



CONNECTION ASSESSMENT & APPROVAL PROCESS ASSESSMENT SUMMARY

Applicant: Hydro One Networks Inc.

**Project: Burlington TS – Installation of a New 128kV
125MVAR Capacitor Bank**

CAA ID: 2003 – EX123

**Long Term Forecasts & Assessments Department
Consistent Information Set Department**

Date: March 19, 2003

1.0 Description of Proposal

Hydro One Networks Inc. is proposing to install a new 128kV 125MVAR capacitor bank at Burlington TS to meet the increasing reactive power demand in the Hamilton – Burlington area.

The new 125MVAR capacitor bank SC11 will be connected directly to the K1 bus at Burlington TS through two series connected SF₆ breakers, series reactors, and a motor operated disconnect switch as shown in Figure 1.

The primary breaker SC11SC for isolating the new capacitor bank will be an independent pole operated breaker to minimize the effect of capacitor bank switching on local customers. The back-up breaker SC11K will be a conventional gang operated breaker.

Series reactors, rated at 2.0mH per phase, will be installed on the capacitor bank to limit the capacitor bank inrush and outrush transient currents. The series reactors will be installed between the motor operated disconnect switch and the back-up breaker as shown in Figure 1.

Metal oxide gapless surge arrestors and a 3-phase gang operated grounding switch will be installed between the primary breaker and the new capacitor bank. A single phase grounding switch will also be connected to the neutral point of the wye-connected capacitor bank.

The scheduled in-service date of the new capacitor bank SC11 is May 2004.

Specifications of major electrical components are:

❖ Capacitor Bank

Capacitance:	125MVAR ± 5% @ 128kV ± 1kV
Maximum Operating Voltage:	128 kV
Configuration:	Single wye ungrounded or double wye ungrounded
Symmetrical Short Circuit Rating:	40kA minimum
Insulation Level:	550kV BIL

❖ Discharge Device

None required (Each capacitor unit is equipped with a 5-minute discharge resistor)

❖ Series Reactors

Inductance:	2.0mH per phase at 60Hz
Maximum Operating Voltage:	127kV continuous 150kV for 5 minutes
Continuous Current:	625A rms
Symmetrical Short Circuit Rating:	63kA for 12 cycles
Asymmetrical Short Circuit Rating:	160kA peak
Insulation Level:	550BIL

❖ **Circuit Breakers**

Type:	Primary SC11SC - Independent pole operated with synchronized closing Back-up SC11K – Gang operated
Interruption Medium:	SF ₆
Maximum Operating Voltage:	128kV continuous
Rated Interrupting Capacity:	40kA symmetrical, 48kA asymmetrical
Rated Interrupting Time:	3 cycles
Insulation Level:	550BIL
Transient Recovery Voltage Across Pole:	310kV peak

❖ **Disconnect Switch**

Continuous Current Rating:	625A minimum
Maximum Operating Voltage:	127kV continuous 150kV for 5 minutes
Momentary Current Rating:	63kA
Insulation Level:	550BIL

