Q. ***Re: Tab 4.4 - Rebuild Distribution Lines Update - Stainless Steel Pole Mounted Transformer Hanging Brackets***

What type of bracket is being used as a replacement? When and by whom were these brackets tested and under what conditions?

A. Transformer brackets will be retrofitted with a reinforcing bracket made of 316L stainless steel with a thickness of 0.1875 inches. This specification was adopted by the Company for 25 kVA and 50 kVA transformers in 2007 based, in part, on operating experience. Once retrofitted with the reinforcing bracket, transformers purchased prior to 2007 will be effectively upgraded to the current specification. Transformers supplied to the current specification have not experienced any failures to date and conform to the appropriate standards, including CSA Standard C2.2-06.

The retrofitted reinforcing bracket is being placed on transformers originally supplied with a bracket made of 316L stainless steel with a thickness of 0.140 inches. The 0.140 inch thick bracket met, and continues to meet, the appropriate CSA Standard C2.2-06. Although other utilities continue to use the same bracket for supporting 25 kVA and 50 kVA transformers, the only significant report of failures has been in Newfoundland. It has been concluded that the failures are the result of the mechanical forces exerted on the transformer tank by the wind conditions experienced in Newfoundland.[1]

The inadequacy of CSA standards for environmental conditions experienced in Newfoundland Power's service territory, while not common, is not rare. For example, accelerated failure of mild steel transformers due to rust and corrosion caused by salt laden winds in the 1990s led to the Company's adoption of a stainless steel specification for transformer tanks over a decade ago. The application of widely used equipment specifications to meet the actual environmental conditions of the Company's service territory is a matter of ongoing engineering evaluation and judgement.[2] A significant aspect of that evaluation and judgement is actual operating experience with specific engineered equipment components.

[1] The 0.140 inch bracket failures were not the result of substandard manufacture. Vertical and horizontal load testing on the 0.140 inch bracket was completed by a third party, Bodycote Testing Group, in accordance with CSA Standard C2.2-06, section *9.9 Mounting Bracket Tests*. The manufacturer, ABB, has also conducted tests to ensure design conformity to the CSA standard. In addition, 2 independent metallurgical studies of the ruptured surfaces were undertaken by X-Per-X and Bodycote. All test results confirmed adherence with the CSA standard.

[2] Reliance on widely accepted national standards is a practical necessity. Newfoundland Power could not reasonably be in a position to independently *test* every component of equipment used in the delivery of service to its customers.