

August 6, 2009

Mr. Neil Jessup
Investment Administrator
DX Stations Sustainment
Systems Investment Division
Network Management
Hydro One Networks Inc.
40 Denniston Street
Lindsay, Ontario
K9V 5M5

Dear Mr. Jessup

***Petawawa DS Refurbishment
Notification of Conditional Approval of Connection Proposal
CAA ID# 2009-EX445***

Thank you for the detailed information regarding the refurbishment at Petawawa DS.

The IESO has determined that this project will not result in a material adverse impact on the reliability of the integrated power system.

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 eight months prior to your energization date.

For further information, please contact the undersigned.

Yours truly

Barbara Constantinescu
Manager – Market Facilitation
Telephone: (905) 855-6406
Fax: (905) 855-6372
E-mail: barbara.constantinescu@ieso.ca
cc: IESO Records

ASSESSMENT SUMMARY
Hydro One

1.0 GENERAL DESCRIPTION & PROPOSED MODIFICATIONS

Hydro One is planning to replace the end of life T1 and T2 transformers at Petawawa DS with new transformers. In addition, fuses will be added on the HV side. The expected in-service date is July 2009.

Petawawa DS is fed from the 115 kV circuit D6 between Des Joachims TS and Chenaux TS.

There is no new load associated with this project.

2.0 TECHNICAL SPECIFICATIONS

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

Petawawa DS		
Transformer	Existing T1 & T2	Replacement T1 & T2
Nomenclature	54T1 & 54T2	
Configuration	Three phase	Three phase
Transformation (kV)	110 / 14.2	115 / 13.4
Winding Configuration	Y / D	D / Y
Thermal Rating	8.0 MVA ONAF	7.5 MVA ONAN 10.0 MVA ONAF 12.5 MVA ONAF
Notes: Continuous, 15 Minute LTR and 10 Day LTR are not applicable for Distribution transformers. Overloads are accepted by Hydro One Distribution rather than cutting customers off, i.e. no load shedding is done to alleviate short-term overloads.		
Unit PLL (summer 30°C)	Not applicable	Summer: 9.4 MVA Winter: 12.0 MVA
Notes: Station PLL is the sum of the unit PLLs minus the highest unit PLL plus 15 MVA for the Mobile Unit Substation (MUS).		
Station PLL (summer 30°C)	Not applicable	Summer: 18.8 MVA Winter: 24.0 MVA
Positive Sequence Impedance (H-X)	R = 0.589 % (average) X = 9.715% (average) on 8 MVA base	R = 0.56 % X = 8.18% on 7.5 MVA base
Impedance to Ground	solidly grounded	solidly grounded
Under-load tap-changer	14.2 ± 1.42 kV 16 steps	13.4 ± 1.34 kV 16 steps
Off-load tap-changer	HV Tap 1: 121.0 kV Tap 2: 118.25 kV Tap 3: 115.5 kV Tap 4: 112.75 kV Tap 5: 110.0 kV	HV Tap 1: 138.0 kV Tap 2: 126.5 kV Tap 3: 115.5 kV
In service off-load tap position	Tap 1	Tap 3

Table 1 – Comparison of Transformer Specifications at Petawawa DS

The technical specifications of the new fuses are given in Table 1 below.

Fuse Specifications Petawawa DS	
Type	S&C SMD-2B
Rated Voltage	138 kV

Table 2 – Specifications of New Fuses at Petawawa DS

3.0 REQUIREMENTS

The proponent must notify the IESO as soon as it becomes aware of any changes to the assumptions made in the connection assessment. The IESO will determine whether these changes require a re-assessment.

Appendix 4.1, reference 2 of the Market Rules states that equipment on the 115 kV grid in the south 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. For these conditions, connection equipment may be exposed to voltages approximately 5% above the maximum continuous operating voltage for the 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 should 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 be able to remain in-service at voltages up to 133 kV for up to 30 minutes.

If revenue metering equipment is being installed as part of this project, please be aware that revenue metering installations must comply with Chapter 6 of the IESO Market Rules for the Ontario electricity market. For more details the applicant is encouraged to seek advice from their Metering Service Provider (MSP) or from the IESO metering group.

The Transmission System Code (TSC), Appendix 2 establishes maximum fault levels for the transmission system. For the 115 kV system, the maximum 3 phase symmetrical fault level is 50 kA and the single line to ground (SLG) symmetrical fault level is 50 kA.

The Transmission System Code (TSC) requires that new equipment be designed to sustain the fault levels in the area where the equipment is installed. If any future system enhancement results in an increased fault level higher than the equipment's capability, the applicant is required to replace the equipment at their own expense with higher rated equipment capable of sustaining the increased fault level, up to the TSC's maximum fault level of 50 kA for the 115 kV system.

Provided that the TSC requirements are satisfied, the IESO does not have additional requirements.

4.0 ASSESSMENT & CONCLUSIONS

The replacement transformers are better than the existing transformers with a higher continuous thermal rating.

According to the Market Rules, Appendix 4.1, the permissible voltage at the primary side of the transformer can vary from 113 kV to 127 kV in southern Ontario. With the voltage at 127 kV, the replacement T2's ULTC can vary the low voltage bus from 16.54 kV to 10.44 kV.

A single unit's summer Planning Loading Limit (PLL) is now 9.4 MVA. The new transformers have higher ONAF ratings which can be utilized in the future, if required.

This expedited System Impact Assessment concludes that the installation of the new transformers T1 and T2 in place of the end of life transformers at Petawawa DS is not expected to have a material adverse impact on the IESO-controlled grid.