NYISO OPERATING STUDY

WINTER 2008-09

Prepared by
Transmission Studies Staff
New York Independent System Operator, Inc.

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NYISO OPERATING STUDY - WINTER 2008-09

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 2008-09 capability period. This analysis indicates that, for the Winter 2008-09 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. 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 25,293 MW. Other NPCC Balancing Authority Areas and adjacent Regional representations were obtained from RFC-NPCC Winter 2008-09 Reliability Assessment power flow base case.

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 2007-08:

Retirements		
Lovett 5		185.2 MW
Ogdensburg		76.7 MW
Russell 3		48.5 MW
Russell 4		80.2 MW
Onondaga		87.1 MW
	Total Retirements	**477.7 MW**
Additions		
Gilboa 1 Uprate		30 MW
Clinton Wind Farm		100 MW
Bliss Wind Farm		100 MW
Ellenburg Wind Farm		80 MW
	Total Additions	**310 MW**

Significant changes since the Winter 2007-08 capability period include:

Transmission Facilities Changes
Re-conductor Northport – Norwalk Harbor 1385 Cable (NNC 601, 602, 603)
Watercure 345/230 kV Transformer Bank Outage
Beck-Packard 230 kV (BP76) Tie-Line Outage
Millwood 240 MVAr (Two 120 MVar) Capacitor Bank Installation

The new three-circuit Northport-Norwalk Harbor 1385 Cable replaces the previous single-circuit and spare cable. The new cable will be operated respecting the same ratings as the previous cable.

The Watercure 345/230 kV transformer failed on January 30, 2008. NYSEG is considering options for replacing the transformer, but it is expected to be out of service for the duration of the Winter 2008-09 operating period. The transformer outage does not significantly impact thermal transfer limits analyzed in this study. However the outage will impact the voltage performance of the 230 kV transmission path from Stolle Road to Watercure. During peak load conditions reactive power normally flows through the transformer from the 345 kV system, which provides voltage support to the 230 kV system. Without this connection to the 345 kV system, low voltage at Watercure 230 kV may be limiting under the same system conditions with the bank in-service. The NYISO and NYSEG are currently conducting voltage analyses for the Watercure 345/230 kV transformer bank outage.

The Millwood capacitor bank was modeled in the case for winter peak conditions as it was expected to be in operation this winter. The capacitor bank has been delayed until Q1 2009. That delay has no impact on the thermal limit analyses performed in this study.

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 2008-09 period.

The schedules used in the base case powerflow for this analysis assumed a net flow of 1000 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 1000 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. These schedules are consistent with the scenarios developed in the RFC-NPCC Inter-Regional Reliability Assessment for Winter 2008-09, and the NERC/MMWG Winter 2008-09 power flow base cases. The series reactors on the Dunwoodie – Mott Haven (71 and 72) and the Sprain Brook – W. 49th St. 345kV cables (M51 and M52) are out of service in the base case. The series reactors on the Sprain Brook – East Garden City 345kV (Y49) and Gowanus to Farragut (41 and 42) cables are in-service.

III. DISCUSSION

A. Resource Assessment

Load and Capacity Assessment

The forecast peak demand for the Winter 2008-09 capability period is 25,293 MW. This forecast is approximately 31 MW (0.2%) lower than the forecast of 25,324 MW for the Winter 2007-08 capability period, and 0.97% 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 period is 38,880 MW based on the NYSRC 15% Installed Reserve Margin (IRM). NYCA generation capacity for Winter 2008-09 is 40,226 MW and net external capacity purchases of 80 MW have been secured for the winter period. The combined capacity resources represent a 59 % margin above the forecast peak demand of 25,293 MW.

