1 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. 2 Has Hydro determined why the current system failed so quickly? 3 4 5 6 The Holyrood plant drainage system is comprised of multiple parts. While the Α. 7 system, in its entirety, has not reached its expected service life, select components 8 require refurbishment to enable its continued service. The items slated for 9 replacement under this proposal consist of portions of the drain pipe, in-line flow 10 valves and cathodic protection anodes for an oil water separator. 11 12 Of the 100 meters of pipe to be replaced under this proposal, 20 meters is 13 comprised of 450mm diameter steel pipe installed during the original plant 14 construction in the late 1960's. This pipe has exceeded its expected service life and 15 severe corrosion has resulted in the failure of the pipe wall. The remaining 80 16 meters of pipe to be replaced consists of 300mm diameter CPVC which was 17 installed in 1991. The CPVC pipe failure is not believed to be the result of a 18 premature deterioration; however, the resultant cause of the failure is unknown at 19 this time. Hydro will further assess the pipe during the completion of the proposed 20 refurbishments. While not anticipated, Hydro will inform the Board should any 21 changes to the refurbishment strategy be required. 22 23 The in-line valves within the drainage system are utilized on a regular basis to aid in 24 the control of effluent flow. These valves are located in close proximity to a 25 corrosive marine environment and are subject to repeated exposure to warm plant 26 effluent. While the chemical properties of the effluent are monitored, the pH level 27 of the effluent can sometimes fluctuate outside the normal operating parameters.

## Page 2 of 2

1	At 25 years of age, the failure of these valves is not unreasonable given the
2	operating environment to which they are exposed.
3	
1	Sacrificial type cathodic protection systems are designed to mitigate the corrosion
5	of the metals. This method of protection connects the metal to be protected to a
5	metal which is far more susceptible to corrosion. Consequently, the sacrificial
7	metals succumb to the effects of corrosion correlated to the ambient
3	environmental conditions to which they are subjected to.