2021 Transmission Security Limit (TSL) Report

For Use in Identifying the TSLs for LCRs

A Report by the
New York Independent System Operator

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Introduction

In support of the NYISO's administration of its Installed Capacity (ICAP) market and pursuant to Section 5.11.4 of the its Market Services Tariff, the NYISO annually determines transmission security limits (TSLs) that are used to establish Locational Minimum Installed Capacity Requirements (LCRs). The TSLs are used in the determination of the Capability Year LCRs for the ICAP Localities (*i.e.,* G-J Locality, Zone J, and Zone K).[1] They act as hard limits when establishing the LCRs for each Locality. This report documents transmission capability inputs that the NYISO will use to determine the TSLs.

The transmission interfaces for each of the three Localities are defined for the purposes of determining the transmission security limits. Each transmission interface is represented by specific transmission elements as shown in Appendix A.

The transmission security limits for the G-J and Zone K Locality interfaces utilize NYS Reliability Council Planning Criteria. For the interfaces for each of these Localities, generation and phase angle regulator schedules for the N-1 outage case are developed to maximize the respective Locality import capabilities while maintaining all bulk power system transmission element power flows related to the respective interfaces within Normal ratings (*i.e.,* N-1-0). The generation re-dispatch for the N-1 outage case recognizes the NYISO's ability to re-dispatch generation in support of maximizing transmission security limits. The NYISO then evaluated NPCC criteria contingencies for the N-1 outage case so that all bulk power system transmission element power flows related to the respective interfaces are within applicable Long Term Emergency (LTE) ratings (*i.e.,* N-1-1).

For the Zone J Locality interface, the transmission security limits use NYS Reliability Council Local Reliability Rule G.1-R1. The G.1-R1 Rule states that "Certain areas of the Con Edison system are designed and operated for the occurrence of a second contingency." Consistent with the G.1-R1 Rule, generation and phase angle regulator schedules for the N-2 outage case are developed to maximize the Locality import capability while maintaining all bulk power system transmission element power flows related to the Zone J interface within Normal ratings (*i.e.,* N-2-0). The generation re-dispatch for the N-2 outage case recognizes that the ISO has the ability to re-dispatch generation in support of maximizing transmission security limits.

[1] On October 5, 2018, FERC issued an Order accepting revisions to the NYISO's Market Services Tariff that became effective October 9, 2018. These changes establish the methodology used to determine LCRs. This method is based upon an economic optimization algorithm to minimize the total cost of capacity for the NYCA at the capacity markets design condition, *New York Independent System Operator, Inc.*, 154 FERC ¶ 61,001 (2018).

SYSTEM REPRESENTATION AND BASE STUDY ASSUMPTIONS

The following section discusses evaluations preformed to identify the transmission capability inputs for the G-J, Zone J, and Zone K Locality interfaces.

Transfer limits set forth in this report are based on the forecasted load and generation, and phase angle regulator schedule assumptions.

Analysis Tool and System Representation

The Siemens PTI PSS™E and PowerGEM's Transmission Adequacy and Reliability Assessment "TARA" software packages were used to calculate the thermal limits based on Normal Transfer Criteria defined in the "NYSRC Reliability Rules for Planning and Operating the New York State Power System."

The NYISO developed the system representation from the modified 2020 Summer Operating Study base case. The primary difference between the system representation in the 2020 Summer Operating Study base case and the 2020-2021 TSL base case employed in this analysis relates to planned or forced power system outages. The 2020 Summer Operating Study base case included transmission equipment outages that were anticipated to extend through the duration of the Summer 2020 Capability Period. The TSL base case employed in this analysis restores all transmission and generation elements to service, creating an all-equipment-in-service base case. Significant facility changes compared to the 2020 Summer Operating Study base case include:

- Indian Point Energy Center Unit 3 Retirement
- Leeds – Hurly Ave. 345 kV Smart Wire Project
- Rochester Area Reinforcement Project

The Indian Point Energy Center Unit 3 has a nameplate capability of 1,012 MW and is expected to retire by the end of April 2021.

The Leeds to Hurley Avenue 345 kV Smart Wire Project consists of the installation of Smart Wires SmartValve technology utilizing a bank design instead of a traditional series capacitor installation. The SmartValve installation will be located at the Hurley Avenue Substation. The SmartValve technology is a modular Static Synchronous Series Compensator (SSSC) that uses variable voltage injection to synthesize a capacitive or inductive reactance.

The Rochester Area Reinforcement Project consists of a new 345/115 kV substation, Station 255. The new 345 kV substation will intersect the existing Somerset – Rochester (SR1-39) 345 kV and Niagara – Rochester NR2) 345 kV lines near Rochester. An additional 345 kV line will be constructed from Station 255 345 kV to Rochester 345 kV and two 345/115 kV transformers will tie the 345 kV substation to the 115 kV network.

Consistent with NYS Reliability Council Transmission Planning criteria, the TSL base case utilizes MVA ratings for the transmission elements identified in Appendix A.

Locality Interface Definition Assumptions

The interfaces for each of the three Localities are described in the appendix. Locality Interconnections to controllable transmission that has Unforced Deliverability Rights (UDRs) are treated as supply-side resources and are not considered part of the import capability when calculating the TSL.

Base Case Study Modeling Assumptions

There are two transmission facilities that are included in the ICAP Locality interface definitions controlled by phase angle regulators. For both the Zone J and Zone K Localities, the Jamaica-Lake Success and the Jamaica- Valley Stream 138kV transmission facilities assume a net flow of 300 MW from the Zone K Locality to the Zone J Locality.