NYISO Peak Demand Operational Reserve Margin– Winter 2008-09

NYISO Installed Capacity	+	38,880
Net Capacity Purchases and Sales	+	80
Scheduled generation outages	-	2,845
Allowance for unplanned outages	-	1,842
Net capacity for load	=	**34,273**
NYISO Forecast Peak	-	25,293
Available Reserve	=	*8,980*
Operating Reserve Requirement	-	1,800
Net Margin	=	**7,180**

The equivalent forced outage rate for generators in the NYCA is 4.7%, which includes forced outages and de-ratings based on historical performance of all generation. For the Winter 2007-08 period, the equivalent forced outage rate assumed was 6.7%.

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 2008-09 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, and are detailed in Appendix D.

Figure 1 presents a comparison of the Winter 2008-09 thermal transfer limits to Winter 2007-08. 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 2008-09 and 2007-08, with limiting element/contingency descriptions. Significant differences in these thermal transfer limits are discussed below.

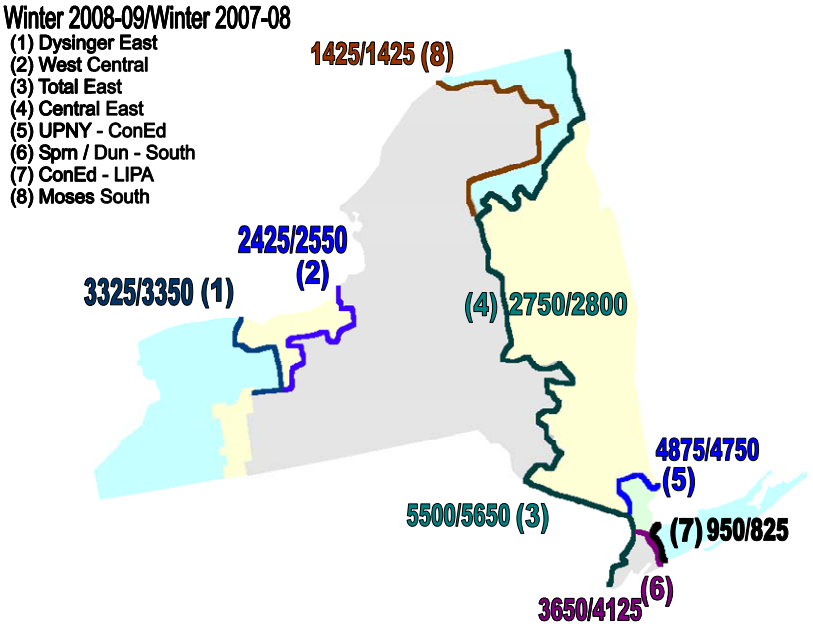

Figure 1 – Cross-State Thermal Transfer Limits

Sprain Brook – Dunwoodie South interface limit decreased 475 MW. The majority of the difference is the result of changes in the Dunwoodie - Mott Haven (71, 72) cable ratings (decreased by 124 MW).

New England – New York interface limit decreased 750 MW due to the 1385 NNC (601, 602, 603) Northport-Norwalk Harbor cable returning in-service this winter operating period. The NNC is the limiting element in the New England – New York interface.

New York – Ontario interface limit decreased 250 MW as a result of the BP76 line out-of-service for this winter operating period.

New York – PJM interface limit decreased 525 MW. Approximately half of the difference is the result of a change in continuous rating of the Erie East– South Ripley (69) tie-line.

2. ATHENS SPS

In January 2008 a Special Protection System (SPS) was placed in-service, which affected the thermal constraint on the Leeds to Pleasant Valley 345 kV transmission corridor. The SPS is designed to reject generation at the Athens combined-cycle plant if either the Leeds to Pleasant Valley 345 kV (92) circuit or the Athens to Pleasant Valley 345kV (91) circuit are out-of-service and the flow on the remaining circuit is above the LTE rating. Generation at Athens will be rejected until the flow is below the LTE rating, the out-of-service circuit recloses, or the remaining circuit trips. This SPS is expected to be active when there is generation on-line at the Athens station, and will allow the NYCA transmission system to be secured to the STE rating of the 91 line for the loss of the 92 line, and vice-versa, for normal operating conditions. The SPS increases the normal thermal limit to match the emergency thermal limit across the UPNY-ConEd operating interface when the 91 or 92 are the limiting circuit. The Table 1 "Emergency" limit for the UPNY-ConEd interface can be interpreted as the "Normal" limit, when the Athens SPS is active.

