Q. Further to the responses to CA-NLH-056 and CA-NLH-067, explain why a trip would be necessary in the event of a low voltage condition of a duration of more than 1 second. Does this requirement relate to low voltage of the auxiliary power supply or of the transmission ac connection or both? Please also state the time taken before the emergency diesel generator has been started and is capable of delivering the power required from valve cooling and other essential supplies

A. As per Hydro's response to CA-NLH-067, there are no auxiliary power load(s) that require the converter station to be tripped if the supply voltage to the auxiliary power load is interrupted for more than one second.

The auxiliary system is designed to ensure that the HVdc scheme is not affected for sudden loss of ac station service supply. As noted in Hydro's response to CA-NLH-067:

"The ac station service supplies the critical HVdc converter systems including the valve cooling systems, building heating-ventilation and air conditioning systems, and converter transformer cooling systems. To ensure continued operation of the converter station following an interruption to ac station service, each converter station is equipped with backup diesel generation such that there is no requirement for the immediate trip of the HVdc system on loss of the ac station service supply."

Detailed design of the converter station including the ac station service is underway. The maximum design start time for the emergency diesels will be a function of numerous parameters including, but not limited to, the capacity of the valve cooling circuit, permissible temperature rise in the valve hall, heating and

ventilation capacity, and time constant of the valve cooling system. Consequently, the determination of the maximum permissible start time for emergency diesel generation following loss of ac station service is a complex task. As a result, Hydro is not expecting the diesel start time to be determined until all other converter valve hall components have been designed and estimates this value to be available in late 2015 at the earliest.