NYISO OPERATING STUDY WINTER 2003-04

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I. SUMMARY OF EXISTING STABILITY LIMITS

NYISO OPERATING STUDY - WINTER 2003-04

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 2003-04 capability period. This analysis indicates that, for the Winter 2003-04 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" (September 10, 1999) 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 37,087 MW are anticipated to be adequate to meet the forecast peak demand of 24,130 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 24,130 MW. The other NPCC members and adjacent regions representations were obtained from MEN/VEM Winter 2003-04 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 2003-04 Reliability Assessment.

Significant changes in the NYISO system since the Winter 2002-03 capability period include:

Northport 1385 PAR (upgrade) **In service November 2002**

New facilities (since Winter 2002-03) considered in this study include:

Cross-Sound Cable **Available for emergency service**
Bowline Point 345/138kV Transformer **In service 06/2003**

NEG/Athens Station (1080MW)

Ravenswood #4 Combined Cycle **Test capability anticipated 12/2003**

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. The facility is currently operating under a temporary emergency order. Commercial operation of this facility is pending resolution of regulatory issues.

II. Base Study Assumptions

The PTI MUST thermal transfer analysis program and PSS/E power flow is 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 2003-04 period.

The schedules used in the base case loadflows 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 2003-04, and the NERC/MMWG Winter 2003-04 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 optimal 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 2003-04 capability period is 24,130MW. This forecast is approximately 1.0% below the forecast for Winter 2002-03 capability period, and 1.3% below the all-time New York control area seasonal peak of 24,454 MW, which occurred in January 2003. The Installed Capacity (ICAP) requirement of 37,087 MW, based on the NYSRC 18% reserve requirement, is anticipated to be adequate to meet forecast demand.

NYISO Peak Load and Capacity Assessment – Winter 2003-04

NYISO ICAP Requirement	37087
Net of full-responsibility purchases/sales	0
Scheduled generation outages	1997
Allowance for unplanned outages	3857
Net capacity for load	31233
NYISO Forecast Peak	24130
Operating Reserve Requirement	1800
Available Reserve	***7103***
Net Margin	5303

The assumed allowance for unplanned outages is an equivalent rate of 10.4% 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 2003-04 thermal transfer limits to Winter 2002-03. 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 2003-04 and 2002-03, with limiting element/contingency descriptions, is located in Appendix H.

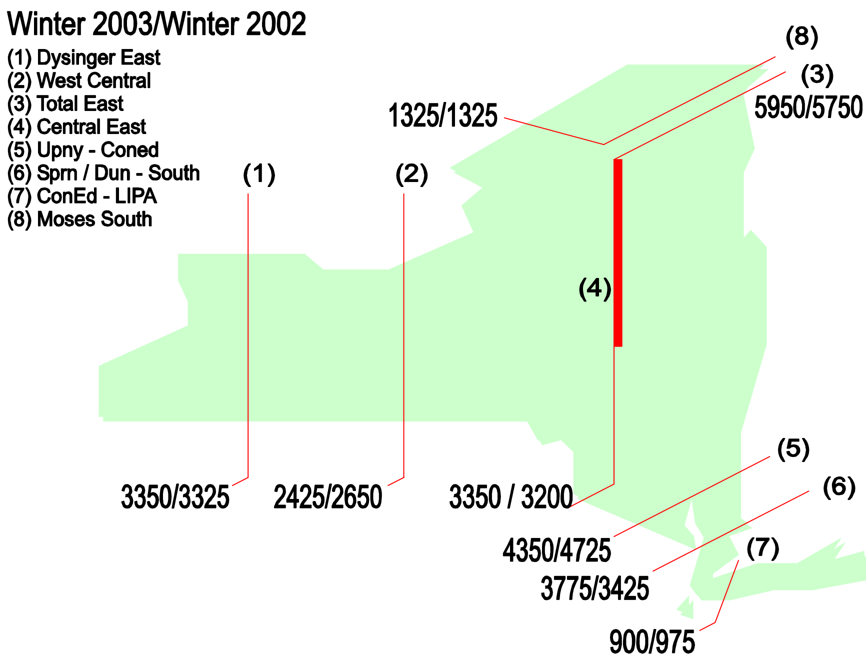

Figure 1 – Cross-State Transfer Limits

- ***West Central*** limit has decreased by 225 MW and ***UPNY – ConEd*** interface limit has decreased 375 MW due to changes in the base case dispatch, including representation of 360 MW at Athens, and the slight increase in the impedance of the Leeds-Athens-Pleasant Valley #95/91 circuits resulting in slightly higher loading of the Leeds-Pleasant Valley circuit #92.