3. 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.

4. 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 115/69kV transformer. Should the West Woodbourne tie be the limiting facility, it may be removed from service to allow higher Total-East transfers. An overcurrent relay at West Woodbourne to protects for contingency overloads.

5. 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 138kV	-210 MW	105 MW
Jamaica – Valley Stream 138kV	-107 MW	70 MW
Sprain Brook – E. Garden City 345kV	693 MW	693 MW
ISO-NE – LIPA PAR Settings		
Norwalk Harbor – Northport 138kV	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 100% loss factor in rapid circulation mode.

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

Con Edison and LIPA have determined possible emergency transfer levels via the Jamaica - Valley Stream (901) 138kV and Jamaica - Lake Success (903) 138kV 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.

6. 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.

7. TRANSIENT STABILITY LIMITS

The thermal interface limits in Section IV do not include the results of transient stability testing. The maintenance outage transient stability and voltage stability interface limits for all lines in-service are summarized and available through the NYISO website located at:

http://www.nyiso.com/public/webdocs/market_data/reports_info/oper_studies_sys_perf_reports/summary_nyiso_operating_limits.pdf

C. Thermal Transfer Capabilities with Adjacent Balancing Areas

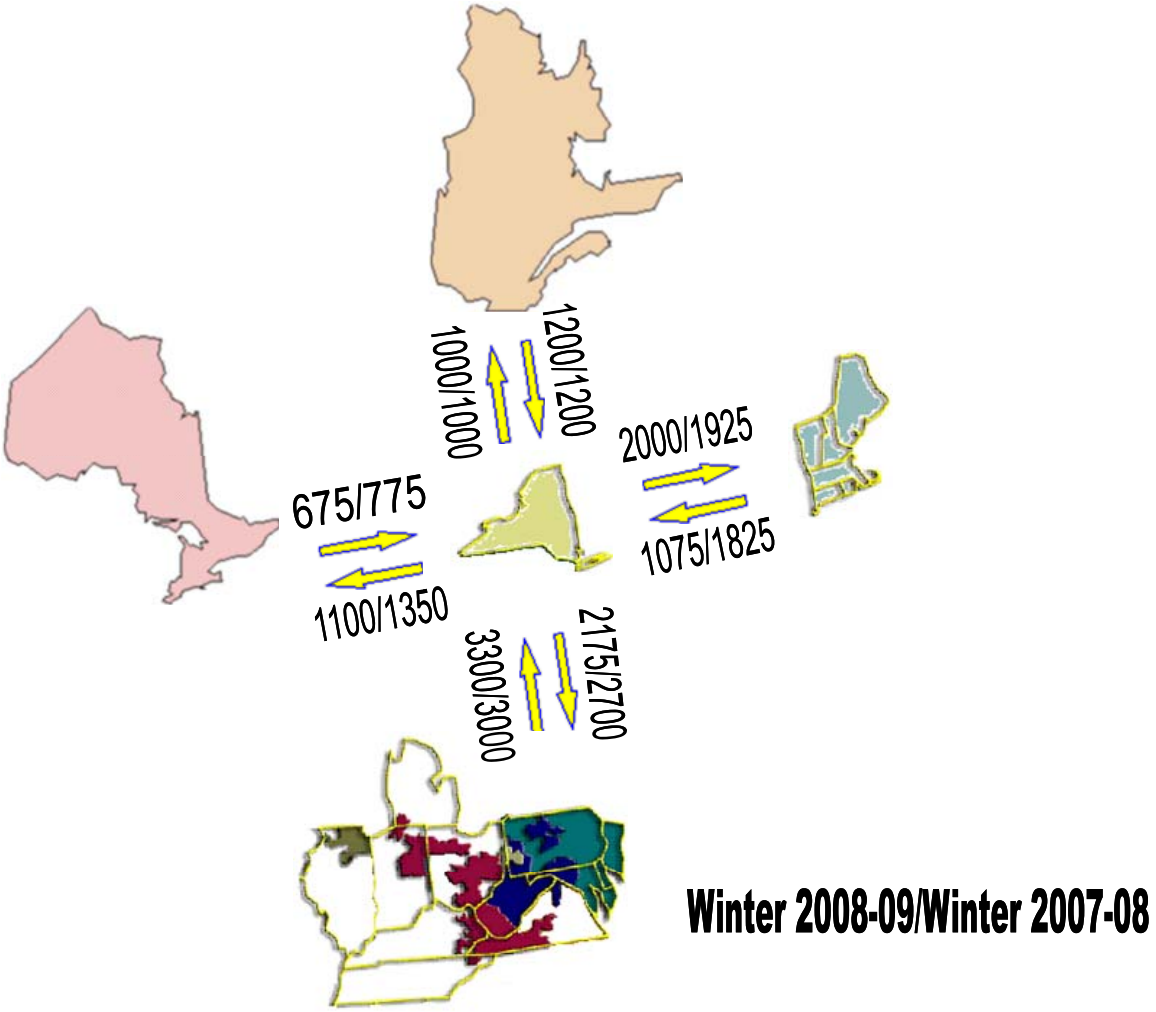

Figure 2 – Inter-Area Thermal Transfer Capabilities

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.

1. NEW YORK – ISO NEW ENGLAND ANALYSIS

a) New England Transmission/Capacity Additions

Transmission

A new 345 kV transmission loop is expected to be placed in service from the new 345 kV stations at Beseck, East Devon and Singer connecting to Norwalk in southwest Connecticut.

Once in-service at the end of 2008, this transmission loop will complete the SWCT Phase II project. Also parallel 115 kV cables will be placed in service between the Glenbrook and Norwalk substation in Norwalk, CT. The 1385 Long Island undersea cable has been replaced with those sections renamed 1385 NNC 601, 602 and 603. The STATCOM at Glenbrook is expected to be only capable for 50% (75 MVAr) compensation though most of 2009. In Vermont, a synchronous condenser and PAR have been added at Granite to the F206 230 kV circuit.

