

October 11, 2011

Mr. Frank Risi
Sustainment Manager - Transmission Stations Planning
Hydro One Networks
483 Bay Street
Toronto, Ontario
M5G 2P5



Dear Mr. Risi:

***Reconfiguration of Orangeville TS
Notification of Conditional Approval of Connection Proposal
CAA ID Number: 2010-EX500***

Thank you for the information regarding the proposed reconfiguration of Orangeville TS.

We have concluded that the proposed changes will not result in a material adverse impact on the reliability of the integrated power system, provided the requirements mentioned in the attached report are satisfied.

The IESO is therefore pleased to grant **conditional approval** for the modification detailed in the attached assessment report. 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 Market Entry process including, without limitation, satisfactory completion of the requirements set out in the System Impact Assessment report. During this process you will be expected to demonstrate that you have fulfilled the requirements and that the facility you have installed is materially unchanged from the proposal assessed by the IESO. Please refer to the '**External Guidelines for Connection to the IESO**' attachment in your approval email for key steps in the Market Entry process. In order to initiate this process, please contact Market Entry at market.entry@ieso.ca at least 8 months prior to your energization date.

For further information, please contact the undersigned.

Yours truly,

Michael Falvo
Manager – Market Facilitation
Telephone: (905) 855-6209
Fax: (905) 855-6319
E-mail: mike.falvo@ieso.ca
cc: IESO Records

All information submitted in this process will be used by the IESO 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.

Final Report - Expedited System Impact Assessment – revised October 11, 2011
Hydro One Networks

1.0 GENERAL DESCRIPTION & PROPOSED MODIFICATIONS

Six 230 kV breakers are approaching their end-of-life at Orangeville TS and will be replaced with new breakers. The associated disconnect switches will also be replaced.

As well, 3 new breakers and 6 new disconnect switches will be added to relocate the 230 kV circuits B4V and D6V. The exiting and final configurations are shown in figures 1 and 2.

Orangeville TS is a 230/44/28 kV switching station connected to Bruce A GS by the 230 kV circuits B4V and B5V, to Detweiler TS by the 230 kV circuits D6V and D7V and to Essa TS by the 230 kV circuits E8V and E9V.

The proposed in-service date is November 2012.

2.0 TECHNICAL SPECIFICATIONS

Specifications of the existing and replacement breakers are shown in the table below. Any details currently not available will be provided prior to receiving final approval to connect from the IESO.

Orangeville TS AH, AL4, HL5, L4L6, L5L9, L6L9		
	Existing breakers	New and replacement breakers (new nomenclature to be provided)
Configuration	three phase	three phase
Nominal kV	230	230
Maximum kV	250	250
Interrupting Medium	Air	to be advised
Continuous Current Rating (A)	2340	3000
Short Circuit Symmetrical Duty (kA)	46.2	63
Breaker interrupting Time	2 cycles	≤ 3 cycles

Replacements of the existing disconnect switches are covered by the existing expedited SIA [2010-EX465](#). Specifications of the new disconnect switches are shown in the table below.

Orangeville TS New Disconnect Switches – nomenclature to be provided	
Configuration	3 phase
Rated Voltage (kV)	230
Maximum Continuous Rated Voltage (kV)	250
Continuous Current Rating (A)	3000
Short Circuit Symmetrical Duty Rating	63 kA

3.0 REQUIREMENTS

The proponent must notify the IESO as soon as they become aware of any material changes to their proposal as described in this assessment. The IESO will determine whether these changes require a re-assessment.

Maximum Voltage

Appendix 4.1, reference 2 of the Market Rules states that under normal conditions voltages are maintained within the range of 220 kV to 250 kV. Thus, the IESO requires that the 230 kV equipment in Ontario must have a maximum continuous voltage rating of at least 250 kV.

Fault interrupting devices must be able to interrupt fault current at the maximum continuous voltage of 250 kV.

Fault Levels

The Transmission System Code (TSC), Appendix 2 establishes maximum fault levels for the transmission system. For the 230 kV system the maximum 3 phase symmetrical fault level is 63 kA and the single line to ground (SLG) symmetrical fault level is 80 kA (usually limited to 63 kA).

The TSC requires that new equipment be designed to sustain the fault levels in the area where the equipment is installed.

