

CONNECTION ASSESSMENT & APPROVAL PROCESS

Preliminary Assessment Report Nanticoke GS Replacement of Station Service Transformers

CAA ID 2001-046

Draft Report

Long Term Forecasts & Assessments Department
Consistent Information Set Department
March 26, 2002

Preliminary Assessment Report

Nanticoke GS, replacement of SST7, SST8, RSS3 and RSS4

Disclaimers

IMO

This report has been prepared solely for the purpose of assessing, on a preliminary basis, whether the connection applicant's proposed connection with the IMO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether a System Impact Assessment of the proposed connection should be conducted under Chapter 4, section 6 of the *Market Rules*. This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant, Hydro One and the IMO in accordance with Chapter 4, section 6 of the *Market Rules*. The IMO assumes no responsibility to any third party for any use which it makes of this report. Any liability which the IMO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the *Market Rules*. In the event that the IMO provides a draft of this report to the connection applicant, you must be aware that the IMO may revise drafts of this report at any time in its sole discretion without notice to you. Although the IMO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that it is using the most recent version of this report.

1.0 Project Description

Ontario Power Generation Inc. plans to add Selective Catalytic Reducers (SCR) at Nanticoke G7 and G8 to reduce nitrogen oxides (NO_x) emissions. The new equipment will be normally supplied via the two station service transformers SST7 and SST8. The backup supply will be provided by two reserve station transformers RSS3 and RSS4.

In order to accommodate the additional SCR equipment load, OPG is planning to replace the existing service station transformers with higher rated units. The existing main station service transformers SST7, SST8 and RSS3, RSS4 have a continuous rating of 33.3 MVar and 36.0 MVar respectively.

OPG has provided, in their CAA application, the following project schedule for installation of the SCR's and the service transformers:

- RSS3 - August 2002
- RSS4 - September 2002
- SST8 - February 2003
- SST7 -September 2003
- Unit 7 SCR - April 2003
- Unit 8 SCR - November 2003

2.0 Review of Connection Arrangement

The new transformers will effectively be installed in the same location as the old transformers and the existing connectivity arrangement will be maintained. Figure 1 shows the electrical location and lists the ratings of the new transformers.

Projected station service load information, which includes the SCR load, has not been provided by OPG. However, based on the new equipment rating this load is not to exceed 43 MVA.

OPG must ensure that the rating of the remaining station equipment is adequate to support the increase in station service load due to the installation of the SCR.

The applicant will have to ensure that the station equipment and station control/protection are designed to meet the intent of the Transmission System Code.

3.0 Station Service Load Supply

The station service load is normally supplied via the service station transformers SST7 and SST8, which are connected at the terminals of units G7 and G8, respectively. During steady state operation the unit terminal voltage remains constant at 1 p.u. kV, hence the station load supply would not experience significant voltage variations.

OPG has indicated that the reserve service station transformers RSS3 and RSS4 will be used to supply the station load during units' start up or during times when SST7 or SST8 are out of service. These transformers are connected on the *IMO-controlled grid* on the 230 kV side of the autotransformers T11 and T12. In accordance with the *Market Rules* (Chapter 4 Appendix 4.1) which set the *IMO-controlled grid* performance standards for normal system voltage variations, it

is possible that at this point of connection the voltage vary anywhere between 220 kV to 250 kV. Historical records from 2001 show that the 230 kV voltage at Nanticoke varied between 241 kV to 251 kV.

If the station service load including the SCR is not sensitive to voltage variations , meaning that continued supply would be maintained for voltage between 4.59 kV to 3.94 kV then, the reserve station transformers do not have to be equipped with under-load tap changers. If, however this is not the case then, the reserve station transformers RSS3 and RSS4 must be equipped with under load tap changers.

4.0 Power Factor

The *Market Rules* require that wholesale customers and distributors connected to the IMO-controlled grid shall operate at a power factor within the range 90% lagging to 90% leading as measured at the *defined meter point*.

The station service load must be within this range at least when supplied via the reserve station transformers.

