Q. **Reference: Labrador Expansion Study, p. 20 (p. 28 pdf)**

Citation :

> For this alternative and as long as the power is delivered over L1301/L1302, the HVYGT must be capable of reliably switching from synchronous condenser mode to generation mode whenever the Labrador East load is expected to exceed 82.5 MW. Although additional capacity is not required until the load reaches 82.5 MW, the switch to generation mode must occur before the load in Labrador East reaches 65 MW. If the HVYGT were to trip during the mode conversion process at a load greater than 65 MW, there is a significant risk of system voltage collapse. Consequently, Hydro would be forced to extend the operation of the HVYGT during peak conditions (i.e., above 65 MW) to ensure system reliability, which translates into an increased amount of additional fuel being consumed by the HVYGT.

a) With regard to the risk described in the Citation of a trip during conversion of the HVYGT from condenser to generator mode, has Hydro encountered such problems in the past with respect to this generator? If so, please indicate a) how many times such as conversion has been effectuated in the last twenty (20) years, and the number of times a trip has occurred;

b) In addition to its own experience described above, is Hydro's concern based:

i) on risks identified in the literature? If so, please provide references;

ii) on standard utility practice? Please provide references regarding best practices for switching between condensor and generator mode for a gas turbine.

c) Has Hydro ever switched the HVYGT from condensor to generator load at a load level of more than 65 MW? If so, please indicate how many times this has occurred in the last ten years, and explain the circumstances;

d) If load for a winter peak had been forecast at 81 MW but, due to a change in the weather forecast that occurred when load was already at 75 MW, that peak was now

expected to rise to 84 MW, would Hydro switch the HVYGT to generator mode despite this risk, or would it instead engage in customer curtailment?

A. a) Newfoundland and Labrador Hydro ("Hydro") has operational data for the Happy Valley Gas Turbine ("HVYGT") beginning in 2002. A review of this data indicates that since that time, the unit has been transitioned approximately 39 times. There were two occasions for which the transition was not successful and the unit tripped.

b) Hydro's concern is based solely on its own experience and knowledge of the operation of the Labrador East system and the historical operation of the HVYGT. As the HVYGT must start without issue to ensure a successful transition from synchronous condenser to generation mode of operation, the overall starting reliability of the HVYGT is considered in addition to transition failures. The 65 MW limit was selected as it is the maximum system load that can be supported without the synchronous condenser in operation.

c) Hydro has not switched the HVYGT from synchronous condenser mode to generation mode with a system load greater than 65 MW. As discussed in the "Labrador Interconnected System Transmission Expansion Study," there is a significant risk of system voltage collapse if the conversion were not successful at loads of this magnitude.

d) In the circumstance described, Hydro would first engage in customer curtailment to the extent required to allow reduced risk to the system during transition of the HVYGT to generation mode. On successful transition, customers would then be restored to the extent possible.