of the new planning and operational criteria and, therefore, why Holyrood TGS and Hardwoods Gas Turbine are not required. Hydro acknowledges the Study and associated plans are to be tested with the input and expectations of the Parties. In support of its mandate to provide reliable service consistent with least cost, Hydro's decisions and plans on investment or retirement of generating assets will be risk based, aiming to provide an appropriate balance of cost and reliability. Any decision with respect to existing generating assets on the Avalon Peninsula would be subject to such analysis by the Board and the Parties.

b. In addition to the reliable operating experience outlined above, the Newfoundland and Labrador System Operator ("NLSO") has developed a set of criteria that must be met before new assets are formally accepted for operation on the bulk electrical system. The criteria cover such areas as:

- Operating diagram development and modifications;
- Equipment nameplate drawings and test reports;

[2] Filed with the Board on November 16, 2018.

- System operating documentation (e.g., operating procedures and equipment manuals);
- Work protection code requirements;
- Training requirements;
- Supervisory Control and Data Acquisition and Energy Management System additions and modifications;
- Communications requirements;
- Energization plans; and
- Equipment release for service forms.

Compliance with these criteria is considered essential by the NLSO before any new equipment can be safely and reliably integrated into the power system, including that associated with the Muskrat Falls project. Prior to and following formal NLSO acceptance, the LIL will be considered equivalent to other transmission elements currently comprising the power system, for the purpose of guarding the power system against the single worst contingency event. For the period of LIL operation up to and including most of 2020, a bipole loss will be considered a single contingency under this criterion.