NYISO OPERATING STUDY

WINTER 2011-12

Prepared by
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New York Independent System Operator, Inc.

Approved by NYISO Operating Committee
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APPENDICES

NYISO OPERATING STUDY - WINTER 2011-12

I. INTRODUCTION

The following report, prepared by the Operating Studies Task Force (OSTF) at the direction and guidance of the System Operations Advisory Subcommittee (SOAS), highlights the significant results of the thermal analysis completed for the winter 2011-12 capability period. This analysis indicates that, for the winter 2011-12 capability period, the New York interconnected bulk power system can be operated reliably in accordance with the "NYSRC Reliability Rules for Planning and Operating the New York State Power System" and the NYISO System Operating Procedures.

Transfer limits cited in this report are based on the forecast peak load conditions and are intended as a guide to system operation. Changes in generation dispatch or load patterns that significantly change pre-contingency line loadings may change limiting contingencies or limiting facilities, and result in higher, or lower, interface transfer capabilities.

System Operators should monitor the critical facilities noted in the enclosed tables, along with other limiting conditions, while maintaining bulk system power transfers within secure operating limits.

II. PURPOSE

The purpose of the study is to determine:

- The total transfer capabilities (TTC) between NYISO and adjacent areas including IESO, PJM and ISO-NE for **normal conditions** in the summer/winter periods. The TTC is calculated based on NERC TPL-002-0b Category B contingencies and a set of selected NERC TPL-003-0a Category C contingencies.
- The TTC between NYISO and adjacent areas including IESO, PJM and ISO-NE for **emergency conditions** in the summer/winter periods. The TTC is calculated based on NERC TPL-002-0b Category B contingencies.

This study is being performed to fulfill NERC requirements, which include Requirement R2 of FAC-013 and Requirement R11 of TOP-002-2a as quoted below.

"FAC-013-1—Establish and Communicate Transfer Capabilities

Requirement R2: The Reliability Coordinator and Planning Authority shall each provide its inter-regional and intra-regional Transfer Capabilities to those entities that have a reliability-related need for such Transfer Capabilities and make a written request that includes a schedule for delivery of such Transfer Capabilities as follows:

R2.1. The Reliability Coordinator shall provide its Transfer Capabilities to its associated Regional Reliability Organization(s), to its adjacent Reliability Coordinators, and to the Transmission Operators, Transmission Service Providers and Planning Authorities that work in its Reliability Coordinator Area.

R2.2. The Planning Authority shall provide its Transfer Capabilities to its associated Reliability Coordinator(s) and Regional Reliability Organization(s), and to the Transmission Planners and Transmission Service Provider(s) that work in its Planning Authority Area."

"TOP-002-2a—Normal Operations Planning

Requirement R11: The Transmission Operator shall perform seasonal, next-day, and current-day Bulk Electric System studies to determine System Operating Limits (SOLs). Neighboring Transmission Operators shall utilize identical SOLs for common facilities. The Transmission Operator shall update these Bulk Electric System studies as necessary to reflect current system conditions; and shall make the results of Bulk Electric System studies available to the Transmission Operators, Balancing Authorities (subject to confidentiality requirements), and to its Reliability Coordinator."

III. STUDY PARTICIPANTS

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Anie	Philip	LIPA	David	Mahlmann	NYISO
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Jalpa	Patel	National Grid	Henry	Wysocki	ConEd
Brian	Gordon	NYSEG	Zahid	Qayyum	ConEd
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IV. SYSTEM REPRESENTATION AND BASE STUDY ASSUMPTIONS

A. System Representation

The representation was developed from the NYISO Data Bank and assumes the forecast winter coincident peak load of 24,533 MW.

Generation Resource Changes
The generator output levels for major units are summarized in Appendix B, and are consistent with typical operation for the period. The inter-Area schedules represented in the study base case are summarized in Appendix A. The following table shows generation retirements and additions since the winter 2010-11:

Retirements		
	Barrett #7	-20 MW
	Ravenswood 3-4	-40 MW
	Westover 8	- 81 MW
	Greenidge 4	-105 MW
	Total Retirements	**- 246 MW**
Additions		
	Upton Solar Farm	5 MW
	Ontario Uprate	6 MW
	Astoria Energy II	617 MW
	Total Additions	**628 MW**

Significant changes since the winter 2010-11 capability period include:

Transmission Facilities Changes

ConEd M29 Project
Stony Ridge Substation
Luther Forest Station Project
Watercure 345/230 kV Transformer Bank in-service
601 NNC in-service
BP 76 Remains out-of-service

The Consolidated Edison M29 project consists of a circuit from Sprain Brook 345 kV substation to a new substation, Academy 345 kV, then to two three-winding 345/138/13.8 transformers and two 138 kV PAR controlled transformers into Sherman Creek 138 kV.

The Luther Forest Station Project is National Grid's station addition project on its 115 kV transmission system between Mohican and North Troy substations (and, subsequently, the Spier Falls and Rotterdam substations) to serve as the supply to a large industrial park. The Project is located in Saratoga County, New York in the Saratoga/Malta area.

The NYSEG/RG&E Stony Ridge Project includes a new Stony Ridge 230 kV substation, which is located on the Canandaigua-Hillside 230 kV line, and a step-down 230/115 kV transformer into a new Sullivan Park 115 kV substation.

The NNC 1385 601 line has returned to service for the winter 2011-12 operating period.

The South Mahwah - Waldwick J3410 line has returned to service for the winter 2011-12 operating period.

The Watercure 345/230-kV transformer bank has returned to service for the winter 2011-12 operating period.

The BP76 remains out-of-service for the winter 2011-12 operating period.