- ***Sprain Brook/Dunwoodie – South*** interface limit has increased 350 MW due to changes in ratings; Last winter the limit was 3425 MW at Dunwoodie – Rainey 345kV for the loss of Dunwoodie – Rainey 345kV at LTE 871 MW; for the winter 2003-04, the limit is 3775 MW for the same limiting element and contingency based on the SCUC-rating of 992 MW,

- ***Con Edison – LIPA*** interface limit has decreased 75 MW due to the change in limiting elements/contingencies. The Winter 2003-04 limit is 900 MW for Sprain Brook – East Garden City (Y49) 345 kV for the loss of Dunwoodie – Shore Road (Y50) 345kV. Last winter limit was 975 MW limited by Dunwoodie – Shore Road (Y50) 345kV for the loss of Sprain Brook – East Garden City (Y49) 345 kV.

- ***Total East*** thermal transfer limits have increased of 200 MW and Central East increased of 150 MW due to the change in the base case dispatch of 360 MW of generation at Athens in the Winter 2003-04.

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 2003-04 period ConEdison will be performing construction work associated with the Fault Current Mitigation Plan. This work involves installation of fault current limiting series reactors in the 345kV circuits between Dunwoodie and Rainey, and between Sprain Brook and West 49th Street. Each 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
All lines in service	**3775(1)**	**4050(2)**
1 Dunwoodie – Rainey 345kV out of service	**3200(3)**	**3225(4)**
1 Sprain Brook – W. 49th St. 345kV out of service	**2700(5)**	**2975(6)**

Notes:

1.	Dunwoodie – Rainey 345kV @ SCUC	L/O Dunwoodie – Rainey
2.	Dunwoodie – Rainey 345kV @ STE	L/O Dunwoodie -- Rainey
3.	Dunwoodie – Rainey 345kV @ SCUC	L/O Sprain Brook – W. 49th St and Sprain Brook 345/138 transformer
4.	Dunwoodie – Rainey 345kV @ NOR	pre-contingency loading
5.	Sprain Brook – W. 49th St 345kV @ SCUC	L/O Dunwoodie – Sprain Brook and Sprain Brook 345/138 transformer
6.	Sprain Brook – W. 49th 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 overcurrent 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. Both normal and emergency limits are dispatch dependant and can vary based on generation and load patterns in the LIPA system.

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	-117MW	-26MW
Sprain Brook – E. Garden City 345kV	693MW	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.

G. Transient Stability Limits

The transient stability limit for all lines in service and selected maintenance conditions are summarized in Appendix I.

