Q. In the San Onofre technical paper referred to in PR-PUB-NLH-178, the authors note that (1) a loss of off-site power eliminated both AC lube oil systems and (2) the DC system failed to operate. This is the same result (but for different reasons) that Hydro experienced at Holyrood in 2013. Has Hydro considered, before or after the 2013 failure, its vulnerability to a simultaneous loss of AC power and failure of the DC lube oil system as occurred at San Onofre in 2001 and at Holyrood in 2013? If yes, explain the results of its considerations.

A. Hydro fully recognizes its vulnerability to a multi-contingency lube oil system failure, such as loss of AC power together with a simultaneous functional failure of the DC lube oil system on the Holyrood generating units. The DC lube oil system is the back-up to the AC system and is critical for safe, sustainable operation of the units through both AC system disturbances, as well as brown out conditions.

Following the 2013 event and subsequent root cause failure investigation, Hydro has enhanced the weekly function testing of lube oil pumps to also confirm DC lube oil pump pressure is adequate to support the lube oil system needs. This change was also made to the return to service testing protocol as discussed further in Hydro's response to PR-PUB-NLH-183.

In Holyrood’s 2013 incident, there was a brown out condition, which caused the AC lube oil pumps starter contactors to drop, which subsequently stopped the AC lube oil pumps. The ensuing drop in lube oil pressure caused the DC lube oil pump to start as per the design of the system. The DC lube oil system is designed to operate on lube oil system pressure drop to cover an array of potential issues beyond just AC brown out or loss of AC power supply. The lube oil system controls operated as

designed in the 2013 incident. The root of the issue lay with an undetected reduction in DC lube oil pump performance due to low motor speed.

To manage risk of a failure of the DC lube oil system, Hydro has a long established practice of performing weekly function testing to confirm that the DC lube oil pump motor starts. This is consistent across all three generating units and has been performed to OEM standards, also taking into account Hydro's operational experience and knowledge base, updated following the 2013 investigation as described above.