Nova Scotia Transmission System Operating Limits Q4-2017 / 2018

System Operating Limit is defined as:
The value (such as MW, MVAR, Amperes, Frequency, or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

System Operating Limits are based upon certain operating criteria. These include, but are not limited to:

- Facility Ratings (applicable pre- and post-contingency equipment or facility ratings)
- Transient Stability Limits (applicable pre- and post- contingency stability limits)
- Voltage Stability Limits (applicable pre- and post- contingency voltage stability)
- System Voltage Limits (applicable pre- and post- contingency voltage limits)

System Operating Limits are established and are subject to review and revision in accordance with NERC and NPCC Standards, and incorporate the function of approved Special Protection Schemes. *System Operating Limits* are subject to change if transmission elements are out of service for any reason, planned or unplanned. *System Operating Limits* are dependent on sufficient generation armed for Special Protection Schemes.

System Operating Limits are established for the following primary[1] interfaces:

1. NS-NB Tie
2. Cape Breton Export
3. Onslow Import
4. Onslow South

The *System Operating Limits* described in this document include the power system configuration prior to the installation of the Maritime Link, scheduled for the end of 2017, and the transmission upgrades associated with Maritime Link, to be completed in 2018.

This document summarizes the transfer limits when the following upgrades are completed:

- Breaker Node Swap 67N-Onslow (complete)
- Thermal Uprate L-6511 (complete)
- Thermal Uprate L-7019 (complete)
- Separate L-7005 from L-8001 Strait of Canso (under construction)
- New 138kV line L-6613 between 1N-Onslow and 74N-Springhill (under construction)
- 101S-Woodbine 345kV and 230kV bus development with L-7011 and L-7012 terminations (commissioning)

[1] Other interfaces are established for local transmission operations, typically used for transmission elements out of service for maintenance.

System Operating Normal Limits (all Elements in Service)

1. NS-NB Tie

From the perspective of the NS side of the NS-NB Tie, the **export** Total Transfer Capability (TTC) is up to 350 MW. **Import** Total Transfer Capability is 300 MW or 22% of gross load in Nova Scotia, whichever is less. The NS Power OASIS provides real-time Recallable (non-firm) Available Transmission Capability and Non-recallable (firm) Available Transmission Capability. Available Transmission Capability (ATC) is a function of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and existing ATC reservations.

Restrictions on the NB side of the NS-NB Tie are the responsibility of the NB Power Transmission System Operator, and may be more restrictive for flow from New Brunswick to Nova Scotia, as the restrictions also apply to flow from New Brunswick to Prince Edward Island.

The Maritime Link Upgrades will increase **export** TTC up to 505 MW. The **import** capability will continue to be governed by restrictions on the NB transmission system, and the impact of loss of transmission on Nova Scotia customers and therefore will not change by the Maritime Link Upgrades.

2. Cape Breton Export (CBX)

CBX limit varies from 850 MW in Summer to 900 MW in Winter, but can be reduced by certain generation dispatch patterns. The Maritime Link Upgrades will increase CBX limits to 975 in Summer and 1100 MW in Winter.

3. Onslow Import (ONI)

ONI limit varies from 1050 MW in Summer to 1200 MW in Winter, but can be reduced by certain generation dispatch patterns. The Maritime Link Upgrades will increase ONI limits to 1175 MW in Summer to 1250 MW in Winter.

4. Onslow South (ONS)

ONS is a function of the available Metro Dynamic Reactive Reserve (MDRR) as shown in Figure 1, up to a thermal limit of 850 MW in Summer and 1000 MW in Winter. ONS limits have been increased by Maritime Link Upgrades completed in 2016, and will not be further increased by Maritime Link Upgrades in progress. The addition of new capacitor banks in Metro in 2017 will increase the available Dynamic Reactive Reserve.

