Q. In discussions with Nalcor, it was stated that the Voltage Source Converter (VSC) Option was discarded and the Line Commutated Converter (LCC) chosen. One reason the VSC option was discarded was because studies showed that the recovery from a DC fault was too slow at about 900 milliseconds, and also that the system still required an Effective Short Circuit Ratio (ESCR) of 1.5. Please provide copies of the studies performed by Siemens on the HVDC Plus fault recovery rate and the ABB PSS/E ESCR study.

A. Nalcor has not specifically excluded the Voltage Source Converter (VSC) option. It may be more accurate to state that, as of DG2, Nalcor has not identified a specific advantage to the use of VSC technology, and has therefore elected to adopt conventional Line Commutated Converter (LCC) technology in the Basis of Design and its capital cost estimate.

Integration studies to date (for example refer to CE-10) have demonstrated the need for high inertia synchronous condensers to prevent system collapse following a three phase fault on the 230 kV AC transmission system (excluding Bay d'Espoir) and for temporary pole to pole faults on the overhead dc transmission line. Screening level studies of the VSC option were undertaken to determine if the VSC offered performance benefits such that high inertia synchronous condenser(s) could be removed from the system, thus reducing overall project cost.

The screening studies have shown that, while the VSC will ride through the three phase 230 kV transmission system faults without the application of high inertia synchronous condensers, the VSC implementation requires the same high inertia synchronous condensers to avoid system collapse following a dc fault as were required in the LCC implementation to avoid system collapse following an ac fault. Consequently, both options require high inertia synchronous condensers to provide satisfactory system performance.

Based upon market information the Line Commutated Converter (LCC) option with high inertia synchronous condensers had a lower total cost when compared to the VSC option with high inertia synchronous condensers.

Referring to page 13 of Exhibit 106, "Technical Note: Labrador — Island HVdc Link and Island Interconnected System Reliability", the Labrador – Island HVdc Link will be required to deliver twice its nominal pole output in the event of a pole fault when the Link is running at rated output. At 900 MW and 320 kV, the sending pole will be required to deliver (900×10^6 W/ 320×10^3V), or 2,812 A during such an event. VSC systems are currently unable to deliver this current level. As a result, a VSC is unable to deliver the overload capability contemplated by Nalcor. LCC systems, however, are capable of delivering these current levels.

Given expected continued advancement of VSC technology, Nalcor has not ruled out VSC as a technology option in the future.

At DG2, however, with no technical or economic benefits for VSC technology, Nalcor elected to include proven LCC technology in the DG2 Basis of Design and to avoid the VSC risk premium as identified in Confidential Exhibit CE-52.

As requested, Nalcor has arranged release of the Siemens and ABB studies to the Board and to MHI only on a confidential basis. Please see Confidential Exhibits CE-62 and CE-63.