



# **CONNECTION ASSESSMENT & APPROVAL PROCESS**

## ***PRELIMINARY ASSESSMENT REPORT***

***For the connection of a new 230/27.6kV TS for Kanata Hydro***

***CAA ID N<sup>o</sup>. 2000-012***

***Long Term Forecasts & Assessments Department***

***Date: 22<sup>nd</sup> December 2000***

## *New TS for Kanata Hydro*

### *1. Details of the Proposed Connection*

Kanata Hydro is proposing to establish a new 230/44kV transformer station adjacent to Hydro One Networks' South March 230/44kV transformer station. The proposed connection arrangement is shown in the attached Diagram.

The proposed location for the new TS is in close proximity to the right-of-way for the 230kV circuit M32S, and one of the step-down transformer at the new TS is to be connected to this circuit. The second step-down transformer is to be connected to 230kV circuit C3S, via an extension of this circuit involving a single, new span.

The scheduled in-service date is subject to agreement between Kanata Hydro and Hydro One Networks Inc.

### *2. Impact on Reliability*

It has been proposed that, as a minimum requirement, the two step-down transformers should be connected to their respective 230kV circuits via circuit-switchers. This would ensure that a fault involving either of the new step-down transformers does not result in the loss of the main 230kV circuit to which it is connected. However, this would require blocking signals to be sent to the circuit breakers at the circuit terminals to delay their operation until the slower-operating circuit-switchers have had an opportunity to clear the fault.

With circuit-switchers included in the transformer connections there would be no adverse impact on the current level of supply reliability provided via circuits M32S and C3S.

#### *2.1 Alternative Arrangement*

While the two circuit-switchers at the new TS are intended to ensure that the supply reliability is maintained at its current level, *replacing the existing disconnect switch, L22M32S-1 at Nepean TS with a circuit breaker would significantly enhance the level of supply reliability of the loads supplied from Nepean TS.*

Furthermore, if the disconnect switch L22M32S-1 at Nepean TS were to be replaced with a circuit breaker there would be no compelling reason to install circuit-switchers at the new TS for Kanata Hydro. Instead the two transformers could be connected via motorised disconnect switches. With a circuit breaker installed at Nepean TS, loss of any circuit section would still leave one transformer in-service at each TS, and this single transformer would be capable of supplying the entire load at the TS.

### *3. Step-down Transformers*

The two new 220/27.6kV 25/41MVA step-down transformers to be installed at the new TS are to be equipped with under-load tap-changers on the HV side with a range of +/- 10% in 18 steps.

#### 4. Load to be Supplied

The forecast load to be supplied from the new TS is as follows:

Year	2001	2002	2003	2004	2005	2006	2007
Load	7MW	14MW	22MW	30MW	38MW	47MW	60MW

Revenue metering is to be installed on the LV side of each transformer at the new TS.

#### 5. Hydro One Studies

Hydro One has completed load flow studies to examine the voltage profile at the new TS; at South March TS; and at Nepean TS, under contingency conditions involving the following circuits or circuit sections:

Affected circuit or circuit section	
<i>i.</i>	<i>C3S</i> <i>Chats Falls to South March TS</i> would include the loss of one transformer at the new TS, & the loss of transformer T2 at South March TS
<i>ii.</i>	<i>M32S</i> <i>South March TS to Nepean TS</i> would include the loss of one transformer at the new TS, the loss of transformer T1 at South March TS, and the loss of transformer T3 at Nepean TS
<i>iii.</i>	<i>M32S</i> <i>Nepean TS to Merivale TS</i> would include the loss of transformer T4 at Nepean TS

For these studies, in addition to a load of 63MVA at the new Kanata Hydro TS, loads of 122MVA and 164MVA were assumed at South March TS and Nepean TS, respectively, which represent the expected loading condition at these locations for the year 2007.

These studies have concluded that the system is capable of supplying the entire load on circuits C3S and M32S at acceptable voltage levels under the contingency conditions identified above.

#### 6. System Impact Assessment

This Preliminary Assessment has concluded that no further analysis is required for this Project and it is recommended that the System Impact Assessment be foregone.

