NYISO OPERATING STUDY WINTER 2004-05

Approved by NYISO Operating Committee November 18, 2004

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1. 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 2004-05 capability period. This analysis indicates that, for the Winter 2004-05 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.

2. RECOMMENDATIONS

The following recommendations are presented based on the analysis and results documented in this report.

1) 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.

2) Installed Capacity (ICAP) resources of 38,137 MW are anticipated to be adequate to meet the forecast peak demand of 25,620 MW. The NYISO should have adequate operating reserve during the period.

3. SYSTEM REPRESENTATION AND BASE STUDY ASSUMPTIONS

I. System Representation

The representation was developed from the NYISO Databank and assumes the forecast winter coincident peak load of 25,620 MW. The other NPCC members and adjacent regions representations were obtained from MEN/VEM Winter 2004-05 Reliability Assessment power flow.

The generator output levels for major EHV-connected units are summarized in Appendix B, and are consistent with typical operation for the period. The inter-Area transactions represented in the study base case are summarized in Appendix A, and are consistent with those modeled in the MEN/VEM Winter 2004-05 Reliability Assessment.

Significant changes in the NYISO system since the Winter 2003-04 capability period include:

Ravenswood #4 Combined Cycle (250MW)	**4/2004**
Plattsburgh–Sandbar (PV-20) Phase Angle Regulator at Plattsburgh	**Out of service**
Plattsburgh–Sandbar (PV-20) Phase Angle Regulator at Sand Bar (new)	**06/2004**

The phase angle-regulating transformer at Plattsburgh controlling the Plattsburgh, New York to Sandbar, Vermont 115kV circuit (PV-20) was also out of service during the Winter 2003/04 and Spring 2004. A new PAR located at Sandbar was placed in service in June 2004.

II. Base Study Assumptions

The PTI MUST thermal transfer analysis program and PSS/E power flow are used to determine the Normal and Emergency Criteria thermal limits. The thermal limits presented have been determined for all transmission facilities scheduled in service during the Winter 2004-05 period.

The schedules used in the base case load flows for this analysis assumed a net flow of 1000 MW from 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 MAAC-ECAR-NPCC (MEN) Inter-Regional Reliability Assessment for Winter 2004-05, and the NERC/MMWG Winter 2004-05 load flow base case.

Thermal transfer capabilities between New York and adjacent 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 capability between Areas. Reductions due to these situations are considered to be the responsibility of the respective operating authority*. Some of these potential limitations are indicated in the summary tables by "____ Internal" limits, which supplement the "Direct Tie" limits. Transfer conditions within and between neighboring Areas can have a significant effect on inter- and intra-Area transfer capabilities. Coordination of schedules and conditions between Areas is necessary to provide realistic transfer conditions while maintaining the reliability and security of the interconnected systems.

4. DISCUSSION

I. Resource Assessment

Load and Capacity Assessment

The forecast peak demand for the Winter 2004-05 capability period is 25,620MW. This forecast is approximately 6.0% above the forecast for Winter 2003-04 capability period 24130 MW, and 1.4% above the all-time New York control area seasonal peak of 25,262 MW, which occurred in January 2004. The Installed Capacity (ICAP) requirement of 38,137 MW, based on the NYSRC 18% reserve requirement, is anticipated to be adequate to meet forecast demand.

NYISO Peak Load and Capacity Assessment – Winter 2004-05

NYISO ICAP Requirement	38137
Net of full-responsibility purchases/sales	0
Scheduled generation outages	2385
Allowance for unplanned outages	3707
Net capacity for load	32045
NYISO Forecast Peak	25620
Operating Reserve Requirement	1800
Available Reserve	***6425***
Net Margin	4625

The assumed allowance for unplanned outages is an equivalent rate of 9.7% and includes forced outages and de-rating based on historical performance of all generation in the New York Control Area.