Capacity

In the New England Control Area, from September 2008 through January 2009, no additional capacity has been added.

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 open during the summer period due to post-contingency limits within the Northeast Utilities system. When the ISO-NE to NYISO transfer is less than approximately 400 MW, however, the line may be closed. When closed, the maximum allowable flow on this line is 28 MVA based on limitations in the Northeast Utilities 69 kV system. The FV/690 line has directional over-current protection that will trip the line in the event of an overload when the flow is into Northeast Utilities. This facility will not limit transfers between NYISO and ISO-NE.

e) Northport - Norwalk Harbor Cable Flow

The Northport – Norwalk Harbor cable (1385 NNC 601, 602, and 603) has been replaced with (3) XLPE cables and carry a present TTC (Total Transfer Capability) of 100 MW in either direction pending the replacement of the Norwalk Harbor 8X transformer on the New England side.

f) Whitehall – Blissville 115kV

The phase angle regulator on this circuit will control pre-contingency flow between the respective stations. VELCo, NationalGrid, ISO-NE and NYISO are developing a joint operating procedure. For the Winter 2008-09 analyses, the pre-contingency schedule is 50 MW from Blissville (ISO-NE) to Whitehall (NYISO). The scheduled flow may be adjusted to protect the NationalGrid local 115kV transmission south of Whitehall for 345 kV contingency events in southern Vermont.

g) 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 - Goudey) 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 - Goudey circuit, but it may be opened by operator action if there is an actual or post-contingency overload condition. However, opening the Laurel Lake – Goudey 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 limits between the New York ISO and the Independent Electricity System Operator (IESO-Ontario) Areas for normal and emergency transfer criteria are presented in Section 4, Table 4. The transfer limits are determined for two assumed schedules on the phase angle regulating transformers controlling the L33P and L34P interconnections at St. Lawrence.

