Q. **Re: Holyrood (HTGS) Stack Breeching**

With the use 0.7% sulfur fuel on a go-forward basis, does Hydro have any operational experience or consultant's opinion that would indicate that a major (e.g., $261,410 as in 2006) internal insulating block replacement will be needed within the 9-year CBA period, if Alternative 3 or 7 is implemented? In the fifteen (15) years' prior to the major replacement in 2006, what was expended by Hydro for internal insulating block replacement? In the period 2006 to 2011, what has Hydro expended for internal insulating block replacement? For the nine-year CBA period, what is Hydro estimating will be the cost of internal insulating block replacement if Alternative 3 or 7 is implemented?

A. Yes, with the use of 0.7% sulfur fuel on a go-forward basis, Hydro does have operational experience that would indicate that a major (e.g., $261,410 as in 2006) internal insulating block replacement will be needed within the nine year CBA period, if Alternative 3 or 7 is implemented. However, the rate of internal insulating block degradation is not due to the sulfur content in the fuel oil. The internal insulating block degradation is caused by the low temperature limit of the existing adhesive membrane that bonds the blocks to the steel casing. The adhesive has a maximum temperature limit of 200 degrees F whereas the flue gas temperature is in the range of 310 degrees F. Hot flue gas can come in contact with the adhesive by travelling through cracks in the insulating block or by exposure to areas where insulation blocks have fallen away from the casing. The gas will then gradually break down the adhesive, causing more blocks to fall free, thereby creating new contact surface for continued deterioration of the adhesive and more blocks to fall away. When the last breeching inspection was performed in 2010, it revealed extensive deterioration to the insulation liner and the cost estimate to make repairs was

$230,000. However, no insulation repairs were made at that time because a full breeching refurbishment project was being planned with work to be completed in 2011.

For the full 15 years prior to the major replacement in 2006, the amount expended by Hydro for internal insulating block replacement is not readily available. However, for the years 2000 to 2005, an estimated total of $57,000 was expended.

In the period 2006 to 2011, Hydro has expended a total of $318,992 for internal insulating block replacement.

For the nine year CBA period, Hydro is estimating that the cost of replacing internal insulating block will be $626,998 if Alternative 3 or 7 is implemented. The cost includes the initial capital cost associated with replacing the internal insulating block and the historic eleven year average block maintenance cost applied to each year of the nine year CBA period for each of the alternatives. In 2009, the inspection revealed that extensive repairs to the internal insulating liner were required and the cost to complete the repairs was estimated to be $100,000. In 2010, another inspection was completed on the internal insulating liner and the cost to complete the repairs had increased to $230,000. The repairs were not undertaken in 2009 or 2010 as a capital project to refurbish the entire stack breeching was proposed for 2011. Based on the rate of insulation deterioration between 2009 and 2010, it was assumed that the cost of block repairs would increase by 50 percent if the work was completed in 2011, compared to the cost estimated in 2010 for an estimated cost of $345,000.