



June 23, 2004

Mr. Tom Kydd  
Acting Manager, Stations, T&D Sustainment Programs  
Investment Planning Division  
Hydro One  
483 Bay Street  
Toronto, Ontario, M5G 2P5

Dear Mr. Kydd:

***Replacement of Failed Wonderland Transformer T6  
Notification of Approval of Connection Proposal  
CAA ID Number: 2004-EX200***

Thank you for the detailed information that you provided on the plan to replace the failed transformer T6 at Wonderland TS. Hydro One proposes to replace the failed unit T6 with a similar transformer unit. A comparison between technical specifications of the old and new transformers is given in the attachment.

We have reviewed the data provided by you and concluded that this project can be classified as a "like-for-like" because the differences between the failed transformer and the replacement unit are effectively immaterial.

The IMO is therefore pleased to grant approval to complete the replacement of Wonderland T6 transformer with the new unit.

Please note that the new facilities will also have to meet the requirements of the IMO's Facility Registration process before being placed in service.

For further information, please contact the undersigned.

Yours truly,

Bob Gibbons  
Manager - Long Term Forecasts & Assessments  
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cc: IMO Records

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All information submitted in this process will be used by the IMO solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and in accordance with its licence. All information submitted will be assigned the appropriate confidentiality level upon receipt

**Attachment**  
**Connection Assessment Report**

**Wonderland TS – T6 Transformer Replacement**  
**CAA ID 2004-EX200**

**Project Description**

Hydro One Networks Inc. (HONI) will be replacing the failed transformer T6 at Wonderland TS with a new unit.

A comparison of the technical specifications of the old and new transformers is given in the table below.

	<u>Failed Transformer</u>	<u>New Transformer</u>
<b>Rating</b>	56/75/93 MVA	50/67/83 MVA
<b>Winding</b>	YD	YZ
<b>Voltage</b>	220/28 kV	215.5/28 kV
<b>Taps</b>	ULTC: Yes (max. tap – 255.5 kV, min. tap – 173.5 kV, no. of steps – 25) Off-circuit taps: N/A	ULTC: Yes (max. tap – 258.6 kV, min. tap – 172.4 kV, no. of steps – 33) Off-circuit taps: N/A
<b>Positive Seq. Impedance (H-X)</b>	R= 0.497 % X= 23.25% on 83 MVA base	R = 0.419% X = 20.35% on 83 MVA base
<b>Summer Continuous</b>	93 MVA	83 MVA
<b>10-Day Limited Time Rating (LTR) at 30 degrees C</b>	103.7 MVA	143.9 MVA

Since the new transformer has a YZ winding arrangement, HONI will also be decommissioning the TG5 grounding transformer and installing a 1.5 ohm, 28 kV, 1000 A neutral reactor. There will be no functional changes to the transformer protections or changes to the autoreclosure settings or selections.

**Assessment**

The transformation ratio and the positive sequence impedance of the new transformer unit T6 are somewhat different than those of the failed unit.

Due to these differences, the replacement is expected to result in slightly uneven loading of the two 230 kV transformers T5 and T6. For normal conditions with all transmission elements, the new unit T6 will be carrying more active power than the companion unit T5 due to the impedance difference. In addition, there will be a circulation of reactive power due to the ratio difference if both units are on the same tap. The operation of T5 and T6 at different taps would minimize the circulation of reactive power.

The 10-Day LTR of the new unit is higher than that of the failed unit by 40 MVA.

**Conclusions and Recommendations**

Based on the information provided by Hydro One, this assessment concluded that although the new transformer is somewhat different than the failed transformer this difference will not result in material changes in system voltages or power flow distribution.

Notification of approval is granted for HONI's proposal to replace the failed Wonderland T6 transformer with the new unit.