II. Cross-State Interfaces

A. Transfer Limit Analysis

Figure 1 presents a comparison of the Winter 2004-05 thermal transfer limits to Winter 2003-04. Changes in these limits from last year 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. The detailed comparison of Cross-State limits between Winter 2004-05 and 2003-04, with limiting element/contingency descriptions, is located in Appendix H.

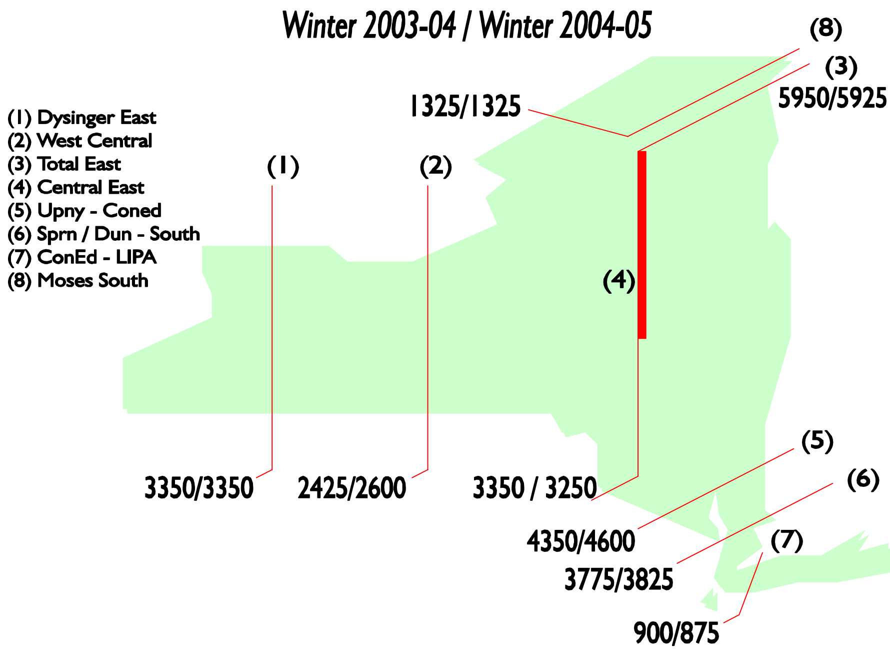

Figure 1 – Cross-State Transfer Limits

- ***West Central*** limit has increased by 175 MW due to the change in limiting elements/contingencies. The Winter 2004-05 limit is 2600 MW for Meyer - Stolle Road 230 kV for the breaker failure at Rochester 345kV and for the loss of Rochester (NR2) – Pannell 345kV and Niagara – Rochester (NR2) 345kV; Last winter limit was 2425 MW limited by Clay – Edic 345kV for the loss of Clay – Edic 345kV and the transformer at Clay (345/115kV).

- ***UPNY – ConEd*** interface limit has increased 250 MW. Changes in the Ramapo PAR schedules account for most of this change. The Leeds to Athens and Athens to Pleasant Valley line impedances were slightly modified which also contributed to the increase.

- ***Central East*** interface limit has decreased 100 MW due to changes in the base case generation schedules in central New York.

B. Sensitivity Testing

The thermal limits presented in Section 5 were determined using the base conditions and transactions. The effects of various intra- and inter-Area transfers or generation patterns in the system are presented in Appendix G.

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

C. Long Term Scheduled Outages

During the Winter 2004-05 period, Con Edison will be performing construction work associated with the Fault Current Mitigation Plan that involves installation of fault current limiting series reactors in the 345kV circuits between Sprain Brook and West 49^{th} Street. This 345kV circuit will be out of service for an approximately 2 – 3 month period while its reactor is being installed. These outages will have a significant impact on the Sprain Brook/Dunwoodie – South interface transfer limits. The following summarizes the general limitations expected during the outages.