The thermal limit from Ontario to New York, with respect to NYISO facilities, has decreased 100 MW compared to Winter 2007-08. The direct tie interface limits decreased about 500 MW compared to Winter 2007-08. This is largely due to the forced outage of BP76 as well as changes in limiting element/limiting contingency and pre contingency loading: The Winter 2008-09 case has about 298 MW of pre-contingency flow from New York through Ontario to Michigan but 338 MW of pre-contingency flow in the Winter 2007-08 base case.

The thermal limit from New York to Ontario, with respect to IESO facilities, has increased

approximately by approximately 600 MW for normal transfer. Changes in IESO dispatch cause this increase.

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."

b) Ontario – Michigan PARs

Phase Angle Regulating transformers are in service on the interconnections between Ontario and Michigan:

Lambton – St.Clair 345kV	L4D
Lambton – St.Clair 230kV	L51D
Keith – Waterman 230kV	J5D

The phase angle regulators controlling the Lambton – St Clair circuits (L4D and L51D) are in-service and are represented in the powerflow base case holding fixed angle (free-flow MW). These PARs will not be available to regulate power flow during normal operation on the Ontario – Michigan interface until an operating agreement among the parties has been finalized. Ontario and Michigan currently have an agreement in place to operate L4D and L51D off neutral tap in emergency conditions. The existing PAR controlling the Keith – Waterman (J5D) circuit is controlling a schedule of 0 MW in the base case.

The Bunce Creek – Scott 230 kV circuit B3N has been returned to service. The phase angle regulating transformer controlling this circuit failed and a replacement is expected in 2010.

c) Generation Rejection for Loss of L33P/L34P-St. Lawrence Ties

The interface limits were determined for a particular load, transmission and generation pattern. When system conditions vary from those forecast in the study, normal interface limits may vary. Generation rejection special protection systems (SPSs) are available at Beauharnois, St. Lawrence/Saunders, and St. Lawrence/FDR to reject generation for the loss of the L33P and/or L34P interconnections. Ontario or NYPA operators consistent with system conditions can select these SPSs.

Of the two circuits, L33P is more limiting. At 40 degrees phase shift the limiting STE rating is 363 MVA (PAR Rating). The outage distribution factor for the loss of L34P is 0.538 and based on this, the maximum pre-contingency flow on each circuit should not exceed 236 MW.

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.

IV. 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

- L33/34P Flow Sensitivity

TABLE 1.a

NYISO CROSS-STATE INTERFACE THERMAL LIMITS - WINTER 2008-09
ALL LINES I/S

	Dysinger East	West Central	UPNY-ConEd$_1$	Sprain Brook-Dunwoodie So.	ConEd-LIPA
NORMAL	3325[(1)]	2425[(1)]	4875[(3)]	3650[(5)]	950[(7)]
EMERGENCY	3600[(2)]	2700[(2)]	5325[(4)]	3900[(6)]	1525[(8)]

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	Niagara – Rochester (NR2) 345 kV	@LTE	1745 MW	L/O	AES/Somerset – Rochester (SR-1) 345 kV
(2)	Niagara – Rochester (NR2) 345 kV	@STE	1904 MW	L/O	AES/Somerset – Rochester (SR-1) 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$_2$	992 MW	L/O	Dunwoodie – Mott Haven (72) 345 kV
(6)	Dunwoodie – Mott Haven (71) 345 kV	@STE	1113 MW	L/O	Dunwoodie – Mott Haven (72) 345 kV
(7)	Dunwoodie – Shore Rd. (Y50) 345 kV	@LTE	925 MW$_3$	L/O	(Breaker failure @ Sprain Brook 345 kV) Sprain Brook – East Garden City (Y49) 345 kV Sprain Brook – Dunwoodie North (S6) 345/138 kV transformer
(8)	Dunwoodie – Shore Rd. (Y50) 345 kV	@NOR	664 MW$_3$		Pre-Contingency Loading