III. Transfer Capabilities with Adjacent Control Areas

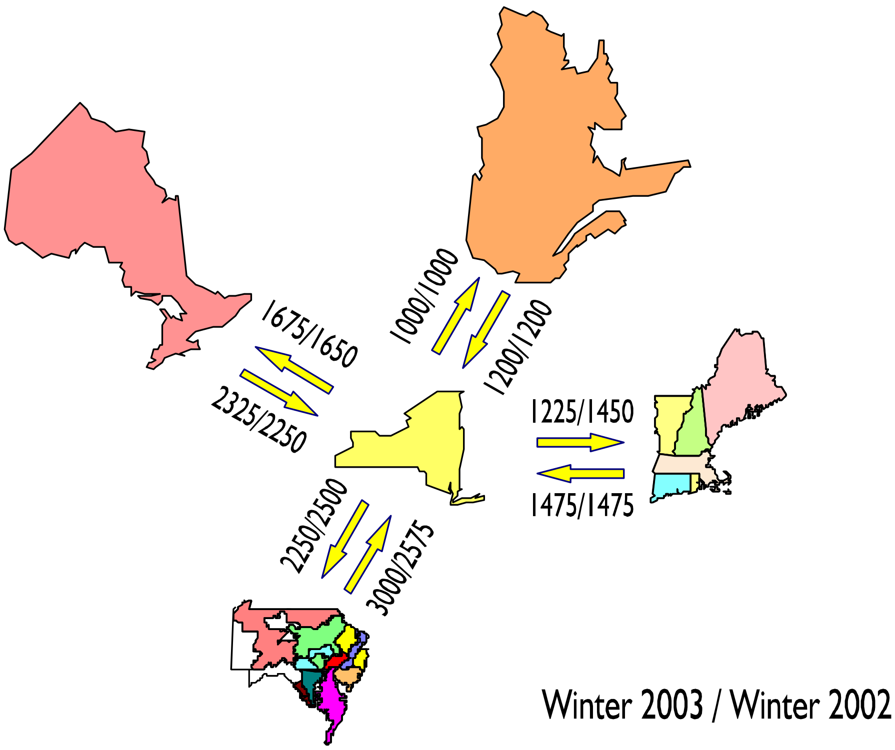

Figure 2 – Inter-Area Transfer Capabilities

A. New York – ISO New England Analysis

1. New England Capacity Additions

In the New England Control Area, from April 2002 through January 2003, approximately 2,140 MW (winter capability) of new capacity has been added with an additional 3,123 MW expected to be in service prior to the start of the Winter 2003-04 capability period. During the Winter 2003-04 period, an additional 500 MW of capacity is expected to become available. Since the beginning of the previous winter (2002-03) capability period, the following new generation has become available or is expected to be available:

PPL-Wallingford	250 MW
PGE-Lake Road	750 MW
Con-Ed West Springfield	100 MW
PDC-Waterside	70 MW

AES Granite Ridge	750 MW
Con-Ed Newington	520 MW
Mirant-Kendall	180 MW
ANP-Bellingham	500 MW
Sithe Mystic #8	750 MW
FPL-RISE	520 MW
Sithe Fore River	750 MW
Sithe Mystic #9	750 MW
GLHA/GNE	100 MW
South Norwalk	23 MW
PDC-Milford	500 MW

2. Thermal 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 above, the transfer capability from NE to NY has not changed, and the transfer capability from NY to NE has decreased by 225 MW due to the increase in the pre-transfer loading of the Pleasant Valley – Long Mountain 345kV circuit as a result of Athens generation.

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-Falls Village 69kV line (FV/690)

CHG&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 over-current protection that will trip the line in the event of an actual overload. This facility will not limit NYISO-ISO-NE transfers.

5. Northport - Norwalk Harbor Cable Flow

As system conditions vary the following may be used to optimize transfer capability between the Areas. 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 278 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 278 MVA (STE rating of Trumbull Junction to Weston (1730)).

- In order to transfer 100 MVA from Norwalk Harbor to Northport, Norwalk Harbor generation should be on.

6. Plattsburgh – Sandbar (PV-20) Circuit

The phase angle regulating transformer controlling flow on this circuit continues out of service for the Winter 2003-04 period. Power flow on this circuit is managed through a Common Operating Instruction among the NYISO, ISO-NE, and the interconnecting transmission owners.

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 2002-03 in Figure 2 shows the New York to PJM limit has decreased by 250 MW, and an increase of 425 MW transfer capability toward NY. This change is primarily due to the changes of the limiting element. The interface was limited by Oxbow - Lackawanna 230kV in Winter 2002-03, and by E. Towanda - Hill Side 230kV in Winter 2003-04.

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 GPU 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 increased 25 MW, and the Ontario to New York limit has increased 75 MW. This is due to the change in dispatch of Kintigh generation in western New York, and Lambton, and Nanticoke generation in Ontario in the Winter 2003-04 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

These PARs are represented in the powerflow base case holding fixed angle (free-flow MW). The existing PAR controlling the Waterman – Keith (J5D) circuit is controlling a schedule of 0MW in the base case.

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) is scheduled to be delivered at the end of April 2004.