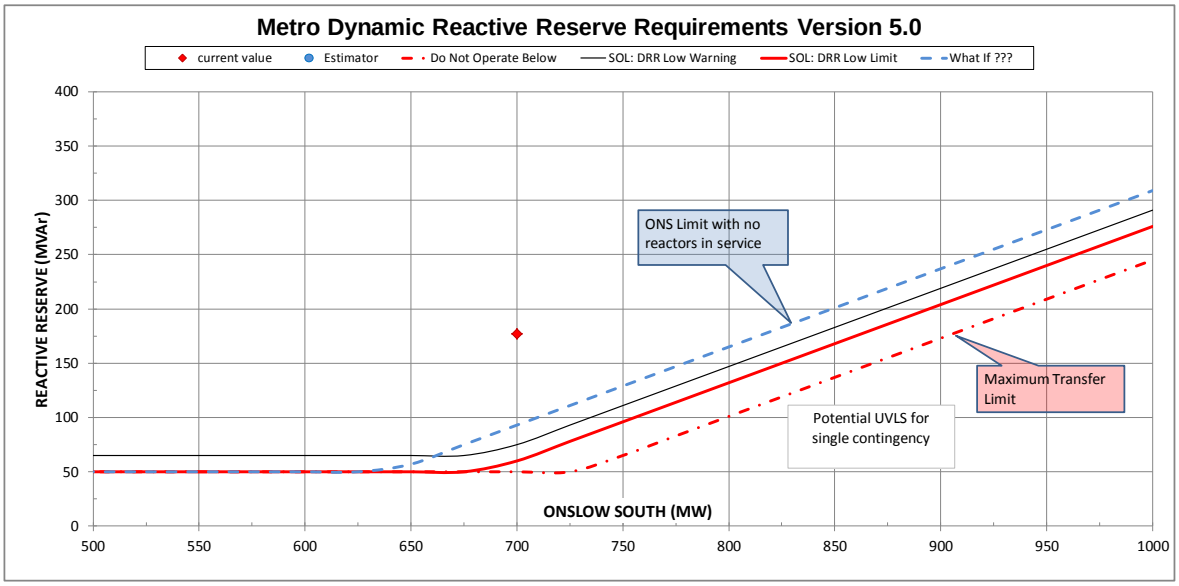

Figure 1 Metro Dynamic Reactive Power Reserve (MDRR)

Transmission Congestion for New Generation

The interconnection of new generation is governed by the NSPI Generation Interconnection Procedures (GIP). The shaded areas of Figure 2 indicate portions of the NSPI power system less likely to encounter transmission congestion, depending on the size and specific location of proposed new generation. However all projects must be studied in accordance with the GIP for overall system impact and interchange capability between Nova Scotia and New Brunswick.

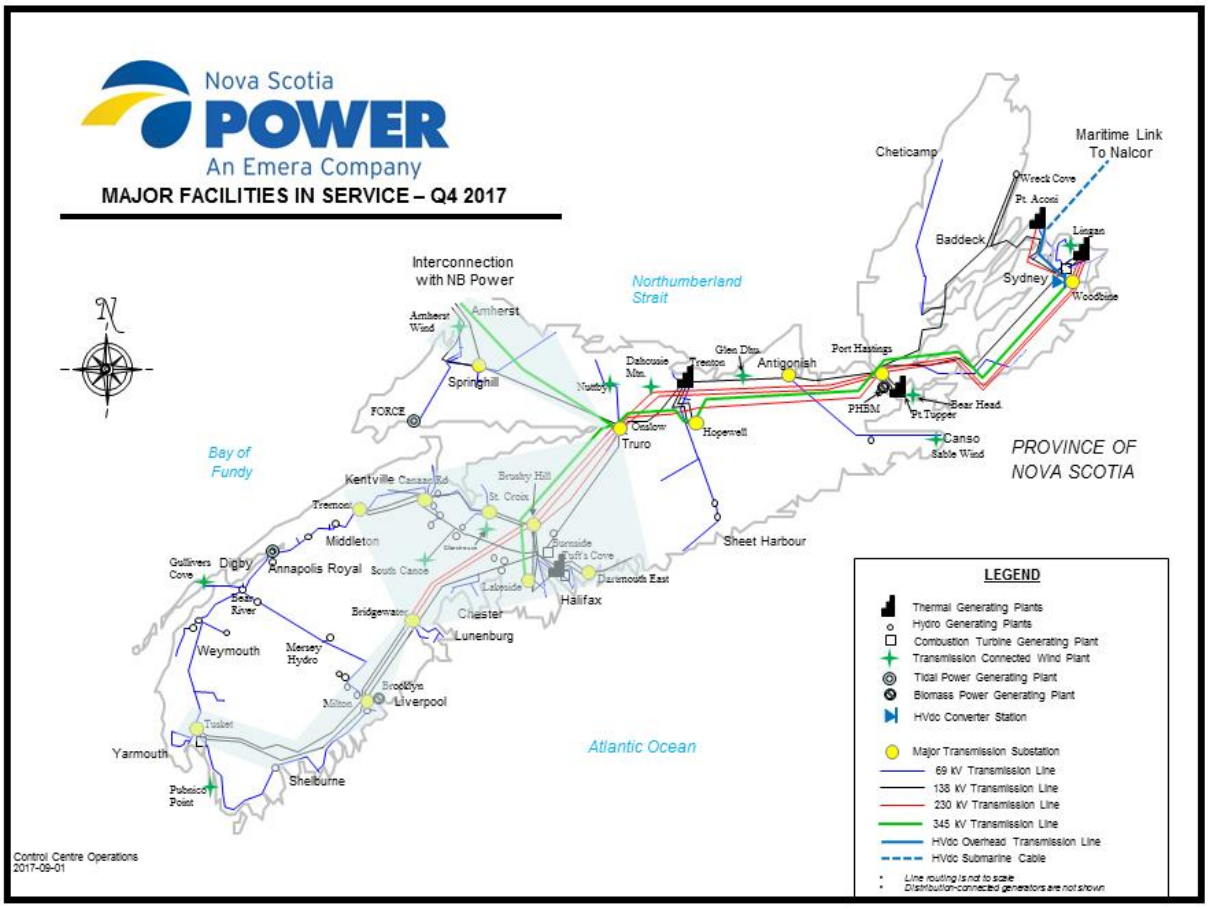

Figure 1 Generation Limited Congestion Zones