## 7. Recommendation

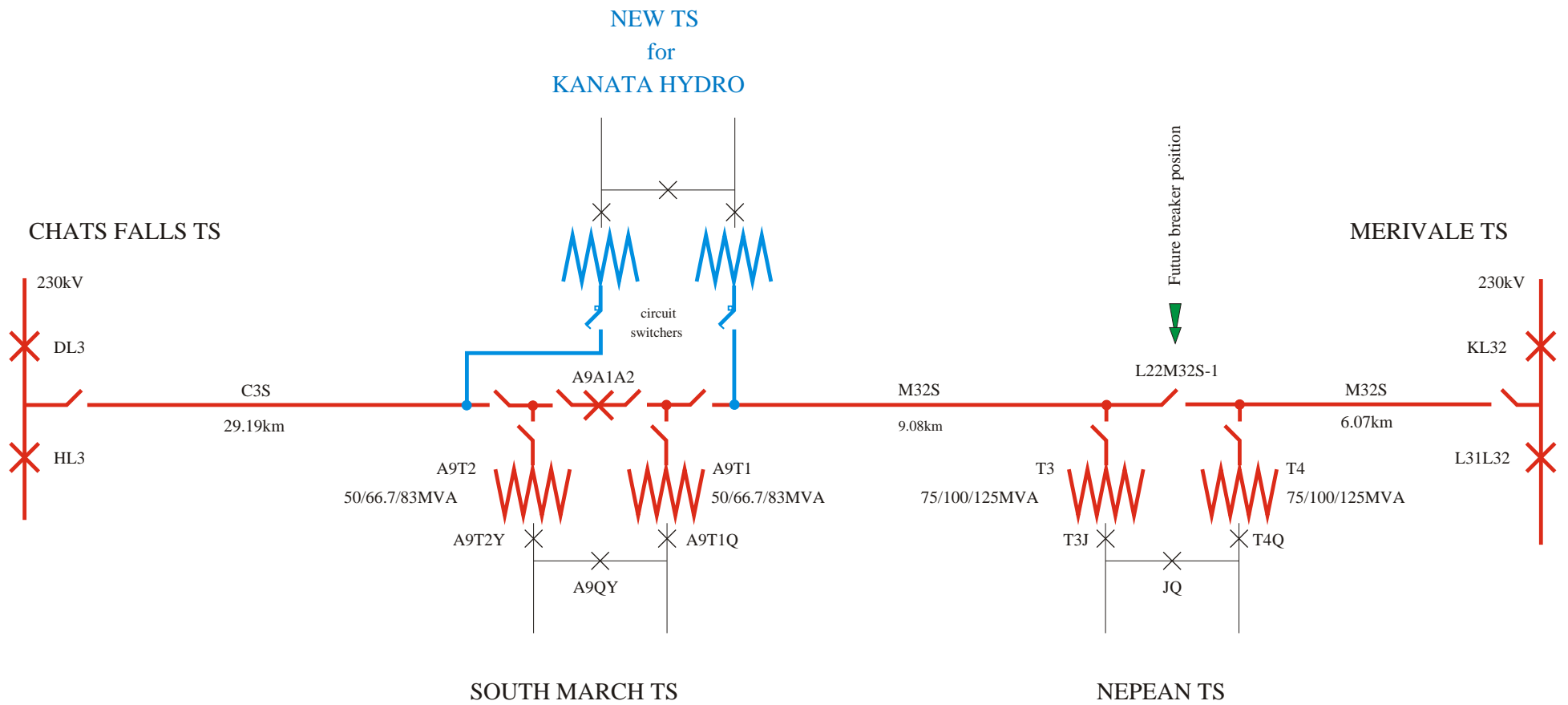
As discussed previously, there is a compelling argument for integrating the facilities required for connecting the new Kanata Hydro TS to the IMO-controlled grid with other system reinforcements, in order to enhance the level of supply reliability provided to the forecast load of 350MVA supplied from circuits C3S and M32S.

It is therefore recommended that Hydro One should investigate entering into an agreement with Kanata Hydro to share the cost of financing a new 230kV circuit breaker to replace the existing disconnect switch, L22M32S-1, at Nepean TS. Subject to this agreement, Kanata Hydro would be permitted to install motorised disconnect switches instead of circuit-switchers to connect their new TS to the system.

## 8. Notification of Approval of Connection Proposal

It is therefore proposed that this Project should receive a *Notification of Approval of Connection Proposal*, subject to the following IMO requirements being met:

- *that a 230kV circuit switcher (together with appropriate blocking signals), should be included in the respective connection for each step-down transformer on to circuits C3S and M32S*
- OR**
- *if a new 230kV circuit breaker were to be installed at Nepean TS to replace the existing 230kV disconnect L22M32S-1, then motorised disconnects in each transformer connection (together with appropriate protection and remote/transfer trip circuits that comply with the Transmission System Code) would be acceptable.*



Proposed Location & Incorporation Arrangement for the New TS for Kanata Hydro