Q. Please describe any Labrador Island Link project impact on the current level of under-frequency interruptions experienced by Hydro.

A. At present the Island Interconnected System is electrically isolated from the North American grid. Therefore, Hydro is unable to call upon, or share, generation reserves with other utilities. Given the relative sizes of the Island Interconnected System generating units and the system load, sudden loss of a generating unit will result in a sudden drop in system frequency as the load exceeds the on line generation supply. To ensure stability of the system, Hydro employs an under-frequency load shedding scheme which, upon detection of a significant drop in system frequency, will automatically trip pre-defined load blocks to rebalance the load with the on line generation and subsequently arrest the frequency decay so that the system remains stable. In the past five years Hydro has experienced between three and seven under-frequency load shedding interruptions each year.

The Labrador-Island Link project will connect the Island Interconnected System to generating resources in Labrador (i.e., Churchill Falls and Muskrat Falls) and to the North American grid via the Hydro-Québec TransÉnergie system. The connection will provide access to generation reserves in Labrador. The HVdc transmission system provides very fast response to changes in power demand. With the application of a system frequency controller on the HVdc system and the addition of high inertia synchronous condensers at Soldiers Pond, under-frequency load shedding events for loss of an on island generator will be eliminated.

In addition, the loss of one pole[1] of the HVdc bipole system will not result in under-frequency load shedding events as each pole of the bipole system has a 2.0 per unit (two times normal) rating for ten minutes. This 2.0 per unit rating in combination with curtailment of the Maritime Link permits continuous power supply to the Island Interconnected System during the pole outage and a ten minute time period to re-dispatch on-line generation on the Island and start-up of standby generation such as off-line hydro units and combustion turbines.

For a temporary loss of the bipole there is sufficient spinning reserve and inertia on the Island Interconnected System, when combined with curtailment of the Maritime Link, for the Labrador-Island Link to restart and recover such that there is no loss of load or under-frequency load shedding on the Island Interconnected System.

For the permanent loss of the bipole there will be insufficient generating reserves on the Island Interconnected System. Therefore, for permanent loss of the bipole (i.e., both poles of the HVdc system) curtailment of the Maritime Link and under-frequency load shedding will be required to rebalance load with available on Island generation and maintain system stability.

[1] A pole in an HVdc system does not reference a physical structure or tower. It references one of the two current carrying wires. In the ac system wires are referred to as phases with three independent wires, one for each phase. In the dc system there are two wires, a positive pole and an negative pole in a bipole system