Monitoring Requirements for Transmitters

In accordance with the telemetry requirements for transmitters (see Appendices 4.16, 4.20 and 4.21 of the Market Rules) the connection applicant must install equipment at this project with specific performance standards to provide telemetry data to the IESO. The data is to consist of certain equipment status and operating quantities which will be identified during the IESO Market Entry Process. For this proposed project, the IESO will continue to require the status associated with the replacement breakers as well as the status of the new breakers.

Protections

Protection systems must be designed to satisfy all the requirements of the TSC as specified in Schedules E, F and G of Appendix 1 and any additional requirements identified by the transmitter. New protection systems must be coordinated with existing protection systems.

Protective relaying must be set to ensure that transmission equipment remains in-service for voltages between 94% of the minimum continuous and 105% of the maximum continuous values in the Market Rules, Appendix 4.1.

The Applicant is required to have adequate provision in the design of protections and controls at the facility to allow for future installation of Special Protection Scheme (SPS) equipment.

Facility Registration/Market Entry Requirements

The connection applicant must complete the IESO Facility Registration/Market Entry process in a timely manner before IESO final approval for connection is granted.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must provide evidence to the IESO confirming that the equipment installed meets the Market Rules requirements and matches or exceeds the performance predicted in this assessment.

4.0 ASSESSMENT & CONCLUSIONS**4.1 Breaker Failure Conditions under the Existing Configuration**

Under the existing configuration at Orangeville TS a breaker failure condition of HL5 results in the loss of the 230 kV circuits D7V and B5V as well as the shunt capacitor SC21. This is particularly onerous for the load supplied from the remaining DxV circuit since the loss of the capacitor bank occurs when increased reactive losses are being imposed on the system as a result of the simultaneous loss of one of the DxV circuits and one of the infeed circuits into Orangeville TS (B5V).

Breaker Failure Conditions under the Proposed Configuration

The proposed re-configuration of Orangeville TS is shown in figure 2 below. The three new breakers have been identified as NB1, NB2 and NB3. The actual nomenclature will be provided later for all breakers in the station to reflect the new station configuration.

With this arrangement, a breaker failure of HL5 will result in the loss of B5V and SC21, while a breaker failure of NB3 will result in the loss of the 230 kV circuit B4V and SC21. This proposed arrangement is preferable to the alternative of losing one of the load-supply circuits (DxV) together with an infeed circuit (BxV) and the shunt capacitor.

4.2 Conclusions

This expedited System Impact Assessment concludes that the proposed modifications at Orangeville TS are not expected to have a material adverse impact on the IESO-controlled grid.