Outage Condition	Normal	Emergency
Sprain Brook – W. 49^{th} St. 345kV all lines in service	**3825**(1)	**4100**(2)
Sprain Brook – W. 49^{th} St. 345kV one line out of service	**2600**(3)	**3050**(4)

Notes:

1. Dunwoodie – Rainey 345kV @ SCUC — L/O Dunwoodie – Rainey
2. Dunwoodie – Rainey 345kV @ STE — L/O Dunwoodie – Rainey
3. Sprain Brook – W. 49^{th} St 345kV @ SCUC — L/O Dunwoodie – Sprain Brook and Sprain Brook 345/138 transformer
4. Sprain Brook – W. 49^{th} St 345kV @ Nor — Pre-contingency loading

D. 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 over current relay is installed at West Woodbourne to protect for contingency overloads.

E. Con Ed – LIPA 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 PAR schedule.

For emergency transfer limit analysis the ConEd - LIPA PARs are adjusted to allow for maximum transfer capability into LIPA:

ConEd - LIPA PAR Settings for Transfer Limit Assessment

	Normal	**Emergency**
Jamaica – Lake Success 138kV	-200MW	0MW
Jamaica – Valley Stream 138kV	-113MW	224MW
Sprain Brook – E. Garden City 345kV	691MW	693MW
Norwalk Harbor – Northport 138kV	100MW	100MW

F. 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 Security Constrained Dispatch system monitors the EHV transmission continuously to maintain the secure operation of the interconnected system.

III. Transfer Capabilities with Adjacent Control Areas

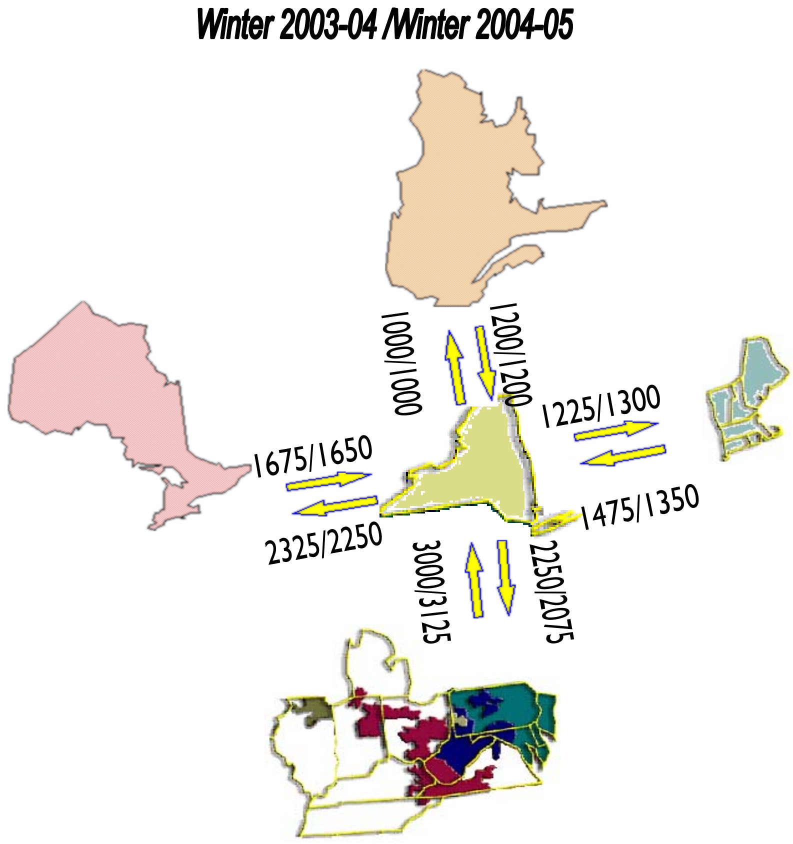

Figure 2 – Inter-Area Transfer Capabilities

A. New York ISO - New England Analysis

1. New England Transmission/Capacity Additions

a) New England

Transmission
In the New England Control Area, a second Scobie 345kV/115 kV transformer was added in late spring 2004. A new phase angle regulating transformer controlling the Plattsburgh, NY to Sandbar, VT 115kV circuit PV-20 was placed in service in early summer 2004. The Plattsburgh phase angle regulating transformer will continue to be bypassed.

