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Subject: EB-2011-0140 Ontario Energy Board_ Clarification of Interrogatory 22 from the IESO
Date: March 12, 2013 3:10:45 PM

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To: All Parties in proceeding EB-2011-0140
From: Board Staff

The following is a clarification of Interrogatory 22 from the IESO.

22. The IESO suggests that to assess whether a proposal will satisfy IESO reliability criteria at the required transfer level, some characteristics for proposals must be available. What is the a.c. resistance (at 20°C), reactance and susceptance (i.e. R, X, B) for each circuit of the Wawa to Marathon and Marathon to Lakehead sections of the new line(s)?

The 20°C temperature reference refers to both the conductor temperature and the ambient temperature. The 20°C is meant to reflect 'normal room temperature' and the conductor is assumed to have reached that temperature when the test is conducted to determine its dc resistance.

Since the test would not involve any significant current, the heating effect would be negligible, so the conductor temperature would not change.

The 20°C reference temperature was actually established in 1913 for the International Annealed Copper Standard for determining the conductivity of commercially pure annealed copper.

CSA Standards C49.1, C49.2, C49.3, C49.5 & C49.7 (there are probably others) all make reference to the 20°C temperature at which the resistivity is to be determined.

Clause 4.2.2.2 of CSA Standard C49.7 states:

All measurements necessary for the determination of volume resistivity, as covered by Clause 3.5.2, shall be carried out at a temperature of 20°C or close enough thereto to permit accurate correction of all measured quantities to their values at 20°C, by the application of the standard linear correction formulae as follows:

$$R_{20} = R_t / [1 + \alpha_R (t - 20)]$$

where

- R_t = resistance in ohms at a temperature of $t^{\circ}\text{C}$

- r_{20} = resistance in ohms at a temperature of 20°C
- α_R = constant mass temperature coefficient of resistance per degree Celsius at 20°C
- t = temperature of wire in degree Celsius at which resistance is measured

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