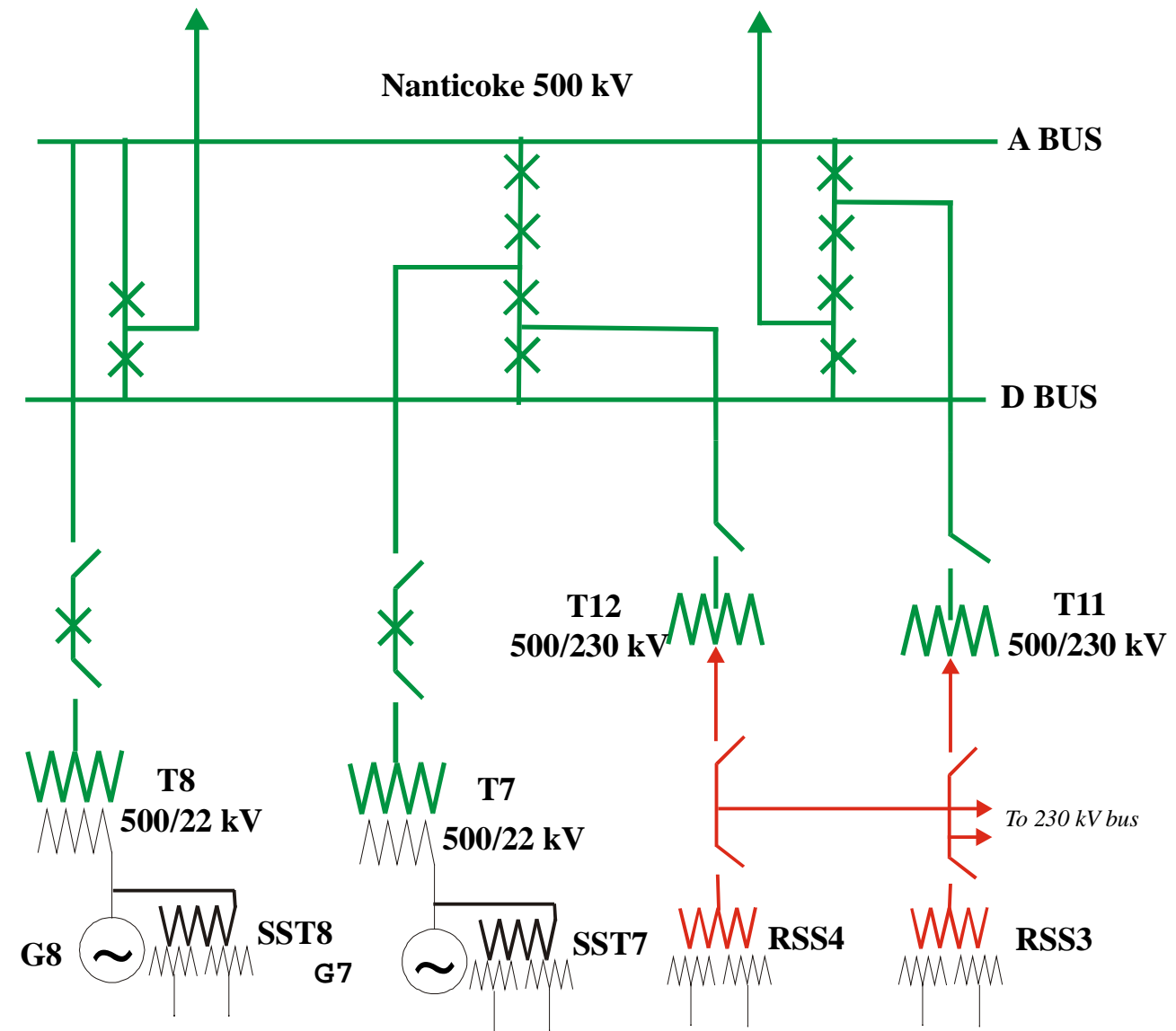
5.0 Fault Level Assessment

It has been assessed by Hydro One that the transformer replacements will not have a significant contribution to the fault levels in the area and consequently short circuit studies were not performed.

6.0 Notification of Approval

Sections 2.0, 3.0 and 4.0 of the Preliminary Assessment Report lists all the requirements identified by the IMO CAA process for the replacement of four service station transformers at Nanticoke GS. It is recommended that approval be granted and Notification of Approval be issued subject to the acceptance by the proponent of the IMO requirements.

In addition to the Connection Assessment and Approval process any new connection to the IMO controlled grid has to fulfill, before coming into service it is required that OPG meet all the requirements of the IMO Facility Registration process.



SST7 & SST8

**24.3/32.3/43 MVA
22.0/4.16/4.16 kV**

Positive Sequence Impedance

**HL=11.6%, HT=11.6% on 21.5 MVA
LT=20.83% on 21.5 MVA**

RSS3 & RSS4

**24.3/32.3/43 MVA
232.0/4.16/4.16 kV**

Positive Sequence Impedance

**HL=13.23%, HT=13.23% on 21.5 MVA
LT=23.82% on 21.5 MVA**

FIGURE 1. Station Service Transformers Connectivity Nanticoke GS