B. Base Study Assumptions

The Siemens PTI PSS™MUST and PSS™E software packages are used to calculate the thermal limits based on Normal and Emergency Transfer Criteria defined in the "NYSRC Reliability Rules for Planning and Operating the New York State Power System". The thermal transfer limits presented have been determined for all transmission facilities scheduled in service during the winter 2011-12 operating period.

The schedules used in the base case power flow for this analysis assumed a net flow of 1,000 MW from Public Service Electric & Gas (PSE&G) to Consolidated Edison via the phase-angle-regulating (PAR) transformers controlling the Hudson – Farragut and Linden – Goethals interconnections, and 1,000 MW on the South Mahwah – Waldwick circuits from Consolidated Edison to PSE&G, controlled by the PARs at Waldwick. The Branchburg – Ramapo 500 kV (5018) circuit is scheduled in accordance with the "Ramapo Phase Angle Regulator Operating Procedure", December 11, 1987. The series reactors on the Dunwoodie – Mott Haven (71 and 72) and the Sprain Brook – W. 49th St. 345 kV cables (M51 and M52) are out of service in the base case. The series reactors on the Sprain Brook – East Garden City 345 kV (Y49) and Gowanus to Farragut (41 and 42) cables are in-service.

V. DISCUSSION

A. Resource Assessment

Load and Capacity Assessment

The forecast peak demand for the winter 2011-12 operating period is 24,533 MW. This forecast is approximately 244 MW (1.0%) higher than the forecast of 24,289 MW for the winter 2010-11 capability period and 3.9% lower than the all-time New York Control Area (NYCA) seasonal peak of 25,541 MW, which occurred on December 20, 2004.

The Installed Capacity (ICAP) requirement for the winter operating period is 28,336 MW based on the NYSRC 15.5% Installed Reserve Margin (IRM) requirement for the winter 2011-12 operating period. NYCA generation capacity for winter 2011-12 is 40,976MW and net external capacity purchases of 965 MW have been secured for the winter period. The combined capacity resources represent a 70.96% margin above the forecast peak demand of 24,533 MW.

NYISO Peak Demand Operational Reserve Margin – Winter 2011-12

NYISO Installed Capacity	+	40,976
Special Case Resources	+	1,882
Net Capacity Purchases and Sales	+	965
Scheduled generation outages	-	2,714
Allowance for unplanned outages	-	2,131
Net capacity for load	=	**38,978**
NYISO Forecast Peak	-	24,533
Available Reserve	=	*14,445*
Operating Reserve Requirement	-	1,800
Net Margin	=	**12,645**

The equivalent forced outage rate for generators in the NYCA is 5.2%, which includes forced outages and de-ratings based on historical performance of all generation. For the winter 2010-11 operating period, the equivalent forced outage rate assumed was 5.23%.

B. Cross-State Interfaces

1. TRANSFER LIMIT ANALYSIS

This report summarizes the results of thermal transfer limit analyses performed on power system representation modeling the forecast peak load conditions for winter 2011-12 capability period. Normal and emergency thermal limits were calculated according to Normal and Emergency Transfer Criteria definitions in the "NYSRC Reliability Rules for Planning and Operating the New York State Power System". Facility ratings applied in the analysis were from the online MW ratings in the EMS, with the exception for Dunwoodie – Shore Rd. (Y50) 345 kV line. The Dunwoodie – Shore Rd. (Y50) 345 kV line uses the 70% loss factor and rapid oil circulation ratings in the operating study and 100% loss factor and rapid oil circulation ratings in the EMS. Facility ratings applied in the analysis are detailed in Appendix D.

Figure 1 presents a comparison of the winter 2011-12 thermal transfer limits to winter 2010-11. Changes in these limits from the previous years are due to changes in the base case load flow generation and load patterns that result in different pre-contingency line loadings, changes in limiting contingencies, or changes in circuit ratings, or line status. Appendix H presents a summary comparison of Cross-State thermal transfer limits between winter 2011-12 and 2010-11, with limiting element/contingency descriptions. Significant differences in these thermal transfer limits are discussed below.