Capacity
In the New England Control Area, from January 2004 through September 2004, an additional 262 MW (summer capability) of new capacity was placed in service prior to the start of the Summer 2004 capability period. Since the beginning of the previous winter (2003) capability period, the following new generation has become available or is expected to be available

Brascan	12 MW
PDC – Milford 1	250 MW
PDC – Milford 2	250 MW

b) New York

In Fall 2003, connections and conductors at the Whitehall, NY, terminal of the Whitehall - Rutland 115kV (line #7) were replaced to upgrade the thermal capability of the circuit, increasing the NMPC winter seasonal rating to239MVA.

2. Thermal Transfer Limit Analysis

The transfer limits between the NYISO and ISO New England for normal and emergency transfer criteria are summarized in Section 5, Table 2. Referring to Figure 2 the transfer capability from NY to NE has increased by 75MW due to a new phase angle regulating (PAR) transformer controlling the Plattsburgh, NY to Sandbar, VT 115kV circuit PV-20, which was placed in service in June 2004. The transfer capability from NE to NY has decreased by 125MW due to the limiting elements.

3. Cross-Sound Cable

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

4. Smithfield – Salisbury 69kV

Central Hudson G&E and Northeast Utilities will operate the Smithfield-Falls Village 69kV line (FV/690) normally closed during the winter period. The maximum allowable transfer on this line is 28 MVA, based on limitations in the Northeast Utilities 69 kV system. The FV/690 has directional over-current protection that will trip the line in the event of an actual overload when the flow is toward ISO-NE. This facility will not limit NYISO-ISO-NE transfers.

5. Northport - Norwalk Harbor Cable Flow

Flow on this facility is controlled by a phase angle regulating (PAR) transformer at Northport. As system conditions vary the following may be used to optimize transfer capability between the Areas. The thermal transfer limits are presented in Table 2 for two different PAR schedule assumptions on the Northport – Norwalk Harbor interconnection. Exhibits in Appendix G graphically demonstrate the optimization of transfer capability by regulating the flow on the Northport-Norwalk Harbor tie.

New York to New England: With power flowing from New York to New England on the Northport to Norwalk Harbor (1385) cable, potential overloads of the Norwalk Harbor to Rowayton Junction (1867) and the Norwalk Harbor to Rowayton Junction (1880) circuits must be considered as follows:

The flow from Norwalk Harbor to Rowayton Junction (1867) should not exceed 237 MVA (Normal rating of Norwalk Harbor to Rowayton Junction (1867).

The flow from Norwalk Harbor to Rowayton Junction (1880) should not exceed 214 MVA (Normal rating of Norwalk Harbor to Rowayton Junction (1880)).

New England to New York: With power flowing from New England to New York on the Norwalk Harbor to Northport (1385) cable, potential overloads of the Trumbull Junction to Weston (1730) circuit must be considered as follows:

The algebraic sum of the flow from Trumbull Junction to Weston (1730) and 27% of the flow from Pequonnock to Trumbull Junction (1710) and 29% of the flow from Devon to Trumbull Junction (1710) should not exceed 239 MVA (STE rating of Trumbull Junction to Weston (1730)).

The algebraic sum of the flow from Trumbull Junction to Weston (1730) and 25% of the flow from Pequonnock to Ash Creek (91001) and 21% of the flow from Bridgeport Resco should not exceed 239 MVA (STE rating of Trumbull Junction to Weston (1730)).

In order to transfer 200 MVA from Norwalk Harbor to Northport, Norwalk Harbor generation should be on.

6. Plattsburgh – Sandbar (PV-20) Circuit

A new phase angle regulating transformer at Sandbar controlling the Plattsburgh, NY, to Sandbar, VT, 115kV circuit (PV-20) was place in service on June 2004. The existing phase angle regulator at Plattsburgh is out of service for repair and is bypassed.

