Q. **Re: Volume II, Tab 11 – Upgrade Underground Plant Drainage System - Holyrood**
The current system was constructed in 1991 with a typical lifespan for 45 years. Has Hydro determined why the current system failed so quickly?

A. The Holyrood plant drainage system is comprised of multiple parts. While the system, in its entirety, has not reached its expected service life, select components require refurbishment to enable its continued service. The items slated for replacement under this proposal consist of portions of the drain pipe, in-line flow valves and cathodic protection anodes for an oil water separator.

Of the 100 meters of pipe to be replaced under this proposal, 20 meters is comprised of 450mm diameter steel pipe installed during the original plant construction in the late 1960's. This pipe has exceeded its expected service life and severe corrosion has resulted in the failure of the pipe wall. The remaining 80 meters of pipe to be replaced consists of 300mm diameter CPVC which was installed in 1991. The CPVC pipe failure is not believed to be the result of a premature deterioration; however, the resultant cause of the failure is unknown at this time. Hydro will further assess the pipe during the completion of the proposed refurbishments. While not anticipated, Hydro will inform the Board should any changes to the refurbishment strategy be required.

The in-line valves within the drainage system are utilized on a regular basis to aid in the control of effluent flow. These valves are located in close proximity to a corrosive marine environment and are subject to repeated exposure to warm plant effluent. While the chemical properties of the effluent are monitored, the pH level of the effluent can sometimes fluctuate outside the normal operating parameters.

At 25 years of age, the failure of these valves is not unreasonable given the operating environment to which they are exposed.

Sacrificial type cathodic protection systems are designed to mitigate the corrosion of the metals. This method of protection connects the metal to be protected to a metal which is far more susceptible to corrosion. Consequently, the sacrificial metals succumb to the effects of corrosion correlated to the ambient environmental conditions to which they are subjected to.