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. **TransEnergie–New York Interface**

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 2003-04
ALL LINES I/S

	Dysinger East	West Central	UPNY-ConEd	Sprain Brook Dunwoodie So.	ConEd-LIPA
NORMAL	3350 (1)	2425 (2)	4350 (4)	3775 (5)	900 (6)
EMERGENCY	3625 (1)	2475 (3)	4800 (4)	4050 (5)	1375 (7)

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Niagara – Rochester (NR2) 345kV	@LTE @STE	1745 MW 1904 MW	L/O	AES/Somerset – Rochester (SR-1) 345kV
(2)	Clay – Edic 345kV	@LTE	1434 MW	L/O	(Breaker failure @ Clay 345kV) Clay – Edic 345kV Clay 345/115kV
(3)	Clay – Edic 345kV	@STE	1434 MW	L/O	Clay – Edic 345kV
(4)	Leeds - Pleasant Valley 345kV	@LTE @STE	1783 MW 1912 MW	L/O	Athens - Pleasant Valley 345kV
(5)	Dunwoodie - Rainey 345kV	@SCUC @STE	992 MW 1113 MW	L/O	Dunwoodie – Rainey 345kV
(6)	Sprain Brook – E. Garden City (Y49) 345 kV (HMP HRBR - DVNPT 345kV)	@LTE	940 MW	L/O	Dunwoodie - Shore Road (Y50) 345kV
(7)	Dunwoodie - Shore Road (Y50) 345kV	@NOR	664 MW	L/O	Pre-Contingency Loading

NOTE: Some transfers may be stability limited. See Appendix I for existing transient stability limits.

TABLE 1.a

NYISO CROSS STATE INTERFACE THERMAL LIMITS-WINTER 2003-04
ALL LINES I/S

	HQ -> NY @ 400 MW	HQ -> NY @ 0 MW
CENTRAL EAST		
NORMAL	3475[(3)]	3350 [(1)]
EMERGENCY	3600[(2)]	3375[(2)]
TOTAL EAST		
NORMAL	6000[(3)]	5950[(1)]
EMERGENCY	6225[(2)]	6025[(2)]
MOSES SOUTH		
NORMAL	1625[(4)]	1325[(5)]
EMERGENCY	2650[(6)]	2175[(6)]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Clay - Edic 345kV	@LTE	1434 MW	L/O	Clay – Edic 345kV Clay 345/115 kV
(2)	Clay - Edic 345kV	@STE	1434 MW	L/O	Clay – Edic 345kV
(3)	New Scotland – Leeds (93) 345 kV	@LTE	1692 MW	L/O	New Scotland – Leeds (94) 345 kV
(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. See Appendix I for existing transient stability limits.

TABLE 2.a

NYISO to ISO-NE INTERFACE LIMITS - WINTER 2003-04
ALL LINES I/S

New York to New England	Northport – Norwalk @ 100MW		
	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
NORMAL	1225(1)		
EMERGENCY	1725(2)		

	Northport – Norwalk @ 0 MW		
NORMAL	1625(1)		
EMERGENCY	2125(2)		

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Norwalk - Northport (1385) 138kV	@LTE	363 MW	L/O	Long Mtn - Plumtree 345 kV Long Mtn - Pleasant Valley (398) 345kV
(2)	Norwalk - Northport (1385) 138kV	@STE	428MW	L/O	Long Mtn - Pleasant 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 2003-04
ALL LINES I/S

New England to New York	Norwalk – Northport @ 100MW		
	DIRECT TIE	NYISO FACILITY	ISO-NE FACILITY
NORMAL	1700(4)		1475(3)
EMERGENCY	1850(2)		1700(4)

	Norwalk – Northport @ 200MW		
NORMAL	1500(1)		1500(3)
EMERGENCY	1900(2)		1750(4)

.