7. 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." These stability transfer limits are presented in Appendix I.

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.

B. New York - PJM Analysis

1. Thermal Analysis

The transfer limits for the New York - PJM interface are summarized in Section 5, Table 3. The comparison with Winter 2003-04 in Figure 2 shows the New York to PJM limit has decreased by 175 MW, and an increase of 125 MW transfer capability toward NY. This change is primarily due in the base case dispatch in the vicinity of the limiting elements.

2. Opening of PJM to New York 115 kV Ties as Required

The normal criteria thermal transfer limits presented in Section 5 were determined for an all lines in-service condition. The 115kV interconnections between First Energy and New York (Warren - Falconer, North Waverly - East Sayre and Tiffany - Goudey) may be opened in accordance with NYISO and PJM Operating Procedures provided this 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, however it may be opened by operator action if it imposes an actual or post-contingency overload condition. The results presented in Table 3 include limits that assume one (or more) of these lines removed from service to achieve higher inter-Area transfer capability.

C. Ontario – New York Analysis

1. Thermal Analysis

The thermal limits between the New York ISO and the Independent Market Operator (IMO-Ontario) areas for normal and emergency transfer criteria are presented in Section 5, Table 4. The New York to Ontario limit has decreased 25 MW, and the Ontario to New York limit also has decreased 75 MW. This is due to the change in dispatch of Darlington, Beck, Bruce, Lambton, Pickering, St. Laurence/Saunders, and Nanticoke generation in Ontario in the Winter 2004-05 base case.

2. Transient Stability Limitations

Transient stability limits for the NYISO - IMO interconnection are reported in "NYPP-OH TRANSIENT STABILITY TESTING REPORT on DIRECT TIE TRANSFER CAPABILITY - OCTOBER 1993." This stability testing is summarized in Appendix I of this report.

3. Ontario – Michigan PARs

Phase Angle Regulating transformers are being installed on the interconnections between Ontario and Michigan:

Lambton – St. Clair 345kV	L4D
Lambton – St. Clair 230kV	L51D
Scott – Bunce Creek 230kV	B3N

The collapsed tower of circuit B3N does not yet have a firm replacement date. The failed phase shifter that is part of B3N (PS3) has not yet been removed from site to be repaired. The phase shifter in circuit L51D (PS51) at Lambton is being evaluated to determine the extent of any internal damage.

The phase shifter for L4D (PS4) will be in-service on December 20, 2004. However, even though L4D and L51D PARs will be in-service this date, there are still no operating agreements between Hydro One and ITC and between the IMO and MISO. Until agreements are reached L4D and L51D will not be able to control flow.

In the base case study analysis, the existing PAR controlling the Waterman – Keith (J5D) circuit, the phase shifters in circuit L4D at Lambton, and the phase shifter controlling the Lambton – St. Clair circuit L51D (PS51) are controlling schedule of 0MW.

4. 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. These SPSs can be selected by the Ontario or NYPA (as appropriate) operators, consistent with system conditions.

Of the two circuits, L33P is more limiting. At 0 degrees phase shift the limiting STE rating is 465 MVA (voltage regulator rating). The outage distribution factor for the loss of L34P is 0.601 and based on this, the maximum pre-contingency flow on each circuit should not exceed 290 MW. At 40 degrees phase shift the limiting STE rating is 334 MVA (PAR rating). The outage distribution factor for the loss of L34P is 0.462 and based on this, the maximum flow on each circuit should not exceed 228 MW.

D. <u>TransEnergie–New York Interface</u>

Thermal transfer limits between TransEnergie (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 TE is limited to 1200 MW. Maximum delivery from NYCA to TE is 1000 MW.