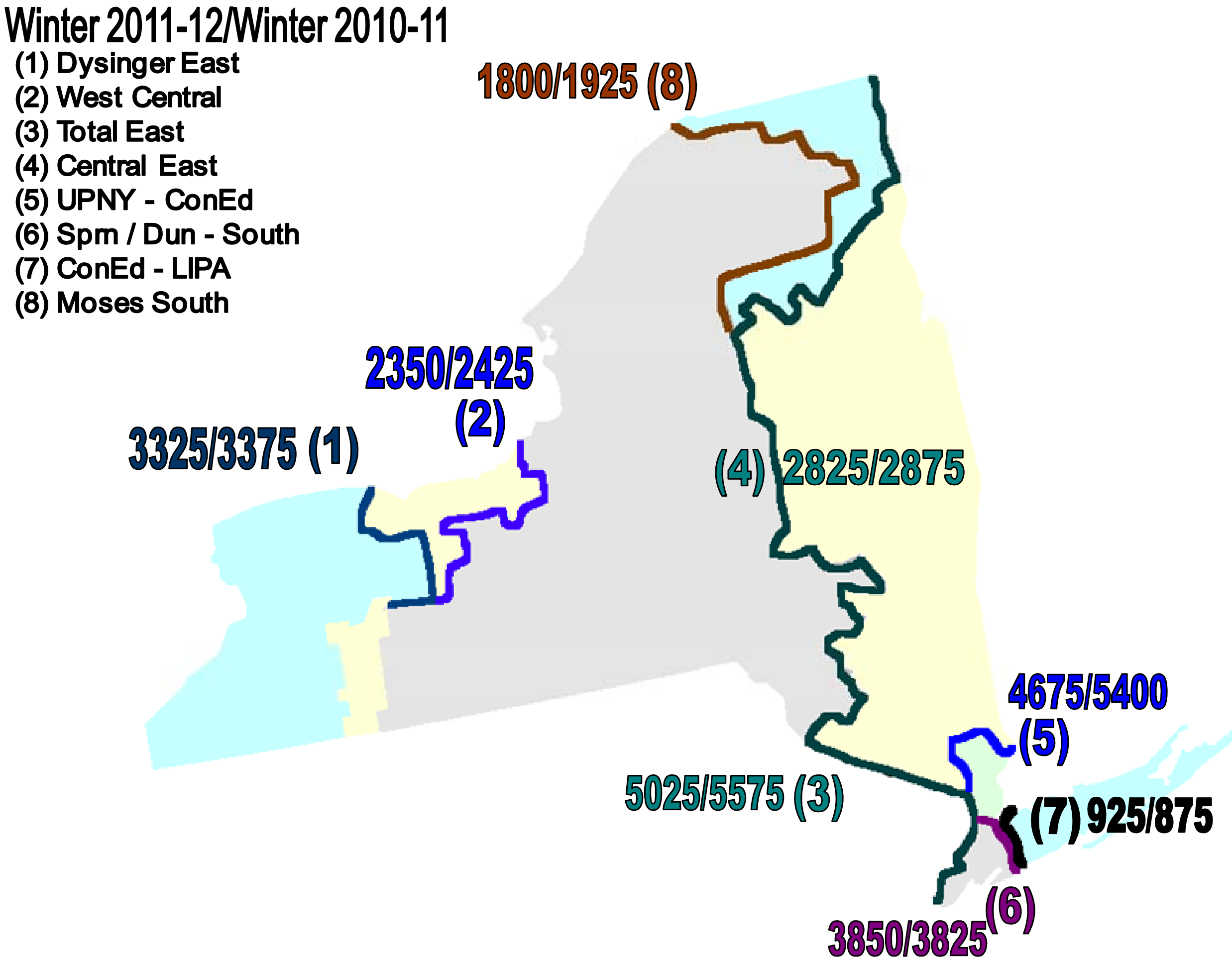

Figure 1 – Cross-State Thermal Transfer Limits

Total East interface thermal transfer limit decreased 550 MW, due to several factors.

- The redistribution of flows in the base case and transfer cases, due to the 1,000 MW ConEd – PSE&G wheel, with the return of the South Mahwah – Waldwick J3410 line.
- The Plattsburgh – Sandbar (PV20) 115 kV PAR controlled line to 0 MW flow.
- The redistribution of base case flows on the 345 kV New York – New England ties to provide a consistent basis in determining the summer and winter transfer limits.

UPNY - ConEd interface thermal transfer limit decreased 725 MW, due to two main factors.

- The redistribution of flows in the base case and transfer cases, due to the 1,000 MW ConEd – PSE&G wheel, with the return of the South Mahwah – Waldwick J3410 line.
- The redistribution of base case flows on the 345 kV New York – New England ties to provide a consistent basis in determining the summer and winter transfer limits.

Moses South interface thermal transfer limit decreased 125 MW. This is due to the reduction on the Plattsburgh – Sandbar (PV20) 115 kV PAR controlled line to 0 MW, along with the load and generation redistribution in northern New York.

2. SENSITIVITY TESTING

The thermal limits presented in Section IV were determined using the base conditions and schedules. The effects of various intra- and inter-Area transfers or generation patterns in the system are presented in Appendix G. Certain graphs indicate that there may not be a measurable sensitivity to the specific variable condition (winter peak load), or the sensitivity may occur at transfer levels above other transfer constraints (e.g., voltage or transient stability limitations). This analysis demonstrates how the particular constraint (thermal transfer limits) may respond to different conditions.

Phase angle regulator schedules may vary from day-to-day. Sensitivity analysis for selected interfaces has been included for the Ramapo and St. Lawrence interconnections. Graphs showing the sensitivity of the interface limit to the PAR schedule are included in Appendix G.

3. WEST WOODBOURNE TRANSFORMER

The Total East interface may be limited at significantly lower transfer levels for certain contingencies that result in overloading of the West Woodbourne 115/69 kV transformer. Should the West Woodbourne tie be the limiting facility, it may be removed from service to allow higher Total East transfers. An over-current relay installed at West Woodbourne protects for contingency overloads.

4. CONED – LIPA TRANSFER ANALYSIS

Normal transfer limits were determined using the base case generation dispatch and PAR settings as described in Appendix B. Emergency limits are dispatch dependant and can vary based on generation and load patterns in the LIPA system.

For emergency transfer limit analysis the PARs controlling the LIPA import were adjusted to allow for maximum transfer capability into LIPA:

ConEd – LIPA PAR Settings	Normal	Emergency
Jamaica – Lake Success 138 kV	-210 MW	105 MW
Jamaica – Valley Stream 138 kV	-107 MW	70 MW
Sprain Brook – E. Garden City 345 kV	635 MW	635 MW
ISO-NE – LIPA PAR Settings		
Norwalk Harbor – Northport 138 kV	100 MW	286 MW

The PAR schedules referenced above and the ConEd - LIPA transfer assessment assume the following loss factors and oil circulation modes in determination of the facility ratings for the 345 kV cables:

Y49 has a 70% loss factor in slow oil circulation mode.
Y50 has a 70% loss factor in rapid circulation mode.

Emergency Transfer via the 138 kV PAR-controlled Jamaica ties between ConEdison and LIPA

Con Edison and LIPA have determined possible emergency transfer levels via the Jamaica - Valley Stream (901) 138 kV and Jamaica - Lake Success (903) 138 kV PAR-controlled ties that could be used to transfer emergency power between the two entities during peak conditions. The emergency transfer levels were calculated in both directions, for system peak load conditions with all transmission lines in service and all generation available for full capacity.

