CONNECTION ASSESSMENT & APPROVAL PROCESS

ASSESSMENT SUMMARY

Applicant: *Hydro One Networks Inc.*

Project: *Kleinburg TS:*
Install two additional 27.6kV feeder positions

CAA ID No. 2003-EX137

Long Term Forecasts & Assessments Department
Consistent Information Set Department

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ASSESSMENT SUMMARY

HYDRO ONE NETWORKS Inc.

KLEINBURG TS: Install two additional 27.6kV feeder positions

1.0 General Description

Kleinburg TS, which is tapped off the radial 230kV circuits V74R & V75R from Claireville TS, has two 75/100/125MVA transformers, T1 & T2. These transformers are each equipped with dual secondary windings; one operating at 27.6kV and the other at 44kV.

The 27.6kV switchyard presently has only 4 feeder positions; two of which supply Hydro Vaughan (M3 & M4); while the other two supply Hydro One - Retail (M5 & M6).

The T1/T2 DESN station has a summer 10-day limited-time-rating of 107.7MVA for the 28kV windings and 109.9MVA for 44kV windings. The combined peak load recorded on the 28kV & 44kV busbars for the summer of 2001 was 132MVA.

Hydro One is proposing to install two additional 27.6kV feeder positions at the T1/T2 DESN station to supply the Hydro One - Retail loads in the Bolton area.

The new feeder positions are scheduled to be in-service on 31st May 2004.

2.0 Proposed Facilities

The ratings for the two new feeder positions are to be as follows:

- Continuous current rating: 1200A
- Nominal voltage for the breakers: 36kV
- Short-circuit rating: At least 25kA
- Breaker interrupting time: 5 cycles

A 3-pole gang-operated disconnect switch is to be installed between the two new feeders on the feeder-side of the LV breakers.

3.0 Forecast Load Growth

The load at Kleinburg TS that is to be supplied from the new two feeders is forecast to grow from approximately 8MW in 2003 to 18MW in 2010, with the ultimate loading of 30MW (representing the combined rating of the two feeders) being reached by about 2018.

4.0 Assessment

The proposed increase in load resulting from the installation of the two new 27.6kV feeders at Kleinburg TS would be well within the capacity of the existing transformers. Furthermore, the total load supplied at Woodbridge TS and Kleinburg TS, via the two radial 230kV circuits V74R & V75R, would be below the 500MW threshold for which a 'continuous' supply is required, as stated in the IMO's criteria.

> *With all transmission elements in-service pre-contingency, any subsequent design-criteria contingency must not result in the simultaneous loss of 500MW or more of load.*

Subject to ensuring that the facilities at Kleinburg TS, following the installation of the two 27.6kV feeders, will continue to comply with the following Market Rule Requirements, the additional feeders are not expected to adversely impact on the IMO-controlled grid:

i. Power Factor

Reference 1 of Appendix 4.3 of the Market Rules states that:

Connected wholesale customers connected to the IMO-controlled grid shall operate at a power factor within the range of 0.9 lagging to 0.9 leading as measured at the defined metering point.

Since the defined meter point is required to be at a voltage above 50kV, then the 'effective' point for determining the power factor would be at the HV terminals of the two step-down transformers.

If it is expected that the power factor could be less than 0.9 lagging, then consideration should therefore be given to making provision within the design of the new facilities for the inclusion of shunt capacitor banks.

ii. Under-Frequency Load Shedding

Reference 2 of Appendix 4.3 and Section 10.4 of Chapter 5 of the Market Rules require that:

Facilities be installed to enable automatic under-frequency load shedding (UFLS) of at least 30% of the total peak load to be initiated in response to reductions in frequency.

However, Hydro One has the option of providing this capability at other transformer stations as long as the capability to reject at least 30% of the total peak load of each group of transformer stations is maintained.

iii. Voltage Reduction

Reference 4 of Appendix 4.3 and Section 10.3 of Chapter 5 of the Market Rules require that:

Facilities be installed to allow the distribution voltage to be reduced by 3% & 5% within 5 minutes of receiving instructions from the IMO for the reductions.

4.0 Notification of Approval

Subject to meeting the requirements of the Market Rules, it is therefore recommended that a Notification of Approval of the Connection Proposal be issued.