5. SUMMARY OF RESULTS
TRANSFER LIMIT ANALYSIS

TABLE 1

NYISO CROSS STATE INTERFACE THERMAL LIMITS-WINTER 2004-05
ALL LINES I/S

	Dysinger East	West Central	UPNY-ConEd	Sprain Brook Dunwoodie So.	ConEd-LIPA
NORMAL	3350[(1)]	2600[(7)]	4600[(3)]	3825[(4)]	875[(5)]
EMERGENCY	3600[(1)]	2925[(2)]	5050[(3)]	4100[(4)]	1525 [(6)]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Niagara – Rochester (NR2) 345kV	@LTE @STE	1745 MW 1904 MW	L/O	AES/Somerset – Rochester (SR-1) 345kV
(2)	Stolle 230kV- Meyer	@NOR	512 MW		Pre-Contingency Loading
(3)	Leeds - Pleasant Valley 345kV	@LTE @STE	1783 MW 1912 MW	L/O	Athens - Pleasant Valley 345kV
4)	Dunwoodie - Rainey 345kV	@SCUC @STE	992 MW 1113 MW	L/O	Dunwoodie – Rainey 345kV
(5)	Dunwoodie - Shore Road (Y50) 345kV	@LTE	891 MW	L/O	Sprain Brook - EGC (Y49)345kV
(6)	Dunwoodie - Shore Road (Y50) 345kV	@NOR	613 MW		Pre-Contingency Loading
(7)	Stolle - Meyer - 230kV	@LTE	564 MW	L/O	(Breaker failure @ Rochester 345kV) Rochester (RP2) – Pannell 345kV Niagara – Rochester (NR2) 345kV

NOTE: Some transfers may be stability limited.

TABLE 1.a

NYISO CROSS STATE INTERFACE THERMAL LIMITS-WINTER 2004-05
ALL LINES I/S

	HQ -> NY @ 400 MW	HQ -> NY @ 0 MW
CENTRAL EAST		
NORMAL	3425(3)	3250 (1)
EMERGENCY	3550(2)	3275(2)
TOTAL EAST		
NORMAL	6200(3)	5925(1)
EMERGENCY	6425(2)	6025(2)
MOSES SOUTH		
NORMAL	700(4)	1325(5)
EMERGENCY	2650(6)	2150(6)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Clay - Edic 345kV	@LTE	1434 MW	L/O	Clay – Edic345kV Clay 345/115 kV
(2)	Clay - Edic 345kV	@STE	1434 MW	L/O	Clay – Edic345kV
(3)	New Scotland – Marcy 345 kV	@LTE	1792 MW	L/O	(Breaker failure@ Edic345kV) Edic - New Scotland (14)345kV Edic 345kV - Porter (2) 230kV Edic 345kV – Porter (4) 115kV
(4)	Moses - Adirondack 230kV	@LTE	359 MW	L/O	Marcy- Massena 765 kV Chateauguay - Massena 765kV and Quebec delivery
(5)	Moses - Adirondack 230kV	@LTE	359 MW	L/O	Moses - Massena (MMS-1) 230 kV Moses - Massena (MMS-2) 230 kV
(6)	Moses – Massena MMS-230kV	@STE	1404 MW	L/O	Moses – Massena MMS-230kV

NOTE: Some transfers may be stability limited.

TABLE 2.a

NYISO to ISO-NE INTERFACE LIMITS - WINTER 2004-05
ALL LINES I/S

New York to New England		**Northport – Norwalk @ 100MW**	
	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
NORMAL	1300 (1)	1775 (5)	2000 (2)
EMERGENCY	1775 (4)	1900 (6)	2000 (2)

