Q. Please describe all planning regarding restoration challenges associated with the loss of any Labrador Island Link project component.

A. The following planning considerations have been made with respect to restoration challenges associated with the loss of Labrador-Island Link components.

- At the converter valve hall level there is redundancy with respect to components such as thyristors and auxiliaries such that no single component failure requires immediate shut down of the pole. At this component level, scheduled shutdown is used to replace components;
- At the converter station level component considerations include:
  - A spare ac harmonic filter bank at each converter station such that failure of a filter bank will not require shutdown of the HVdc system. The ac filter banks are arranged such that an individual bank can be removed from service and maintained/repaired without shutdown of the HVdc system;
  - A spare converter transformer is located at each converter station. Failure of a converter transformer will require a pole outage (monopolar operation) to replace the failed unit. By maintaining a spare converter transformer at each converter station, the replacement/repair time is minimized. Please refer to Hydro's responses to PUB-NLH-217 and PUB-NLH-218 for impacts on supply during the pole outage;
  - A spare dc smoothing reactor is located at each converter station. Failure of a dc smoothing reactor will require a pole outage (monopolar operation) to replace the failed unit. By maintaining a spare dc smoothing reactor at each converter station the

replacement/repair time is minimized. Please refer to Hydro's responses to PUB-NLH-217 and PUB-NLH-218 for impacts on supply during the pole outage;

- At the electrode line level each electrode line consists of two conductors such that failure of an electrode line conductor insulator does not result in shutdown of the HVdc system;
- At the HVdc transmission line level the system is capable of supplying twice rated current for ten minutes and 1.5 times rated current continuously in monopolar mode for the loss of a pole conductor through failed insulator/clamp and/or failed cross-arm. Please refer to Hydro's responses to PUB-NLH-217 and PUB-NLH-218 for the impacts on supply during the pole outage;
- At the HVdc submarine cable level the project includes an energized spare (third) submarine cable connected to the upstream pole crossing the Strait of Belle Isle. The cable arrangement includes high speed switching to isolate a failed cable and switch the spare cable, if required, such that a cable failure is considered a temporary pole outage resulting in system transients but no continuous loss of bipole capacity. Note that the Maritime Link would be curtailed during the event and restored once the failed cable is isolated and the spare cable switched, as required; and
- At the synchronous condenser level the total synchronous condenser package includes three high inertia 175 MVAR synchronous condensers at Soldiers Pond, Holyrood Unit 3 operating in synchronous condenser mode and a new nominal 120 MVAR synchronous condenser at Holyrood. The system has been planned under the assumption that one of the three high inertia synchronous condensers is out of service for maintenance and the system experiences the loss of a high inertia synchronous condenser leaving

one high inertia synchronous condenser and the two Holyrood synchronous condensers in service. This arrangement permits the HVdc system to function properly at rated output with any one synchronous condenser out of service for annual or major overhaul maintenance without the need for load limitations on the HVdc system. During winter peak load periods with all annual maintenance completed, the system can operate with all synchronous condensers in service to provide maximum security to overall system performance.