1 See Section III.B.2 for discussion on Athens SPS.
2 The rating used for cable circuits during SCUC reliability analysis is the average of the LTE and STE rating (SCUC Rating).
3 LIPA rating for Y50 circuit is based on 100 % loss factor and rapid oil circulation.

NOTE: Some transfers may be voltage/stability limited. Thermal Transfers on the Dysinger East Interface may be limited by underlying 115 kV facilities.

TABLE 1.b

NYISO CROSS-STATE INTERFACE THERMAL LIMITS - WINTER 2008-09
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	2775(2)	2750(2)	2600(5)
EMERGENCY	3150(4)	3025(3)	2625(6)
TOTAL EAST			
NORMAL	5425(2)	5500(1)	5500(1)
EMERGENCY	6175(4)	6200(3)	5550(6)
MOSES SOUTH			
NORMAL	1750(7)	1425(7)	1075(7)
EMERGENCY	2250(8)	1950(8)	1625(8)

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	Oakdale - Fraser (32) 345 kV	@LTE	1380 MW	L/O	(Tower 40 &41) Marcy – Coopers Corners (UCC2-41) 345kV Edic - Fraser (EF24-40) 345 kV
(2)	New Scotland – Leeds (93) 345 kV	@LTE	1692 MW	L/O	New Scotland – Leeds (94) 345 kV
(3)	Oakdale - Fraser (32) 345kV	@STE	1380 MW	L/O	Edic - Fraser (EF24-40) 345kV
(4)	New Scotland – Leeds (93) 345 kV	@STE	1912 MW	L/O	New Scotland – Leeds (94) 345 kV
(5)	Marcy – Edic 345 kV	@LTE	1792 MW	L/O	Marcy – Volney 345 kV Scriba – Volney 345 kV
(6)	Marcy – Edic 345 kV	@STE	1792 MW	L/O	Marcy – Volney 345 kV
(7)	Moses - Adirondack 230 kV	@LTE	359 MW	L/O	Chateauguay–Massena (MSC-7040) 765 kV Massena – Marcy (MSU-1) 765 kV and TransÉnergie delivery
(8)	Moses - Adirondack 230 kV	@STE	478 MW	L/O	Chateauguay–Massena (MSC-7040) 765 kV Massena – Marcy (MSU-1) 765 kV and TransÉnergie delivery

NOTE: Some transfers may be voltage/stability limited.

TABLE 2.a

NYISO to ISO-NE INTERFACE THERMAL LIMITS - WINTER 2008-09
ALL LINES I/S

New York to New England	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
		Northport –Norwalk @ 100MW	
NORMAL	1700 (1)	1925 (3)	2325 (5)
EMERGENCY	2025 (2)	1925 (4)	2700 (6)
		Northport –Norwalk @ 0 MW	
NORMAL	2000 (1)	1875 (3)	2325 (5)
EMERGENCY	2325 (2)	1875 (4)	2700 (6)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Norwalk Harbor - Northport (1385) 138kV	@LTE	363 MW	L/O	Long Mountain – Pleasant Valley (398) 345kV
(2)	Norwalk Harbor - Northport (1385) 138kV	@STE	428 MW	L/O	Long Mountain – Pleasant Valley (398) 345kV
(3)	Greenbush – Reynolds Rd 115 kV	@LTE	318 MW	L/O	Alps – New Scotland (2) 345 kV
(4)	Greenbush – Reynolds Rd 115 kV	@STE	318 MW	L/O	Alps – New Scotland (2) 345 kV
(5)	Berkshire – Northfield Mount (312) 345 kV	@LTE	1345 MW	L/O	Millstone – Haddam – Beseck (348) 345 kV
(6)	Berkshire – Northfield Mount (312) 345 kV	@STE	1793 MW	L/O	Millstone – Haddam – Beseck (348) 345 kV

NOTE: Northport – Norwalk Harbor flow is positive in the direction of transfer.

