

March 26, 2009  
Final Draft Report  
Expedited System Impact Assessment  
Hydro One Networks Inc.

### 1.0 GENERAL DESCRIPTION & PROPOSED MODIFICATIONS

Hydro One is proposing to replace two 115 kV disconnect switches, A4-A5 and H2-H3 at Gage TS. The replacement disconnect switches will operate and remain in their original configuration and location.

### 2.0 TECHNICAL SPECIFICATIONS

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

<b>Comparison of Disconnect Switches A4-A5 at Gage TS</b>		
	<b>Original A4-A5</b>	<b>Replacement A4-A5</b>
<b>Configuration</b>	three phase	three phase
<b>Maximum Continuous Voltage</b>	138 kV	145 kV
<b>Rated Continuous Current</b>	1200 A	2000 A
<b>Short Circuit Symmetrical Duty Rating</b>	Not available	44 kA

<b>Comparison of Disconnect Switches H2-H3 at Gage TS</b>		
	<b>Original A4-A5</b>	<b>Replacement A4-A5</b>
<b>Configuration</b>	three phase	three phase
<b>Maximum Continuous Voltage</b>	138 kV	145 kV
<b>Rated Continuous Current</b>	1200 A	2000 A
<b>Short Circuit Symmetrical Duty Rating</b>	Not available	44 kA

### 3.0 REQUIREMENTS

Appendix 4.1, reference 2 states that equipment on the 115 kV grid may be exposed to voltages as high as 127 kV. In addition, some recognized contingencies (e.g. load shedding, open line end) can cause a temporary voltage increase above the maximum continuous voltage of 127 kV. For these conditions, connection equipment may be exposed to voltages above the maximum continuous voltage of 127 kV for the short period of time that it takes the IESO to direct operations to restore a normal voltage profile, and to prepare for the next contingency. This re-preparation period will be as short as possible, but it will not take longer than 30 minutes. Therefore, the IESO requires that 115 kV connection equipment in southern Ontario:

- must have a maximum continuous voltage rating of at least 127 kV; and
- must remain in service and not automatically trip for voltages up to 5% above the maximum continuous voltage or 133.4 kV, for up to 30 minutes, to allow the system to be re-dispatched to return voltages to their normal range.

The Transmission System Code (TSC) indicates that the transmission system has to be designed to sustain short circuit currents of 50 kA for the 115 kV system.

The Market rules (Chapter 4 section 7.4) require that each transmitter connected to the IESO-controlled grid shall provide the IESO on a continual basis with on-line monitored status as specified in Appendix 4.16. The IESO will continue to require the status associated with the replacement disconnect switches.

### 4.0 ASSESSMENT & CONCLUSIONS

The installation of disconnect switches whose short circuit capability is lower than the TSC requirements is a risk assumed completely by Hydro One who must ensure that the short circuit current seen by these disconnect switches does not exceed the short time rating of the new equipment. Should future system changes result in fault currents greater than the installed switch ratings, Hydro One will be required to change these disconnect switches at their expense.

It can be concluded that these replacements will have no material adverse impact on the integrated power system subject to the requirements in section 5.