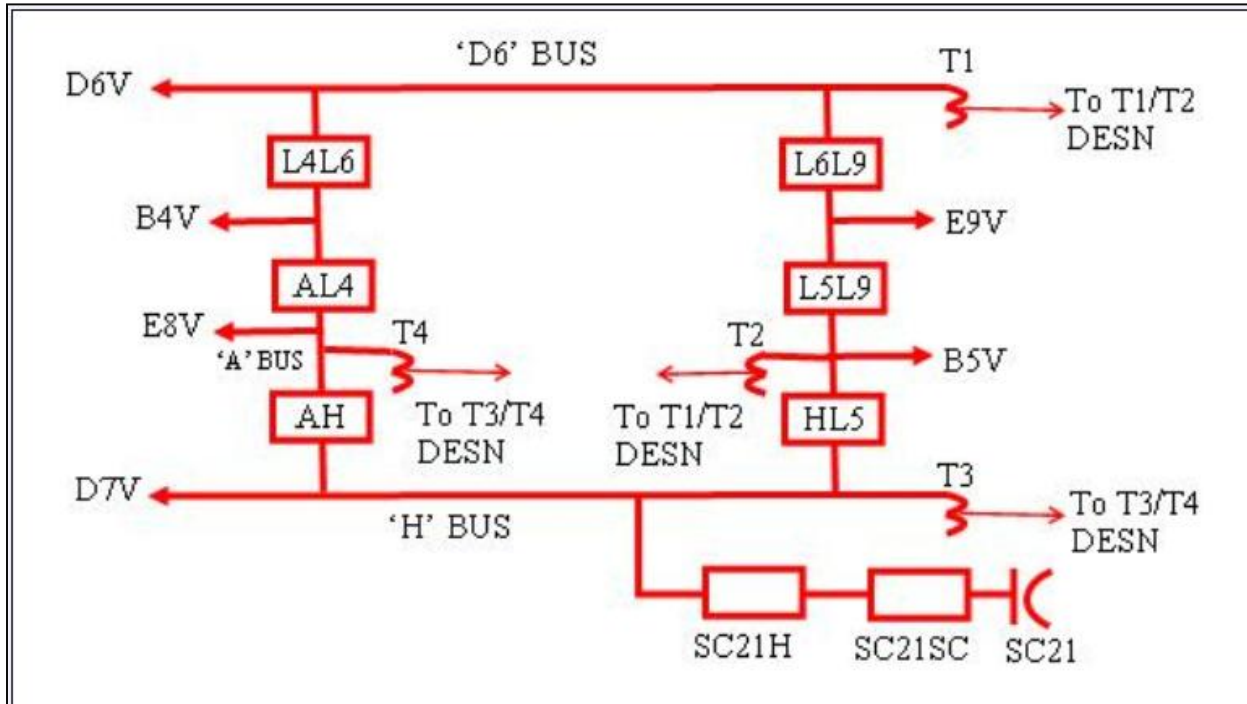


Figure 1 – Existing Configuration of Orangeville TS

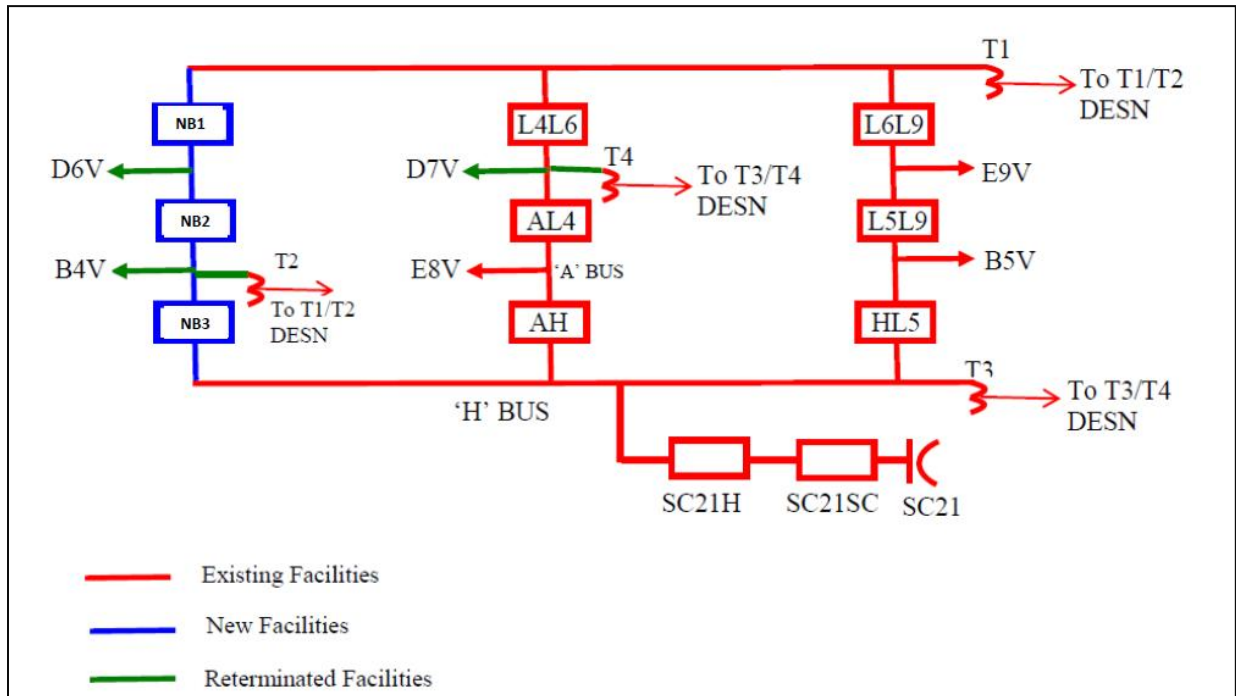


Figure 2 – Proposed Configuration of Orangeville TS