	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)	Whitehall – Blissville (7) 115kV	@STE	239 MW	L/O	Berkshire- Alps 393 345kV Berkshire 345/115kV
(3)	Southington-Todd (1910) 115 kV	@STE	352 MW	L/O	Southington-Frost Bridge (329) Southington 345/115 (3X) Xf (Breaker failure at Southington)
(4)	Southington-Todd (1910) 115 kV	@STE	352 MW	L/O	Southington-Frost Bridge (329)

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

TABLE 3.a

PJM to NYISO INTERFACE LIMITS-WINTER 2003-04
ALL LINES I/S

PJM to NYISO	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1650[1]	3625[5]	3000[3]
3-115-O/S	3000[2]	3600[6]	3075[4]
EMERGENCY	2200[7]	3625[5]	3325[3]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Warren-Falconer (171) 115 kV	@LTE	136 MW		Forest – Glade 230 kV
(2)	E. Towanda-Hillside (70) 230kV	@LTE	564 MW	L/O	Homer City - Watercure (30) 345kV
(3)	Oxbow – Lackawanna 230 KV	@LTE	504 MW	L/O	Homer City - Watercure (30) 345kV
		@NOR	504 MW		Warren-Falconer (171) 115 kV Pre – Contingency
(4)	Oxbow – Lackawanna 230 KV	@LTE	504 MW	L/O	E. Towanda - Grover 230 KV Grover --Moshannon 230 KV Grover 230/34.5KV
(5)	Goudey – Oakdale 115 KV	@LTE @STE	239 MW 239 MW	L/O	Oakdale - Watercure (31) 345kV
(6)	Hillside-Watercure (69) 230kV	@LTE	657MW	L/O	Homer City - Watercure (30) 345kV
(7)	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. See Appendix I for existing transient stability limits.

TABLE 3.b

NYISO to PJM INTERFACE LIMITS-WINTER 2003-04
ALL LINES I/S

NYISO to PJM	DIRECT TIE	NYISO FACILITY	PJM FACILITY
NORMAL	1575[(1)]	1475[(4)]	2600[(7)]
3-115-O/S	2250[(3)]	2100[(5)]	2425[(7)]
EMERGENCY	1725[(2)]	1650[(6)]	2650[(7)]
3-115-O/S	2300[(3)]	2425[(6)]	2500[(7)]

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	E. Sayre - N. Waverly 115kV	@LTE	139 MW	L/O	E.Towanda – Hillside 230 kV Laurel - Gouldy 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)	Goudey – Oakdale 115 KV	@LTE	239 MW	L/O	Avoca- Hillside 230kV Hillside - Watercure 230kV Hillside 230/34.5kV E. Towanda – Hillside 230kV
(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
(7)	Homer City–Shelecta 230 kV	@LTE @NOR	981MW 815MW	L/O	Wayne – Hansdmilk 345 kV Pre-contingency loading

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. See Appendix I for existing transient stability limits.

TABLE 4

NYISO- IMO INTERFACE LIMITS - WINTER 2003-04
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	2325 (1)	1125 (8)	2250 (3)	2700 (1)	1575 (8)	2625 (3)
EMERGENCY	2875 (1)	1425 (8)	2675 (2)	3250 (1)	1875 (8)	3125 (4)

New York to Ontario	L33/L34P @ 0 MW			L33/34P @ 200 MW		
NORMAL	1675 (6)		1350 (3)	1850 (6)		1525 (3)
EMERGENCY	2000 (7)		1875 (5)	2200 (7)		

	LIMITING ELEMENT				LIMITING CONTINGENCY
(1)	Beck - Niagara (PA27) 230kV	@LTE @STE	540 MW 685 MW	L/O	Beck - Niagara (PA302) 345kV
(2)	AllanQ30- Middleport 220kV	@LTE	517 MW	L/O	Beck- Hannon-Nebo-Middleport (Q29HM) 220kV
(3)	AllanQ30- Middleport 220kV	@LTE	517 MW	L/O	Beck- Hannon-Nebo-Middleport (Q24HM) 220kV Beck- Hannon-Nebo-Middleport (Q29HM) 220kV
(4)	AllanQ30- Middleport 220kV	@NOR	456 MW		Pre-Contingency Loading
(5)	AllanQ30- Middleport 220kV	@LTE	517 MW	L/O	Beck- Hannon-Nebo-Middleport (Q24HM) 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	@LTE @STE	1745 MW 1904 MW	L/O	AES/Somerset – Rochester (SR-1) 345 KV

NOTE: Some transfers may be stability limited. See Appendix I for existing transient stability limits.