ConEd to LIPA emergency assistance

Based on analysis of historical conditions performed by LIPA and Con Edison, Con Edison anticipates being able to supply approximately 175 MW of emergency transfer from Con Edison to Long Island, if requested, via the ties.

LIPA to ConEd emergency assistance

LIPA anticipates being able to supply approximately 459 MW of emergency transfer from Long Island to Con Edison, if requested, via the ties.

5. TRANSFER LIMITS FOR OUTAGE CONDITIONS

Transfer limits for scheduled outage conditions are determined by the NYISO Scheduling and Market Operations groups. The NYISO Real-Time Dispatch system monitors the EHV transmission continuously to maintain the secure operation of the interconnected system.

6. TRANSIENT STABILITY LIMITS

The interface transfer limits shown in Section IV are the results of a thermal transfer limit analysis only. Transient stability and voltage interface transfer limits for all lines in-service and line outage conditions are summarized and available through the NYISO website located at:

http://www.nyiso.com/public/markets_operations/market_data/reports_info/index.jsp

C. Thermal Transfer Capabilities with Adjacent Balancing Areas

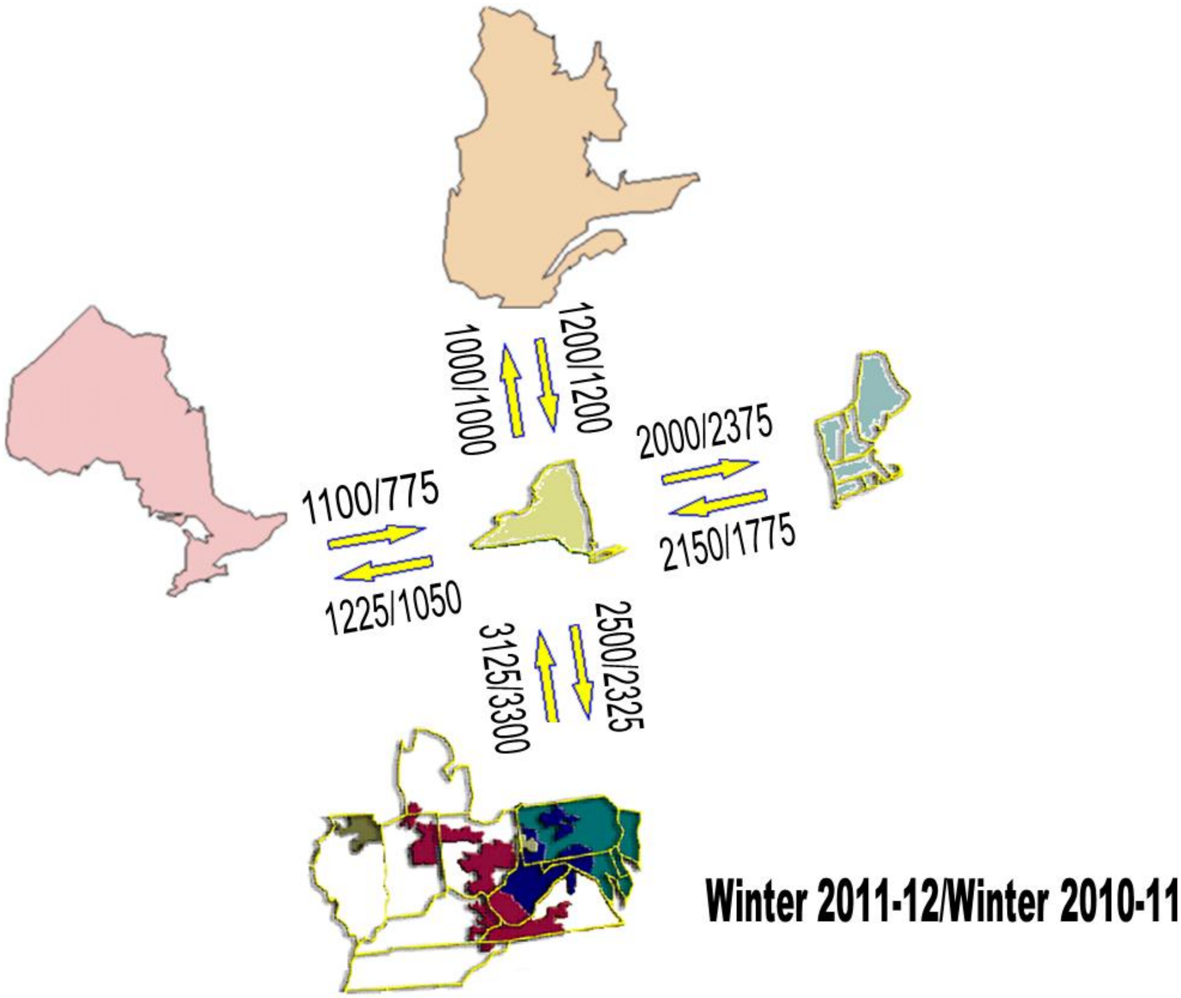

Figure 2 – Inter-Area Thermal Transfer Capabilities

Thermal transfer limits between New York and adjacent Balancing Authority Areas are also determined in this analysis. These transfer limits supplement, but do not change, existing internal operating limits. There may be facilities internal to each system that may reduce the transfer limits between Balancing Authority Areas. Reductions due to these situations are considered to be the responsibility of the respective reliability authority. Some of these potential limitations are indicated in the summary tables by "[Reliability Coordinating] Facility" limits, which supplement the "Direct Tie" limits between the Balancing Authority Areas. Transfer conditions within and between neighboring Balancing Authority Areas can have a significant effect on inter- and intra-Area transfer limits. Coordination between Balancing Authority Areas is necessary to provide optimal transfer while maintaining the reliability and security of the interconnected systems.