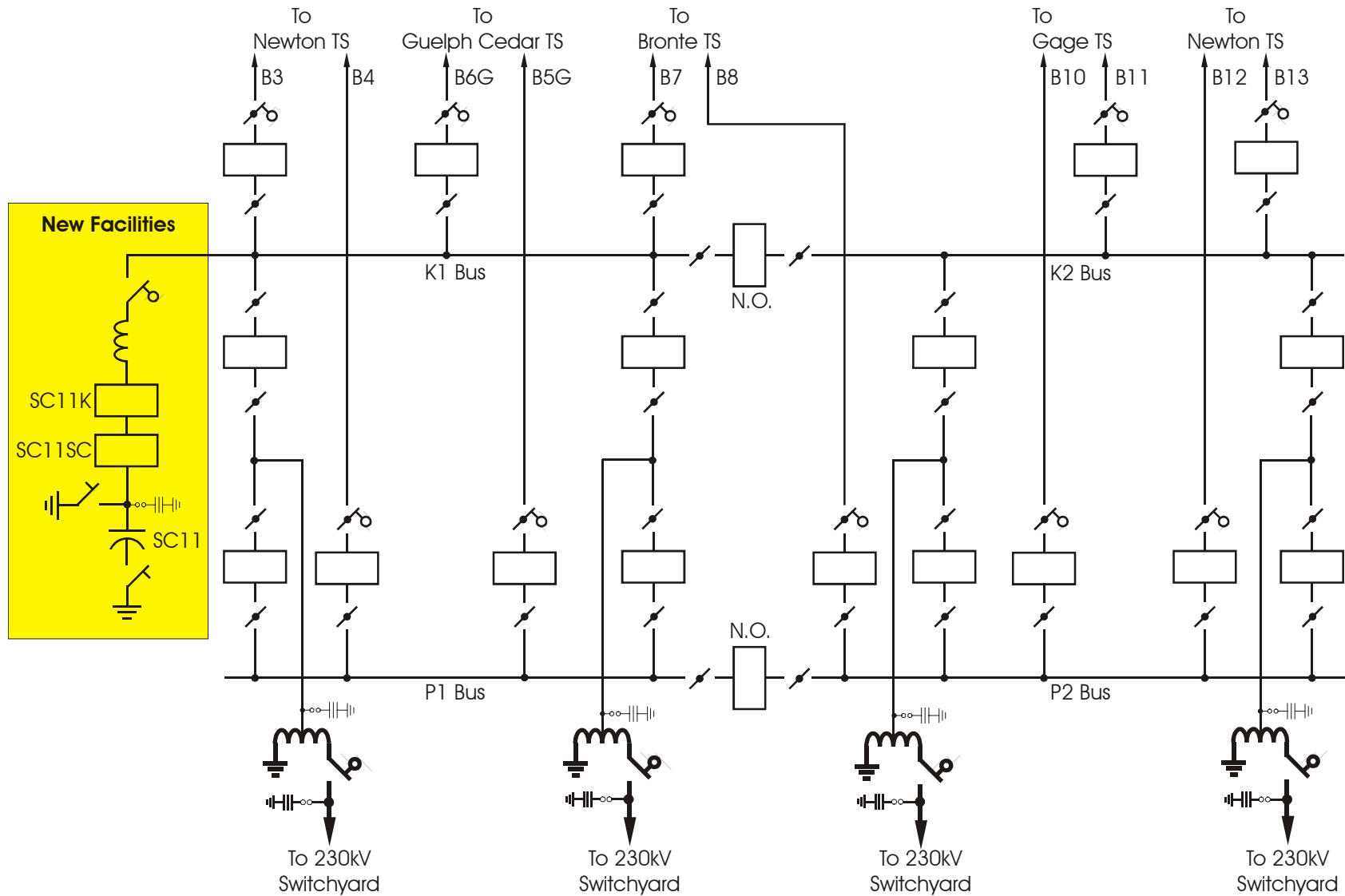


Figure 1 - Burlington TS 115kV Switchyard

2.0 Assessment

With the present fault level at the 115kV switchyard of the Burlington TS, the voltage change upon switching the new 125MVAR capacitor bank either in or out of service is expected to be less than 2%.

A power flow study has confirmed that the voltage change upon switching a 128kV 125MVAR capacitor bank at Burlington TS would be about 1.6%. This would comply with the maximum limit of 4% for capacitor switching stipulated in the Market Rules.

The two SF₆ circuit breakers have an interrupting capability of 40kA. With the proposed arrangement of having the current limiting series reactors installed upstream of the circuit breakers, the 40kA breakers would be adequate for the projected fault levels. The applicant has further specified that should physical constraints dictate that the series reactors be installed downstream of the circuit breakers, then the breakers would be rated at 63kA.

The proposed new capacitor bank at Burlington TS would improve the voltage profile in the Hamilton - Burlington area and would have no adverse impact on the IMO-controlled grid.

3.0 Notification of Approval

Based on the above assessment, it is recommended that a Notification of Approval for this proposal be issued to the applicant.