The phase angle regulator schedules used in the base case power flow for this analysis assumed a net flow of 0 MW from Public Service Electric & Gas (PSE&G) to Con Edison via the PAR transformer controlling the Linden – Goethals interconnection and 0 MW on the South Mahwah – Waldwick circuits from Consolidated Edison to PSE&G, controlled by the PARs at Waldwick. For the Summer 2021 Capability Period used in the base case, the NYISO input a 360 MW schedule for the Hopatcong – Ramapo 500 kV (5018) tie from PJM to New York.

The four Ontario – Michigan PARs are modeled in-service and scheduled to a 0 MW transfer. These phase angle regulator schedules are consistent with the scenarios developed in the RFC-NPCC Inter-Regional Reliability Assessment for Summer 2021, and the MMWG Summer 2020 power flow base cases.

The series reactors on the Dunwoodie – Mott Haven (71 and 72), the Farragut – Gowanus (41 and 42) 345 kV, the Sprain Brook – W. 49th St. (M51 and M52) 345 kV, Packard – Sawyer (77 and 78) 230 kV cables, as well as the E. 179th St. – Hell Gate (15055) 138 kV feeder are in-service in the base case. The series reactors on the Sprain Brook – East Garden City (Y49) 345 kV cable are by-passed. The series capacitors on the Marcy – Coopers Corners (UCC2-41) 345 kV, the Edic – Fraser (EF24-40) 345 kV and the Fraser – Coopers Corners (33) 345 kV cables are in-service in the base case. The Leeds – Hurley Ave. 345 kV static synchronous series compensator is modeled in-service in the base case.

SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS

- **Table 1 – Zone K Locality Limit**
- **Table 2 – G-J Locality Limit**
- **Table 3 – Zone J Locality Limit**
- **Table 4 – Comparison of 2021 & 2020 Locality Limits**

TABLE 1 – Zone K Locality Limit

			Limit
N-1 Outage applied (Sprain Brook – East Garden City (Y49) 345 kV)			350 MW (1)
LIMITING ELEMENT	**RATING**		**LIMITING CONTINGENCY**
(1) Dunwoodie – Shore Road (Y50) 345 kV	@NORM	690 MVA[1]	Pre-Contingency Loading

Note:

1: LIPA rating for Y50 circuit is based on 70 % loss factor and rapid oil circulation.

TABLE 2 – G-J Locality Limit

				Limit
N-1 Outage applied (Athens – Pleasant Valley (91) 345 kV)				3400 MW (1)
LIMITING ELEMENT	**RATING**			**LIMITING CONTINGENCY**
(1) Leeds – Pleasant Valley (92) 345 kV	@LTE	1538 MVA	L/O	Leeds – Hurley Ave. (301) 345 kV

TABLE 3 – Zone J Locality Limit

			Limit
N-2 Outages applied (Sprain Brook – W.49th St. (M51) 345 kV & Sprain Brook – W.49th St. (M52) 345 kV)			3200 MW (1)
LIMITING ELEMENT	**RATING**		**LIMITING CONTINGENCY**
(1) Dunwoodie – Mott Haven (71) 345 kV	@NORM	785 MVA	Pre-Contingency Loading

TABLE 4 – Comparison of 2021 & 2020 Locality Limits

Locality	2021 Limit	2020 Limit	Difference
Zone K Locality	350 MW	350 MW	0 MW
G-J Locality	3400 MW	3400 MW	0 MW
Zone J Locality	3200 MW	3200 MW	0 MW

Appendix A – TSL INTERFACE DEFINITIONS

G-J Locality		
Mohawk (Zone E) – Hudson Valley (Zone G)		
Name	**Line ID**	**Voltage (kV)**
Coopers Corners-Dolson Ave*	CCDA42	345
Middletown-Rock Tavern*	CCRT34	345
Middletown 345/138	BK 114	345/138
West Woodbourne 115/69	T152	115/69
Capital (Zone F) – Hudson Valley (Zone G)		
*Athens-Pleasant Valley	91	345
*Leeds-Pleasant Valley	92	345
*Leeds-Hurley Ave.	301	345
Hudson-Pleasant Valley*	12	115
Blue Stores E-Pleasant Valley*	13-987	115
Blue Stores W-Pleasant Valley*	8	115
*Feura Bush-North Catskill	2	115

Zone J Locality		
Dunwoodie (Zone I) – NYC (Zone J)		
Name	**Line ID**	**Voltage (kV)**
*Dunwoodie-Mott Haven	71	345
*Dunwoodie-Mott Haven	72	345
Sprain Brook-Tremont*	X28	345
*Sprain Brook-West 49th Street	M51	345
*Sprain Brook-West 49th Street	M52	345
*Sprain Brook-Academy	M29	345
*Dunwoodie-Sherman Creek	99031	138
*Dunwoodie-Sherman Creek	99032	138
*Dunwoodie-East 179th Street	99153	138
Long Island (Zone K) – NYC (Zone J)		
*Lake Success-Jamaica	903	138
*Valley Stream-Jamaica	901L_M	138

Zone K Locality		
Dunwoodie (Zone I) – Long Island (Zone K)		
Name	**Line ID**	**Voltage (kV)**
*Dunwoodie-Shore Road	Y50	345
*Sprain Brook-East Garden City	Y49	345
NYC (Zone J) – Long Island (Zone K)		
Jamaica-Valley Stream*	901L_M	138
Jamaica-Lake Success*	903	138

* indicates the metered end of the circuit