TABLE 2.b

ISO-NE to NYISO INTERFACE THERMAL LIMITS - WINTER 2008-09
ALL LINES I/S

New England to New York	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
		Norwalk –Northport @ 100MW	
NORMAL	1075[1]		1500 [5]
EMERGENCY	1400[2]		2100 [6]
		Norwalk–Northport @ 200MW	
NORMAL	750[1]	2925 [3]	1500 [5]
EMERGENCY	1050[2]	3825 [4]	2100 [6]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Norwalk Harbor - Northport (NNC) 138 kV	@LTE	363 MW	L/O	(Breaker failure @ Pleasant Valley 345 kV) Pleasant Valley - Fishkill (F36) 345 kV Long Mountain – Pleasant Valley (398) 345 kV
(2)	Norwalk Harbor - Northport (NNC) 138 kV	@STE	428 MW	L/O	Long Mountain – Pleasant Valley (398) 345 kV
(3)	Alps –New Scotland. 345 kV	@LTE	1410 MW	L/O	Long Mountain – Frost Bridge 345 kV
(4)	Alps – Reynolds Rd. 345 kV	@STE	796 MW	L/O	Alps – New Scotland (2) 345 kV
(5)	Berkshire – Northfield Mount (312) 345 kV	@LTE	1345 MW	L/O	Long Mountain – Pleasant Valley (398) 345 kV
(6)	Berkshire – Northfield Mount (312) 345 kV	@STE	1793 MW	L/O	Long Mountain – Pleasant Valley (398) 345 kV

NOTES:

Norwalk Harbor – Northport schedule is positive in the direction of transfer.

The above limits reflect the following system condition:

- Existing (year 2008; 402 MVA) Norwalk Harbor auto transformer is in-service.
- SWCT Phase II 345kV project is NOT yet in-service.

TABLE 3.a

NYISO to PJM INTERFACE THERMAL LIMITS - WINTER 2008-09
ALL LINES I/S

NYISO to PJM	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1425[(1)]	1275[(3)]	2250[(4)]
3-115-O/S	2175[(2)]	2150[(8)]	2075[(4)]
EMERGENCY	1425[(5)]	1350[(6)]	2500[(7)]
3-115-O/S	2175[(9)]	2350[(10)]	2275[(7)]

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	E. Sayre – North Waverly 115 kV	@LTE	139 MW	L/O	Hillside – East Tawanda 230 kV
(2)	Hillside – East Tawanda 230 kV	@LTE	564 MW	L/O	Forest – Glade 230 kV Glade – Lewis 230 kV Lewis 230/115 kV transformer
(3)	Oakdale – Goudey 115 kV	@LTE	239 MW	L/O	Fraser – Cooper Corner 345 kV Oakdale – Fraser 345 kV
(4)	Homer City 345/230kV transformer	@Emer	838 MW	L/O	Homer City 345/230kV transformer
(5)	E. Sayre – North Waverly 115 kV	@STE	139 MW	L/O	Hillside – East Tawanda 230 kV
(6)	Oakdale – Goudey 115 kV	@STE	239 MW	L/O	Oakdale – Fraser 345 kV
(7)	Homer City 345/230 kV transformer	@Emer	917 MW	L/O	Homer City 345/230kV transformer
(8)	Oakdale – Goudey 115 kV	@LTE	239 MW	L/O	Meyer – Hillside 230 kV Hillside – Watercure 230 kV
(9)	Erie East – South Ripley 230 kV	@NOR	553 MW		Pre – Contingency Loading
(10)	Goudy – South Owego 115 kV	@STE	167 MW	L/O	Oakdale – Upstate Shredding 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. Some transfers may be stability limited.