PJM – New York interface thermal transfer limit decreased 175 MW. This is mainly due to the generation dispatch, load distribution differences and the return of the Watercure 345/230 kV transformer. There were significant configuration and dispatch changes in PJM between winter 2010/11 and winter 2011/12 analysis.

New York – PJM interface thermal transfer limit increased 175 MW. This is mainly due to the generation dispatch and load distribution differences. There were significant configuration and dispatch changes in PJM between winter 2010/11 and winter 2011/12 analysis.

New England – New York interface thermal transfer limit increased 375 MW, due to several factors. The redistribution of base case flows on the 345 kV New York – New England ties to provide a consistent basis in determining the summer and winter transfer limits, along with the Plattsburgh – Sandbar (PV20) 115 kV PAR controlled line to 0 MW flow.

New York – New England interface thermal transfer limit decreased 375 MW, due to several factors. The redistribution of base case flows on the 345 kV New York – New England ties to provide a consistent basis in determining the summer and winter transfer limits, along with the Plattsburgh – Sandbar (PV20) 115 kV PAR controlled line to 0 MW flow.

Ontario – New York interface thermal transfer limit increased 325 MW. This is due to the reduced Beck – Niagara tie flow, associated with the reduction in the Lake Erie Circulation to provide a consistent basis in determining the summer and winter thermal transfer limits.

1. NEW YORK – ISO NEW ENGLAND ANALYSIS

a) New England Transmission/Capacity Additions

Transmission

New England had a modest number of new transmission facilities installed since the last operating period. None of the new transmission facilities placed into service in New England are relevant to determining NE-NY and NY-NE transfer limits.

Capacity

In the New England Control Area, from September 2010 through January 2011, approximately 190 MW of wind generation is expected in northern New England.

b) Thermal Transfer Limit Analysis

The transfer limits between the NYISO and ISO New England for normal and emergency transfer criteria are summarized in Section 4, Table 2.

c) Cross-Sound Cable

The Cross-Sound Cable is an HVdc merchant transmission facility connecting the New Haven Harbor 345 kV (United Illuminating, ISO-NE) station and Shoreham 138kV (LIPA, NYISO) station. It has a design capacity of 330 MW. This facility is not metered as part of NY-NE interface, and HVdc transfers are independent of transfers between the NYISO and ISO-NE.

d) Smithfield – Salisbury 69kV

CHG&E and Northeast Utilities will operate the Smithfield - Salisbury 69 kV (FV/690) line normally closed. The maximum allowable flow in this line is 28 MVA based on limitations in the Northeast Utilities 69 kV system. When the ISO-NE to NYISO transfer is greater than approximately 400 MW, however, the line will be opened, due to post contingency limits within the Northeast Utilities system. The FV/690 line has directional over-current protection that will trip the FV/690 line in the event of an overload when the flow is into Northeast Utilities, no protection exists that will trip the FV/690 line in the event of an overload when the flow is into NYISO.

e) Northport - Norwalk Harbor Cable Flow

The Northport – Norwalk Harbor cable (1385 NNC 601, 602, and 603) are all in-service and the TTC (Total Transfer Capability) is unchanged from previously accepted values.

f) Whitehall – Blissville 115kV

The phase angle regulator on this circuit will control pre-contingency flow between the respective stations. VELCO, National Grid, ISO-NE and NYISO developed a joint operating procedure. For the winter 2011-12 analyses, the pre-contingency schedule is 0 MW from Blissville (ISO-NE) to Whitehall (NYISO). The scheduled flow on the PAR may be adjusted to protect internal Vermont and New York 115kV transmission for certain 345kV contingency events in southern Vermont.

g) Plattsburgh - Sandbar 115kV

The phase shifting transformer (PST) on this circuit will control pre-contingency flow between the respective stations. VELCO, NYPA, ISO-NE and NYISO developed a joint operating procedure. For the winter 2011-12 analyses, the pre-contingency schedule is 0 MW from Plattsburgh (NYISO) to Sandbar (ISO-NE). The scheduled flow on the PST may be adjusted to protect internal Vermont and New York 115kV transmission for certain transmission contingency events in northern New York, Vermont and New England.

h) Transient Stability Limitations

For certain system configurations, stability performance determines the transfer capability between the Areas. For those instances, the limits have been obtained from the report "1992-1996 NYPP-NEPOOL TRANSFER LIMIT STUDY - OCTOBER 1992." A new study of NYISO-ISO-NE transfer capability through 2009, including transient stability assessment, has been completed since the Spring of 2007. The stability limits are expressed in terms of the transfer on the "Northern Ties", i.e., excluding flow on the Norwalk Harbor – Northport circuit. Stability limits for transfers from New England to New York are a function of the New England MW load level, and include the effect of Northfield and Bear Swamp in the generating and pumping mode.

2. NEW YORK - PJM ANALYSIS

a) Thermal Transfer Limit Analysis

The transfer limits for the New York - PJM interface are summarized in Section IV, Table 3. The phase angle regulating transformers controlling the Branchburg – Ramapo 500 kV circuit are used to maintain flow at the normal rating of the Ramapo 500/345 kV transformer (1000 MW) in the direction of the transfer.

b) Opening of PJM - New York 115 kV Ties as Required

The normal criteria thermal transfer limits presented in Section IV were determined for an all lines in-service condition. The 115kV interconnections between GPU Energy and New York (Warren - Falconer, North Waverly - East Sayre, and Laurel Lake - Westover) may be opened in accordance with NYISO and PJM Operating Procedures provided that this action does not cause unacceptable impact on local reliability in either system. Over-current protection is installed on the Warren - Falconer and the North Waverly - East Sayre 115kV circuits; either of these circuits would trip by relay action for an actual overload condition. There is no overload protection on the Laurel Lake - Westover circuit, but it may be opened by operator action if there is an actual or post-contingency overload condition. However, opening the Laurel Lake – Westover tie could potentially cause local thermal and pre- and post-contingency voltage violations for the 34.5 kV distribution system within New York. Sensitivity analysis performed indicated that the thermal and voltage conditions were exacerbated for conditions that modeled high simultaneous interface flows from NY to PJM and NY to Ontario.

