Q. Substations - Additions to Load Growth - p. 20 of 96 - Deer Lake and Mobile substation projects - is there an industry or engineering standard as to when a substation transformer should be replaced by reason of age and/or loading?

A. Newfoundland Power is not aware of an industry or engineering standard as to when substation transformers are to be replaced due to age or loading. As long as a substation transformer can be maintained in good condition and can perform a useful function, then the transformer will either be kept in service or function as a spare. A transformer is retired when its condition is such that it cannot be economically refurbished or the transformer is no longer useful as a spare.

An important tool used in recent years in the management of transformer life has been periodic transformer oil dissolved gas analysis. It has enabled Newfoundland Power to detect when some types of transformer problems occur and repair or replace the transformers before failure. It has been instrumental in managing some transformers to the end of their useful lives without a significant end of life failure event.

Newfoundland Power refers to American International Standards Institute ("ANSI") standard C57.92, *Guide for Loading Oil-immersed Distribution and Power Transformers*, in the assessment of when a substation transformer is to be replaced or otherwise offloaded due to loading. ANSI standard C57.92 is based upon the guidance of the Institute of Electrical and Electronic Engineers ("IEEE").

When a substation transformer is forecast to exceed its nameplate rating, Newfoundland Power assesses the engineering options available to address the situation within the context of appropriate standards. These standards do not, however, simply indicate when a transformer is to be replaced by reason of age and/or loading.