TABLE 3.b

PJM to NYISO INTERFACE THERMAL LIMITS - WINTER 2008-09
ALL LINES I/S

PJM to NYISO	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1800[1]	2800[3]	2675[2]
3-115-O/S	3300[8]	2750[3]	2925[7]
EMERGENCY	1800[4]	3425[6]	3150[5]
3-115-O/S	3300[8]	3400[9]	3350[5]

	LIMITING ELEMENT		Rating		LIMITING CONTINGENCY
(1)	Warren – Falconer (171) 115 kV	@LTE	136 MW	L/O	Forest – Glade Tap 230 kV Glade Tap – Lewis 230 kV
(2)	Towanda - East Sayre (ETS) 230 kV	@LTE	159 MW	L/O	Meyer – Hillside (68) 230 kV Hillside – Watercure (69) 230 kV Hillside – East Tawanda (70) 230 kV
(3)	Jennison – Kattelville 115 kV	@LTE	160 MW	L/O	Oakdale – Fraser (32) 345 kV Layayette – Oakdale (4-36) kV
(4)	Warren – Falconer (171) 115 kV	@STE	136 MW	L/O	Glade – Glade Tap 230 kV
(5)	North Meshoppen 230/115 kV transformer	@STE	216 MW	L/O	East Towanda – North Meshoppen 230 kV
(6)	North Waverly - Lounsberry	@STE	167 MW	L/O	Homer City – Watercure 345 kV Warren – Falconer 115 kV
(7)	North Meshoppen 345/230 kV transformer	@LTE	179 MW	L/O	East Towanda – North Meshoppen 230 kV
(8)	Homer City – Watercure 345 kV	@LTE	927 MW	L/O	Homer City – Stolle Road 345 kV
(9)	Jennison – Kattelville 115 kV	@STE	178 MW	L/O	Oakdale – Fraser (32) 345 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. Some transfers may be stability limited.

TABLE 4

NYISO - IESO INTERFACE THERMAL LIMITS - WINTER 2008-09
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 @ 400 MW**	
NORMAL	1975[1]	675[2]	2125[3]	2375[1]	1150[2]	2550[3]
EMERGENCY	2550[4]	1025[5]	2125[3]	2950[4]	1500[5]	2550[3]
New York to Ontario		**L33/34P @ 0 MW**			**L33/34P @ 200 MW**	
NORMAL	1100[6]		1950[7]	1300[6]		2150[7]
EMERGENCY	1475[8]		2475[9]	1875[4]		2675[9]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Beck – Niagara (PA301) 345 kV	@LTE	1469 MW	L/O	Niagara 345/230 kV transformer Beck – Niagara (PA302) 345 kV
(2)	Niagara – Rochester (NR-2) 345 kV	@LTE	1745 MW	L/O	AES/Somerset - Rochester (SR-1) 345 kV
(3)	Middleport 500/230 kV transformer	@NOR	802 MW		Pre-Contingency Loading
(4)	Beck – Niagara (PA27) 230 kV	@STE	685 MW	L/O	Beck – Niagara (PA 301) 345 kV
(5)	Niagara – Rochester (NR-2) 345 kV	@STE	1904 MW	L/O	AES/Somerset - Rochester (SR-1) 345 kV
(6)	Beck – Niagara (PA27) 230 kV	@LTE	540 MW	L/O	(Breaker Failure @ Niagara 345 kV) Beck – Niagara (PA301) 345 kV Niagara 345/230 kV transformer T3
(7)	Beck – Hanon Q24HM 220 kV	@Emer	703 MW	L/O	Q25BM and Q29HM
(8)	Beck – Niagara (PA27) 230 kV	@NOR	480 MW		Pre-Contingency Loading
(9)	Beck – Hanon Q24HM 220 kV	@Emer	703 MW	L/O	Q29HM

NOTE: Some transfers may be stability limited.