3. ONTARIO – NEW YORK ANALYSIS

a) Thermal Transfer Limit Analysis

The thermal transfer limits between the NYISO and Ontario's Independent Electricity System Operator (IESO) Balancing Areas for normal and emergency transfer criteria are presented in Section 4, Table 4. The thermal transfer limits between NY and Ontario were determined for two scheduled transfers in either direction on the phase angle regulating transformers controlling the L33P and L34P interconnections at St. Lawrence: One transfer at 0 MW and one at 300 MW.

The 300 MW transfer on L33P and L34P is the interconnection flow limit across these ties, as presented in table 5.2 "Interconnection Limits" from the document "Ontario Transmission System" available at:
http://www.ieso.ca/imoweb/monthsYears/monthsAhead.asp

The Beck-Packard (BP76) 230kV tie between Ontario and New York will continue to be out of service in a long-term outage for the 2011/2012 winter period, therefore the direct-tie transfer capability between the two Balancing Areas continues to be reduced. It is anticipated that the voltage regulator in the BP76 tie will return to service at the end of 2012.

Transient Stability Limitations

Transient stability limits for the NYISO - IESO interconnection are reported in "NYPP-OH TRANSIENT STABILITY TESTING REPORT on DIRECT TIE TRANSFER CAPABILITY - OCTOBER 1993" available at:
http://www.nyiso.com/public/webdocs/market_data/reports_info/operating_studies/NOH-1/NYPP-OH_1993.PDF

b) Ontario – Michigan Phase Angle Regulators (PAR)

As of the time of this writing, the required agreements to have all these PARs in service have not been completed; therefore the PARs between Ontario and Michigan in the winter 2011-12 study were modeled as shown in the table below:

Operating conditions			Normal	Emergency
Lambton – St. Clair	L4D	345 kV	bypassed	I/S
Lambton – St. Clair	L51D	230 kV	bypassed	I/S
Keith – Waterman	J5D	230 kV	I/S	I/S
Scott – Bunce Creek	B3N	230 kV	bypassed	bypassed

It is anticipated that all four PARs become available for the next seasonal study in 2012. Once in service, the PARs would help ensure scheduled flows are maintained on the Ontario-Michigan interface.

It is desirable to schedule a transfer of 0 MW between Ontario and Michigan if possible. This will eliminate the impact of the Lake Erie Circulation (LEC) if there is any. Therefore, in service PARs in the emergency conditions were scheduled for our study in such a way to reduce the Ontario-Michigan transfer as close to 0 as possible. A separate study is planned for investigating the impact of LEC on the ON-NY transfer limits.

4. TRANSÉNERGIE–NEW YORK INTERFACE

Thermal transfer limits between TransÉnergie (Hydro-Quebec) and New York are not analyzed as part of this study. Respecting the NYSRC and NYISO operating reserve requirements, the maximum allowable delivery into the NYCA from TransÉnergie on the Chateauguay – Massena (MSC-7040) 765kV tie is limited to 1200 MW. However in real-time the total flow is limited to 1800 MW; the additional flow is a “wheel-through” transaction to another Balancing Authority Area. Maximum delivery from NYCA to Quebec on the 7040 line is 1000 MW.

VI. SUMMARY OF RESULTS – THERMAL TRANSFER LIMIT ANALYSIS

Table 1 – NYISO CROSS STATE INTERFACE THERMAL LIMITS

- Table 1.a
  - Dysinger East
  - West Central
  - UPNY – ConEd
  - Sprain Brook – Dunwoodie So.
  - Coned – LIPA
- Table 1.b – MSC-7040 Flow Sensitivity
  - Central East
  - Total East
  - Moses South

Table 2.a – NYISO to ISO-NE INTERFACE THERMAL LIMITS

- Northport-Norwalk Flow Sensitivity

Table 2.b – ISO-NE to NYISO INTERFACE THERMAL LIMITS

- Northport-Norwalk Flow Sensitivity

Table 3.a – NYISO to PJM INTERFACE THERMAL LIMITS

- 3-115 kV Ties I/S and O/S

Table 3.b – PJM to NYISO INTERFACE THERMAL LIMITS

- 3-115 kV Ties I/S and O/S

Table 4 – NYISO - IESO INTERFACE THERMAL LIMITS

TABLE 1.a

NYISO CROSS-STATE INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

	Dysinger East	West Central	UPNY-ConEd	Sprain Brook-Dunwoodie So.	ConEd-LIPA Transfer Capability
NORMAL	3325(1)	2350(1)	4675(3)	3850(5)	925(7)
EMERGENCY	3600(2)	2625(2)	5125(4)	4150(6)	1525(8)

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	Niagara – Rochester (NR2) 345 kV	@LTE	1745 MW	L/O	AES/Somerset – Rochester (SR1-39) 345 kV
(2)	Niagara – Rochester (NR2) 345 kV	@STE	1904 MW	L/O	AES/Somerset – Rochester (SR1-39) 345 kV
(3)	Leeds – Pleasant Valley (92) 345 kV	@LTE	1783 MW	L/O	Athens – Pleasant Valley (91) 345 kV
(4)	Leeds – Pleasant Valley (92) 345 kV	@STE	1912 MW	L/O	Athens – Pleasant Valley (91) 345 kV
(5)	Dunwoodie – Mott Haven (71) 345 kV	@SCUC$_1$	977 MW	L/O	Dunwoodie – Mott Haven (72) 345 kV
(6)	Dunwoodie – Mott Haven (71) 345 kV	@STE	1125 MW	L/O	Dunwoodie – Mott Haven (72) 345 kV
(7)	Dunwoodie – Shore Rd. (Y50) 345 kV	@LTE	959 MW$_2$	L/O	(Breaker failure @ Sprain Brook 345 kV) Sprain Brook – East Garden City (Y49) 345 kV Sprain Brook – Academy (M29) 345 kV
(8)	Dunwoodie – Shore Rd. (Y50) 345 kV	@NOR	721 MW$_2$		Pre – Contingency Loading

1 The rating used for cable circuits during SCUC reliability analysis is the average of the LTE and STE rating (SCUC Rating).
2 LIPA rating for Y50 circuit is based on 70% loss factor and rapid oil circulation.