		Northport – Norwalk @ 0 MW	
NORMAL	1675 (1)	2150 (5)	2400 (3)
EMERGENCY	2150 (4)	2250 (6)	2400 (3)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Norwalk - Northport (1385) 138kV	@LTE	363MW	L/O	Breaker failure @ Long Mtn Long Mtn – Plumtree (321) 345 kV Long Mtn – Pleas. Valley (398) 345kV
(2)	Berkshire 345kV/115kV transformer	@STE	448MW	L/O	Ludlow – Northfield (354) 345kV
(3)	Vermont Yankee – Amherst (379) 345kV	@STE	896MW	L/O	Ludlow – Northfield (354) 345kV
(4)	Norwalk - Northport (1385) 138kV	@STE	428MW	L/O	Long Mtn – Pleas. Valley (398) 345kV
(5)	Northport - Northport (PAR) 138kV	@LTE	450MW	L/O	(Breaker failure @ Long Mtn 345kV) Long Mtn - Plumtree (321) 345kV Long Mtn – Pleas.Valley (398) 345kV
(6)	Norwalk - Northport (PAR) 138kV	@STE	450MW	L/O	Long Mtn – Plea. Valley (398) 345kV

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

TABLE 2.b

ISO-NE to NYISO INTERFACE LIMITS - WINTER 2004-05
ALL LINES I/S

New England to New York		**Norwalk – Northport @ 100MW**	
	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
NORMAL	1725 (1)	2175 (6)	2000 (2)
EMERGENCY	2000 (3)	2225 (8)	2300 (5)

		Norwalk – Northport @ 200MW	
NORMAL	1350 (1)	1825 (7)	2025 (2)
EMERGENCY	1725 (4)	1850 (8)	2325 (5)

.

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Norwalk - Northport (1385) 138kV	@LTE	363 MW	L/O	Fishkill – Pleasant Valley 345 kV Long Mtn (398) – Pleasant Valley 345kV
(2)	Southington – Todd (1910) 115kV	@STE	352 MW	L/O	Southington – Frost Bridge (329) 345kV Southington 345/115kV(3X) transf. (Stuck Breaker)
(3)	Bennington – Hoosick (6) 115kV	@LTE	159MW	L/O	Berkshire- Alps (393) 345kV
(4)	Norwalk - Northport (1385) 138kV	@STE	428MW	L/O	Long Mtn (398) – Pleasant Valley 345kV
(5)	Southington – Todd (1910) 115kV	@STE	352 MW	L/O	Southington – Frost Bridge (329) 345kV
(6)	Hoosick - N.Troy (5)115kV	@LTE	159 MW	L/O	Berkshire- Alps (393) 345kV Alps – Reynold3 (1) 345kV Alps - N Scotland77 (2) 345kV
(7)	Northport - Northport (PAR) 138kV	@LTE	450 MW	L/O	Fishkill – Pleasant Valley 345 kV Long Mtn (398) – Pleasant Valley 345kV
(8)	Northport - Northport (PAR) 138kV	@STE	450 MW	L/O	Long Mtn (398) – Pleasant Valley 345kV

NOTE: Norwalk Harbor – Northport cable schedule is positive in the direction of transfer

TABLE 3.a

PJM to NYISO INTERFACE LIMITS-WINTER 2004-05
ALL LINES I/S

PJM to NYISO	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1725(1)	3875(4)	3575(3)
3-115-O/S	3125(2)	3750(5)	3725(3)
EMERGENCY	2175(6)	3875(4)	3575(3)
3-115-O/S	3200(2)	3750(5)	3725(3)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Warren-Falconer (171) 115 kV	@LTE	136 MW	L/O	Forest – Glade 230 kV
(2)	E. Towanda-Hillside (70) 230kV	@LTE @STE	564 MW 598 MW	L/O	Homer City - Watercure (30) 345kV
(3)	Oxbow – Lackawanna 230 KV	@NOR	566 MW		Pre – Contingency
(4)	Goudey – Oakdale 115 KV	@LTE @STE	239 MW 239 MW	L/O	Oakdale - Watercure (31) 345kV
(5)	Hillside-Watercure (69) 230kV	@LTE	657MW	L/O	Homer City - Watercure (30) 345kV
(6)	Warren-Falconer (171) 115 kV	@NOR	96 MW		Pre - Contingency

NOTE: Emergency Transfer Limits may require line outages as described in Section 4.III. PAR schedules have been optimized for the emergency limits as described in Appendix B. Some transfers may be stability limited.

