Q. (Re: November 2013 Report to Board on Holyrood Black Start Analysis, Summary) Hydro states "By modeling a black start event, Hydro was able to predict the ability of a particular generation solution to start the thermal plant and in particular the large boiler feed pump motors". Did Hydro undertake this modeling exercise prior to moving and connecting the Newfoundland Power mobile generation at Holyrood? If so, what did the modeling results show, and if not, why not?

A. Simultaneous with the decision to move and connect the Newfoundland Power (NP) mobile generation at the Holyrood Thermal Generating Station (HTGS), Hydro initiated a motor starting analysis to determine the ability of the NP mobile generation to effectively start the large boiler feed pump motors within the HTGS. The analysis demonstrated that the NP generation may be able to start the 3,000 hp boiler feed pump motor but that it was marginal due to the generation size relative to the boiler feed pump motors.

The study identified two items that may impede blackstart from NP mobile generation. The first item related to the duration that a low voltage may exist on the equipment in the plant. The boiler feed pump motor operates at a voltage of 4.16 kV. The equipment operating at 4.16 kV may trip offline when the equipment experiences low voltage for a sustained period. The behaviour of a motor during low voltage operation is dependent upon the magnitude of the voltage and the duration of the voltage reduction. The simulations indicated voltage depressions to approximately 70% of nominal voltage for several seconds. Second, the simulations indicated that the mobile gas turbine would be required to supply 150% of steady state reactive power for several seconds to start the boiler feed pump motor.

On May 10, 2013 blackstart tests of the HTGS were performed using the NP mobile generation. The observations of on-site personnel during the first attempt to start the boiler feed pump motor indicate that the mobile generation tripped on under voltage. Excitation adjustments were made to the gas turbine to increase the system voltage prior to the second boiler feed pump motor start attempt. The observations from the second attempt indicate a failed start due to an over current trip of the mobile generation. The over current trip limited the amount of reactive power delivered to start the boiler feed pump.

The simulation results completed for the boiler feed pump start using the eight 1,825 kW diesel units being installed at the HTGS show a much more robust result than the NP generation simulation. Figure 4, Appendix B, page 8 of the report "Proposal to Provide Blackstart Capability to Holyrood Thermal Generating Station" dated November 2013 demonstrates that the simulation of the boiler feed pump start from eight 1,825 kW diesel units will result in a system voltage that does not fall below 80% and a motor current that does not exceed the motor thermal limit. Consequently, the model demonstrates a high degree of confidence that there will be no under voltage tripping of auxiliaries and a successful start of the boiler feed pump motors from the eight diesel units.