LETTER OF SUPPORT FOR THE NORTHERN REACTORS FOR AREA VOLTAGE CONTROL

ONTARIO POWER AUTHORITY

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Mr. Mike Penstone
Vice President, Transmission Project Development
Hydro One
483 Bay Street
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Dear Mike:

Installation of Reactors for Controlling High Voltages in Northwestern Ontario

The purpose of this letter is to recommend that Hydro One Networks (Hydro One) proceeds with the installation of four reactor banks in Northwestern Ontario (Northwest), two banks at Marathon TS and two banks at Dryden TS, as shown in Figure 1. These facilities are required to control high voltages on the Northwest transmission system under light load conditions. Unless controlled, these high voltages increase the risk of damaging equipment connected to that system.

Figure 1: Map of Northwestern Ontario

The nature of the Northwest system (long transmission lines serving relatively small loads) makes it susceptible to developing high system voltages under certain system conditions - light load, low level of power transfers and few generating units in-service. The light load aspect has been exacerbated by a significant decline in demand in the Northwest in the past few years, as shown in Figure 2. Since 2005,

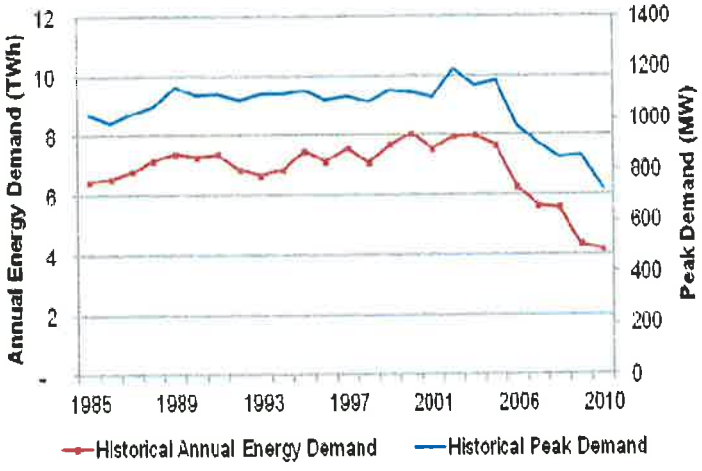

Figure 2: Historical Northwest Energy and Peak Demand

due to a significant downturn in the pulp and paper industry, the peak demand in the Northwest has declined from 1,150 MW to 730 MW while total energy demand has dropped from 7.7 TWh to 4.2 TWh. Thus, light load situations are much more prevalent than before.

Another aspect of the Northwest system that makes it more susceptible to high voltage conditions is that of decreasing energy production from Atikokan GS. When operating, Atikokan GS can provide important reactive power absorbing capabilities. The energy produced by the unit also helps lower voltages in the Northwest by loading the key transmission lines. Thunder Bay GS units also have similar voltage control capabilities but they are not as effective as the Atikokan unit for controlling 230 kV system voltages. With lower demand, the Atikokan generating unit is dispatched less frequently, as seen in Figure 3. Furthermore, Atikokan GS is planned to be converted to biomass fuel with limited hours of operation due to the availability of that fuel. This would limit the availability of the unit for voltage control in the future.

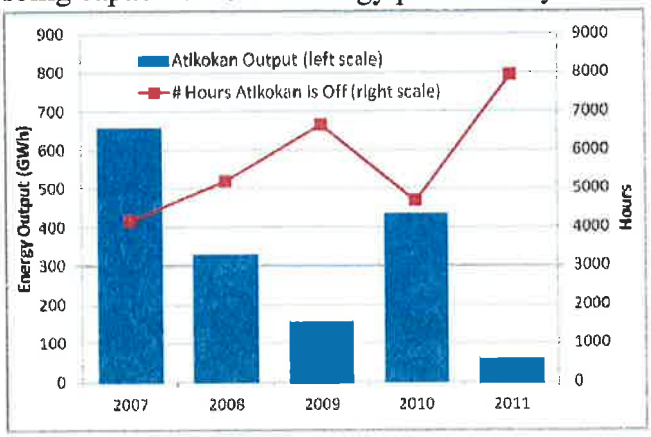

Figure 3: Atikokan Operation Profile

Considering the lower demand and the conversion of coal-fired generation units, high voltage conditions are expected to occur more frequently than in the past. The changing conditions will make it difficult to manage high voltages in the area even after utilizing existing reactive control devices. Consequently, over the past several months, OPA staff has worked closely with IESO and Hydro One staff to identify the voltage control need of the Northwest and alternatives to address the need. A recent IESO feasibility study – "Northwest Reactive Study" dated July 27, 2012 – concludes that the Northwest system will experience high voltage conditions and four reactors are required to control voltages within the established maximum continuous limit of 250 kV. The four reactors, 2x32 MVAr at Dryden TS and 2x40 MVAr at Marathon TS, are to be connected to the 13.8 kV tertiary windings of the autotransformers in the two stations (see Figure 4). Together with associated protection and voltage-based switching schemes, the reactors will be able to maintain voltages on the 230 kV transmission system below the 250 kV limit during light load conditions. Without the proposed reactors, high system voltages would need to be managed by operating local generators out-of-merit or taking transmission lines out of service. The former action will increase operational costs and the latter will reduce system reliability. As such, these mitigating options are not recommended for use in the long term.

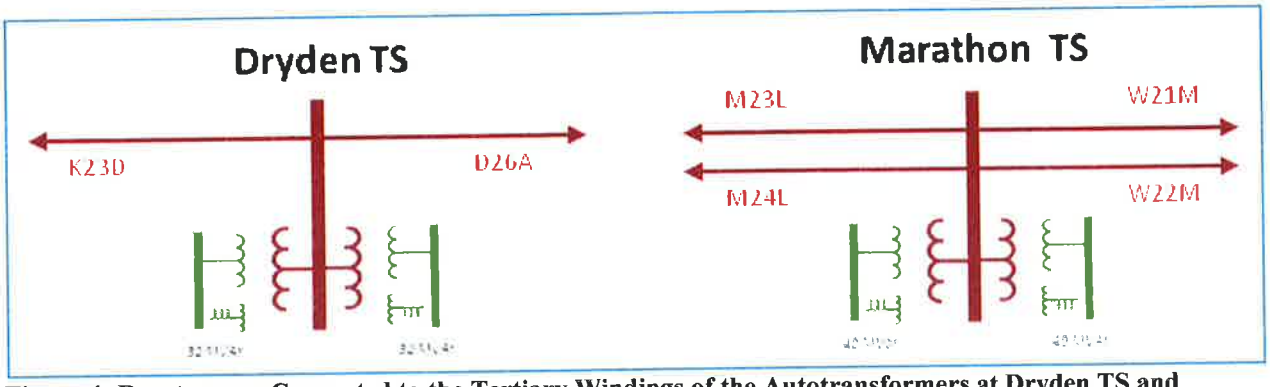

Figure 4: Reactors are Connected to the Tertiary Windings of the Autotransformers at Dryden TS and Marathon TS

Hydro One has indicated the preliminary cost estimate for the four reactors is $12 Million. Due to the upcoming need to take extended outage of the Atikokan generating unit for the conversion to biomass, there is an urgency to have the reactors installed and available for voltage control as soon as possible with a planned in-service date of November 2014.

We look forward to the opportunity to continue working with and supporting Hydro One throughout the implementation of this project.

Regards,

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Vice President, Power System Planning
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