TABLE 3.b

NYISO to PJM INTERFACE LIMITS-WINTER 2004-05
ALL LINES I/S

NYISO to PJM	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1425(1)	1350(5)	3075(4)
3-115-O/S	2075(3)	1975(5)	2675(4)
EMERGENCY	1575(2)	1550(6)	3100(4)
3-115-O/S	2125(3)	2325(6)	2675(4)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	E. Sayre - N. Waverly 115kV	@LTE	139 MW	L/O	E.Towanda – Hillside 230 kV Laurel - Goudey 115 kV
(2)	E. Sayre - N. Waverly 115kV	@STE	139 MW	L/O	E.Towanda – Hillside 230 kV
(3)	E. Towanda – Hillside 230kV	@LTE @NOR	564 MW 512MW	L/O	Forest – Glade 230kV Pre-contingency loading
(4)	Erie E. – Erie S.E. 230 KV	@LTE @NOR	626 MW 542 MW	L/O	Homer City - Stolle 345kV Warren - Falconer 115kV Pre-contingency loading
(5)	Goudey – Oakdale 115 KV	@LTE	239 MW	L/O	Avoca- Hillside 230kV Hillside-Watercure 230kV
(6)	Goudey – Oakdale 115 KV	@STE	239 MW	L/O	Hillside-Watercure 230kV

NOTE: Emergency Transfer Capability Limits may have required line outages as described in Section 4.III. PAR schedules have been optimized for the emergency limits as described in Appendix B. Some transfers may be stability limited.

TABLE 4

NYISO- IMO INTERFACE LIMITS - WINTER 2004-05
ALL LINES I/S

Ontario to New York	**L33/34P @ 0 MW**			**L33/34P @ 400 MW**		
	DIRECT TIE	NYISO FACILITY	IMO FACILITY	DIRECT TIE	NYISO FACILITY	IMO FACILITY
NORMAL	2250(1)	725(9)	1950(3)	2650(1)	1050(9)	2350(3)
EMERGENCY	2800(1)	2025(8)	2425(4)	3175(1)	2475(8)	2825(4)

New York to Ontario	**L33/L34P @ 0 MW**			**L33/34P @ 200 MW**		
NORMAL	1650(6)		1400(5)	1825(6)		1600(5)
EMERGENCY	1950(7)		2050(2)	2125(7)		2250(2)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Beck - Niagara (PA27) 230kV	@LTE @STE	540 MW 685 MW	L/O	Beck - Niagara (PA302) 345kV
(2)	Beck2 DK - Hannon J29 220kV	@NOR	584MW		Pre-Contingency Loading
(3)	Middleport DK2 – Neal JQ23 220kV	@LTE	540 MW	L/O	Beck- Hannon-Nebo-Middleport (Q24HM) 220kV Beck- Hannon-Nebo-Middleport (Q29HM) 220kV
(4)	Middleport DK2 – Neal JQ23 220kV	@NOR	462MW		Pre-Contingency Loading
(5)	Burlington J23 – Neal JQ23 220kV	@LTE	674 MW	L/O	Beck- Hannon-Nebo-Middleport (Q24HM) 220kV Beck- Hannon-Nebo-Middleport (Q29HM) 220kV
(6)	Beck - Niagara (PA27) 230kV	@LTE	540 MW	L/O	Breaker failure @ Niagara Beck - Niagara (PA301) 345kV Niagara 345/230 kV
(7)	Beck - Niagara (PA27) 230kV	@NOR	480 MW		Pre-Contingency Loading
(8)	Niagara –Rochester (NR-2) 345kV	@STE	1904 MW	L/O	AES/Somerset – Rochester (SR-1) 345 KV
(9)	Packard2 – Niagara2W (62) 230kV	@LTE	717 MW	L/O	Packard2 – Niagara2W (61) 230kV Robinson – Niagara2E (64) 230kV

NOTE: Some transfers may be stability limited.