TABLE 1.b

NYISO CROSS-STATE INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

	MSC-7040 FLOW HQ->NY 400 MW	MSC-7040 FLOW 0 MW	MSC-7040 FLOW NY->HQ 400 MW
CENTRAL EAST			
NORMAL	2850(1)	2825(1)	2800(1)
EMERGENCY	3200(2)	3200(2)	3175(2)
TOTAL EAST			
NORMAL	5025(3)	5025(3)	5025(3)
EMERGENCY	6300(4)	6300(4)	6275(4)
MOSES SOUTH			
NORMAL	2175(5)	1800(5)	1450(5)
EMERGENCY	2675(6)	2200(6)	1725(6)

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	New Scotland – Leeds (93) 345 kV	@LTE	1692 MW	L/O	New Scotland – Leeds (94) 345 kV
(2)	New Scotland – Leeds (93) 345 kV	@STE	1912 MW	L/O	New Scotland – Leeds (94) 345 kV
(3)	Rock Tavern – Ramapo (77) 345 kV	@LTE	2010 MW	L/O	Roseton – East Fishkill (305) 345 kV East Fishkill 345/115 kV Transformer
(4)	Rock Tavern – Ramapo (77) 345 kV	@STE	2390 MW	L/O	Roseton – East Fishkill (305) 345 kV
(5)	Adirondack – Porter (12) 230 kV	@LTE	478 MW	L/O	(Tower MMS1&2) Massena – Moses East (MMS1) 230 kV Massena – Moses East (MMS2) 230 kV
(6)	Massena – Moses East (MMS1 or MMS2) 230 kV	@STE	1404 MW	L/O	Massena – Moses East (MMS2 or MMS1) 230 kV

NOTE: Some transfers may be voltage/stability limited.

TABLE 2.a

NYISO to ISO-NE INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

New York to New England	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
		Northport –Norwalk @ 100MW	
NORMAL	2000(1)	3075(3)	2375(7)
EMERGENCY	2325(2)	4025(4)	2375(8)
		Northport –Norwalk @ 0 MW	
NORMAL	2000(1)	3125(3)	2375(7)
EMERGENCY	2325(2)	4025(4)	2375(8)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Pleasant Valley – Long Mountain (398) 345 kV	@LTE	1476 MW	L/O	Millstone G3 24.0 kV
(2)	Pleasant Valley – Long Mountain (398) 345 kV	@STE	1633 MW	L/O	Millstone G3 24.0 kV
(3)	Reynolds Rd – Greenbush (9) 115 kV	@LTE	398 MW	L/O	Leeds – New Scotland (93) 345 kV New Scotland – Alps (2) 345 kV Edic – New Scotland (14) 345 kV New Scotland 345/115 Transformer
(4)	Reynolds Rd – Greenbush (9) 115 kV	@STE	398 MW	L/O	Pleasant Valley – Long Mountain (398) 345 kV
(7)	Pleasant – Blanford (1421) 115 kV	@STE	167 MW	L/O	Northfield – Ludlow (354) 345 kV
(8)	Pleasant – Blanford (1421) 115 kV	@STE	167 MW	L/O	Northfield – Ludlow (354) 345 kV

NOTE: Northport – Norwalk Harbor flow is positive in the direction of transfer.
The Northport – Norwalk Harbor (NNC) line is no longer part of the NY-NE Interface Definition

TABLE 2.b.1

ISO-NE to NYISO INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

New England to New York	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
		Norwalk –Northport @ 0MW	
NORMAL	2150 (1)		2025 (5)
EMERGENCY	2450 (2)		2025 (5)
		Norwalk –Northport @ 100MW	
NORMAL	2250 (1)		2025 (5)
EMERGENCY	2550 (2)		2025 (5)
		Norwalk–Northport @ 200MW	
NORMAL	2025 (3)		2050 (5)
EMERGENCY	2275 (4)		2050 (5)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Pleasant Valley – Long Mountain (398) 345 kV	@LTE	1476 MW	L/O	Alps –Berkshire (393) 345 kV Berkshire – Northfield Mount (312) 345 kV Berkshire 345/115 kV Transformer
(2)	Pleasant Valley – Long Mountain (398) 345 kV	@STE	1633 MW	L/O	Alps –Berkshire (393) 345 kV
(3)	Northport – Norwalk Harbor (NNC) 138 kV	@LTE	597 MW	L/O	Pleasant Valley – Long Mountain (398) 345 kV Pleasant Valley – East Fishkill (F37) 345 kV
(4)	Northport – Norwalk Harbor (NNC) 138 kV	@STE	641 MW		Pleasant Valley – Long Mountain (398) 345 kV
(5)	Norwalk Junction – Archers Lane (3403C) 345 kV	@LTE	922 MW	L/O	Long Mountain – Frost Bridge (352) 345 kV

NOTE: Northport – Norwalk Harbor flow is positive in the direction of transfer.
The Northport – Norwalk Harbor (NNC) line is no longer part of the NY-NE Interface Definition

