Q. Does Hydro consider that a design of the emergency diesel generator scheme in which the unit does not start under degraded voltage conditions (brownout), but only on complete loss of power (blackout), is "standard industry practice"? If yes, provide all the documentation on which Hydro relies for this position.

A. Hydro's experience in the application of its emergency diesel generators is that they are designed to start and operate on the loss of voltage which is the result of the loss of supply to a facility. They have not been designed to disconnect the incoming supply when it is in a much less common situation of a low voltage condition. Hydro's experience, and that of its consultant used in diesel control schemes, is that emergency standby diesel systems are most commonly applied after complete loss of power, and not under brownout conditions.

As part of Hydro's Root Cause Analysis into Holyrood Unit 1 Failure (January 11, 2013, Hydro reviewed the operation of the emergency diesels, with consideration of protection from a brownout as well as a blackout condition. Hydro concluded any potential brownout protection scheme was deemed to be unwarranted. The emergency diesels which back up the essential services motor control centres (MCC's) at the Holyrood plant were tested, to verify the amount of time that it takes for them to restore voltage, once called upon. The restoration time is in excess of the time it took for bearing damage to occur during the January 11, 2013 Holyrood Unit 1 incident (keeping in mind that the emergency DC pump was not functioning properly at that time). An emergency diesel starting and switching scheme for potential brownout protection would necessitate removing the station service (Holyrood switchyard) supply to the Essential Services MCC's during an under-voltage condition, and replacing it with emergency diesel power while the

main units are generating. As the South AC pumps (i.e. the backup AC pumps) are powered from this MCC, there is a potential reliability risk during such a transition, as any possible diesel motor or generator issue, switching breaker malfunction, etc. would remove the availability of South pumps completely (i.e. at any time during or after the low voltage brownout condition).