Q. Hydro's response to PR-PUB-NLH-127 dismisses the erroneous resistor setting as a "major contributor" to the event. As "the resistor setting is meant to fine-tune the motor speed to deliver target lube oil pump discharge", would not an operator, when making the setting, discover that the required pump discharge could not be achieved? Please clarify Hydro's response in this regard and why Hydro concludes this is not a major contributor.

A. Any adjustments to the resistor located in the DC motor starter cabinet would be executed by an industrial electrician, as an operator is not qualified to work in energized cabinets. Motor speed has a major impact on discharge volume and relatively negligible impact on discharge pressure. The controls that trigger the start of standby and/or emergency pumps are based on pressure, not flow rate. The standard set of return to service tests involve validating that each pump will start and recover pressure with the primary pump left running in all cases. In other words, there is no test that would see the DC pump running alone with the turbine at speed. Therefore, an operator validating these tests as part of any return to service will not be aware of the presence of an inadequate flow situation.

A normal return to service activity after an annual overhaul or a maintenance intervention on the lube oil pumping system would include validating that the standby and emergency pumps will successfully start in an emergency situation, such as loss of pressure or power supply to the primary pump. This activity is executed by the operator through the test logic provided on the unit control board. Both a loss of pressure and loss of power scenarios are monitored such that these will trigger first the standby and then the emergency systems. These tests are completed without any intervention into the DC starter cabinet. If a test fails to

complete, then and only then would additional investigation be triggered that may result in work inside the energized electrical cabinet by a qualified industrial electrician.

The pass/fail for each of these tests is determined by achieving a minimum threshold pressure not flow rate. Following the 2012 maintenance outage and for each of the on-line weekly tests thereafter, the unit continued to test successfully and the operator was unaware that insufficient flow was to be afforded by the DC pump alone if both the primary and standby pumps were not available as was the case on January 11, 2013. Upon investigation, it was determined that the DC motor speed was improperly adjusted by a motor service provider. This had the result of limiting the pumping capacity in terms of flow-rate (not pressure) to support adequate lubrication and cooling to each of the five journal bearings supporting the turbine generator set. The as found motor speed was approximately 80% of expected/rated speed, which is well beyond the adjustment provided by the resistor set-up in the motor starter cabinet. [ ] The position of the resistor had a lesser impact than the condition of the motor on the pump speed and flow rate. Therefore, Hydro considered the motor condition to be the major contributor to the January 11, 2013 event.