TABLE 3.a

NYISO to PJM INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

NYISO to PJM	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	2025 (1)	2400 (5)	2775 (9)
3-115-O/S	2500 (3)	2775 (7)	2225 (9)
EMERGENCY	2025 (2)	2575 (6)	2775 (10)
3-115-O/S	2600 (4)	2875 (8)	2225 (10)

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	East Sayre – North Waverly (966) 115 kV	@LTE	139 MW	L/O	Hillside – East Towanda (70) 230 kV
(2)	East Sayre – North Waverly (966) 115 kV	@STE	139 MW	L/O	Hillside – East Towanda (70) 230 kV
(3)	Hillside – East Towanda (70) 230 kV	@LTE	564 MW	L/O	Susquehanna G1
(4)	Hillside – East Towanda (70) 230 kV	NORM	512 MW		Pre-Contingency Loading
(5)	Goudey – Oakdale (939) 115 kV	@LTE	321 MW	L/O	Hillside – East Towanda (70) 230 kV
(6)	Goudey – Oakdale (939) 115 kV	@STE	352 MW	L/O	Hillside – Watercure (69) 230 kV
(7)	Goudey – South Owego (961) 115 kV	@LTE	157 MW	L/O	Hillside – Watercure (69) 230 kV
(8)	Goudey – South Owego (961) 115 kV	@STE	167 MW	L/O	Hillside – Watercure (69) 230 kV
(9)	Towanda – North Meshoppen 115 kV	@LTE	182 MW	L/O	East Towanda – North Meshoppen 230 kV
(10)	Towanda – North Meshoppen 115 kV	@STE	182 MW	L/O	East Towanda – North Meshoppen 230 kV

NOTE: Emergency Transfer Capability Limits may have required line outages as described in Section III.C.2. PAR schedules have been adjusted in the direction of transfer.

TABLE 3.b

PJM to NYISO INTERFACE THERMAL LIMITS - WINTER 2011-12
ALL LINES I/S

PJM to NYISO	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	2175(1)	2850(5)	2800(9)
3-115-O/S	3125(3)	2950(7)	3500(11)
EMERGENCY	2400(2)	2925(6)	2800(10)
3-115-O/S	3125(4)	3050(8)	3500(12)

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	Falconer – Warren (171) 115 kV	@LTE	133 MW	L/O	Erie South Transformer
(2)	Falconer – Warren (171) 115 kV	@STE	153 MW	L/O	Erie East – Erie South East (69) 230 kV
(3)	Watercure - Homer City (30) 345 kV	@LTE	927 MW	L/O	Stolle – Homer City (37) 345kV
(4)	Watercure - Homer City (30) 345 kV	@STE	927 MW	L/O	Stolle – Homer City (37) 345kV
(5)	Watercure 345/230 Transformer	@LTE	590 MW	L/O	Oakdale – Watercure (31) 345 kV
(6)	Watercure 345/230 Transformer	@STE	600 MW	L/O	Oakdale – Watercure (31) 345 kV
(7)	North Waverly – Lounsberry (962) 115 kV	@LTE	157 MW	L/O	Oakdale – Watercure (31) 345 kV
(8)	North Waverly – Lounsberry (962) 115 kV	@STE	167 MW	L/O	Oakdale – Watercure (31) 345 kV
(9)	Towanda – East Sayre (ETS) 115 kV	@LTE	131 MW	L/O	Hillside – East Towanda (70) 230 kV
(10)	Towanda – East Sayre (ETS) 115 kV	@STE	131 MW	L/O	Hillside – East Towanda (70) 230 kV
(11)	Erie East – Erie South East (69) 230 kV	@LTE	640 MW	L/O	Stolle – Homer City (37) 345kV
(12)	Erie East – Erie South East (69) 230 kV	@STE	640 MW	L/O	Stolle – Homer City (37) 345kV

NOTE: Emergency Transfer Capability Limits may have required line outages as described in Section III.C.2. PAR schedules have been adjusted in the direction of transfer.

TABLE 4.a

NYISO - IESO INTERFACE THERMAL LIMITS - WINTER 2011-12
BP76 O/S

	DIRECT TIE	NYISO FACILITY	IESO FACILITY	DIRECT TIE	NYISO FACILITY	IESO FACILITY
Ontario to New York		**L33/34P @ 0 MW**			**L33/34P @ 300 MW**	
NORMAL	1975[(1)]	1100[(3)]		2275[(1)]	1475[(3)]	
EMERGENCY	2425[(2)]	1425[(4)]		2700[(2)]	1875[(4)]	
New York to Ontario		**L33/34P @ 0 MW**			**L33/34P @ 300 MW**	
NORMAL	1225[(5)]		450[(8)]	1525[(5)]		750[(8)]
EMERGENCY	1700[(6)]		1050[(9)]	1875[(6)]		1150[(9)]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Beck – Niagara (PA27) 230 kV	@LTE	540 MW	L/O	Beck – Niagara (PA 302) 345 kV
(2)	Beck – Niagara (PA27) 230 kV	@STE	685 MW	L/0	Beck – Niagara (PA301) 345 kV
(3)	Niagara – Rochester (NR-2) 345 kV	@LTE	1745 MW	L/O	AES/Somerset – Rochester (SR1-39) 345 kV
(4)	Niagara – Rochester (NR-2) 345 kV	@STE	1904 MW	L/O	AES/Somerset – Rochester (SR1-39) 345 kV
(5)	Beck – Niagara (PA27) 230 kV	@LTE	540 MW	L/O	Beck – Niagara (PA 302) 345 kV Beck #2 GS15
(6)	Beck – Niagara (PA27) 230 kV	@NOR	480 MW		Pre – Contingency Loading
(8)	Q30M 220 kV	@STE	450 MVA	L/O	Q24HM+Q29HM
(9)	Q29 HM 220 kV	@NOR	507 MVA		Pre-Contingency Loading