

November 7, 2007

Mr. Gord Haines

Manager - Electrical, P&C and Compliance  
Hydro Engineering - OPG  
14000 Niagara Parkway, RR#1  
Niagara on The lake, Ontario  
L0S 1J0

Dear Mr. Haines

***Replacement of Nanticoke T6-R & T6-B  
Notification of Conditional Approval of Connection Proposal  
CAA ID Number: 2007-EX357***

Thank you for the detailed information regarding the replacement of the two single phase transformers T6-R and T6-B at Nanticoke TGS with 2 new single phase transformers.

Since the ratings of the replacement units are the same as the original transformers, we have concluded that the proposed change will not result in a material adverse effect on the reliability of the IESO-controlled grid.

The IESO is therefore pleased to grant **conditional approval** for the modification detailed in the attached assessment report subject to your signed acknowledgment below. Any material changes to your proposal may require re-assessment by the IESO in accordance with Market Manual 2.10, and may nullify your conditional approval.

**Final approval** to connect the facility to the IESO-controlled grid will be granted upon successful completion of the IESO Facility Registration process including, without limitation, satisfactory completion of the requirements set out in the System Impact Assessment report. During this process you shall demonstrate the requirements have been fulfilled and the equipment installed has characteristics no worse than those in the proposal assessed by the IESO. Please contact [market.entry@ieso.ca](mailto:market.entry@ieso.ca) if you have not received a Facility Registration Summary package within the next 10 days.

For further information, please contact the undersigned.

Yours truly

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cc: IESO Records

Replacement of Nanticoke T6-R & T6-B (CAA ID Number: 2007-EX357)

Ontario Power Generation acknowledges receipt of the System Impact Assessment Report setting out the IESO requirements for final approval, and commits to fulfill these requirements, and all other applicable Market Rules, before receiving final approval to connect to the IESO-controlled grid.

Dated: \_\_\_\_\_

Per: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**ASSESSMENT SUMMARY**

**Ontario Power Generation**

**1.0 GENERAL DESCRIPTION**

The single phase transformers T6-R and T6-B at Nanticoke TGS are being replaced. The scheduled in-service date for the replacement transformers is December 15, 2007.

**2.0 PROPOSED MODIFICATION**

A comparison of the technical specifications between the existing and the replacement transformers is given below.

Nanticoke TGS	T6-R		T6-B	
	Original unit	Replacement unit	Original unit	Replacement unit
<b>Configuration</b>	single phase	single phase	single phase	single phase
<b>Transformation (kV)</b>	303.11 / 20.9	303.11 / 20.9	303.11 / 20.9	303.11 / 20.9
<b>Winding Configuration</b>	wye / delta	wye / delta	wye / delta	wye / delta
<b>Thermal Rating</b>	190 MVA OFWN	190 MVA OFWN	190 MVA OFWN	190 MVA OFWN
<b>Continuous Thermal Rating (summer 30°C)</b>	190 MVA	190 MVA	190 MVA	190 MVA
<b>15 Minute Thermal Rating (summer 30°C)</b>	190 MVA	190 MVA	190 MVA	190 MVA
<b>10 Day Thermal Rating (summer 30°C)</b>	190 MVA	190 MVA	190 MVA	190 MVA
<b>Positive Sequence Impedance (H-X)</b>	R = 0.23% X = 11.93% on 190 MVA base	R = 0.23% X = 11.99% on 190 MVA base	R = 0.23% X = 11.92% on 190 MVA base	R = 0.23% X = 12.03% on 190 MVA base
<b>Impedance to Ground</b>	Y - 0 Ω D - ungrounded	Y - 0 Ω D - ungrounded	Y - 0 Ω D - ungrounded	Y - 0 Ω D - ungrounded
<b>Under-load tap-changer</b>	N/A	N/A	N/A	N/A
<b>Off-load tap-changer</b>	<b>HV</b> Tap 1 - 317.54 kV (550 kV phase to phase) Tap 2 - 310.325 kV (537.5 kV phase to phase) Tap 3 - 303.11 kV (525 kV phase to phase) Tap 4 - 295.89 kV (512.5 kV phase to phase) Tap 5 - 288.675 kV (500 kV phase to phase)			
<b>In service off-load tap position</b>	Tap 3 - 303.11 kV (525 kV phase to phase)			
<b>Manufacturer</b>	CGE	CGE	CGE	CGE
<b>Serial #</b>	287955	287951	287954	287953

### **3.0 ASSESSMENT**

The information provided by OPG shows that the technical characteristics of the replacement single phase transformers T6-R and T6-B are similar to those of the existing single phase transformers. The replacement units have the same configuration, transformation, thermal ratings and similar positive sequence impedances.

The replacements T6-R and T6-B have identical off-load tap-changers as the existing transformers.

These replacements represent a like-for-like exchange and will have no material adverse effect on the IESO-controlled grid.

### **4.0 CONCLUSIONS**

It can be concluded that the replacement single phase transformers T6-R and T6-B will not result in a material adverse effect on the reliability of the IESO-controlled grid because:

- the impedances of the replacement transformers T6-R and T6-B are similar to the existing transformers;
- the thermal ratings of the replacement transformers T6-R and T6-B are identical to the existing transformers; and
- the replacement transformers T6-R and T6-B are equipped with identical off-load tap-changers as the existing transformers.

### **5.0 REQUIREMENTS**

All equipment with a nominal voltage of 525 kV (303.11 kV phase to ground ) must be able to operate in the range between 490 – 550 kV (282.9 - 317.54 kV phase to ground).

As soon as the manufacturer data sheets for the new transformers are available, the connection applicant must submit this information to the IESO. If the data is different than the data used in the review then the IESO may perform additional studies to verify the performance of the actual equipment.

The Market rules (Chapter 4 section 7.3) require that each generator connected to the IESO controlled grid shall provide the IESO on a continual basis with on-line monitored quantities as specified in Appendix 4.15. For this proposed project, the IESO will continue to require the status and operating quantities associated with the new transformers.

OPG is required to meet the transmitter's requirements with respect to protection systems for the new transformers and coordination with the existing protection systems, as outlined in the Transmission System Code.

### **6.0 NOTIFICATION OF CONDITIONAL APPROVAL**

This expedited System Impact Assessment concludes that replacement of two single phase transformers T6-R and T6-B at Nanticoke TGS with 2 new single phase transformers is not expected to have a material adverse effect on the IESO-controlled grid. It is therefore recommended that a Notification of Conditional Approval of the Connection Proposal be issued, subject to the requirements detailed above.