JOINT PJM, NY, NE, TÉ WORKING GROUP

Review of the PJM-NY-NE Procedures and Methodology
for the TÉ-NE HVDC Line

FINAL

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Table of Contents

List of revisions

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EXECUTIVE SUMMARY

It is recognized that NY and PJM may require limitations to transfers over the TÉ-NE HVDC interconnection (also referred as Phase II facilities) since the loss of Phase II may expose NY and PJM systems to a contingency more severe than their internal source loss contingencies. The method to determine the limit over Phase II facilities was established more than 15 years ago. Several changes have happened since then, including the establishment of Open Market in PJM, NY and NE. These changes could have a real impact not only on the transfers affecting the TÉ-NE line but also on how the limit is applied in today market environment.

An *ad hoc* working group was formed with representatives from NYISO, PJM, ISO-NE and Hydro-Québec TransÉnergie to assess how this limit is applied in today's operation and to determine any improvement to the existing methodology that could maximize the use of this line to the advantage of all parties. This includes the documentation of the present methodology used by PJM and NYISO to limit Phase II, the description of TTC/ATC calculation and posting in NE, and the description of the coordination process between ISO-NE, NYISO and PJM.

Base on this review, the group did identify some areas of improvement. One issue is that PJM when authorizing additional margin on Phase II base limit assumes that 100% of Phase II loss flows through the PJM interfaces. However, in reality, only a portion of Phase II loss flows on the PJM interfaces and the present method imposes additional restriction on Phase II.

Another issue is that even if the limit used for Phase II is determined through proper coordination between PJM, NYISO and ISO-NE, this information is not transparent to the transmission or market users. This results in a ISO-NE TTC posting for Phase II that reflects Phase II facility limitation and internal NE system contingencies but does not reflect a potential real-time limit imposed by PJM and NYISO. This could lead to real time curtailment of scheduled transactions.

The WG discusses several proposals documented in Section 3 and 4 to mitigate these issues. Finally, the group agrees to the following recommendations, which are discussed in details in Section 5.

1. **Improve the PJM calculation method**: PJM has agreed to modify its present method of calculating the Phase II limit to include a distribution factor that will take into account the real impact of the loss of Phase II on PJM internal interfaces.

2. **Improve posting limit transparency**: ISO-NE could begin posting[1] the NYISO and PJM real time authorized limit for Phase II as shown in **Appendix 1**.
3. **Follow up on future curtailments**: It is proposed that any significant curtailment to programmed deliveries on Phase II should be examined by the parties involved

This report presents also other avenues of improvement that could be pursued in future work:

- Review relevant operating procedures such as the "**PROCEDURE TO PROTECT FOR THE LOSS OF PHASE II IMPORTS**" in line with the proposed recommendations of this report.
- Pursue the analysis of forecasted TTC for Phase II as a pilot program (propose to gather information and review it later).
- Investigate the possibility of monitoring of additional analysis parameters such as PJM voltage drop, etc.

These recommendations will be presented as appropriate to internal ISO-NE, NYISO and PJM committees for further actions.

[1] Formal authorization from NYISO and PJM must be obtained.

1 Introduction

The method to determine the limit over the TÉ-NE HVDC interconnection was established more than 15 years ago. Several changes have happened since then, including the establishment of Open Market in PJM, NY and NE and the addition of important blocks of generation on these networks, and the elimination of the loss of the Hydro-Quebec system as a criteria contingency. These changes could have a real impact not only on the transfers affecting the TÉ-NE HVDC line but also on how the market can react to it. It is recognized that NYISO & PJM may require limitations to transfers on the Phase II facility since the TÉ-NE HVDC interconnection may expose NY & PJM systems to a contingency loss more severe than their internal source contingencies. This effort focused on reviewing limitations caused by these systems. This group did not examine limitations inside of New England

Therefore, it seems appropriate to assess how this limit is applied in today's operation and to determine any improvement to the existing methodology that could maximize the use of this line to the advantage of all parties. The modification of operating practices or the addition of equipment to achieve further improvement could be seen as future steps to this analysis.

1.1 Scope

An *ad hoc* group with NYISO, PJM, ISO-NE and Hydro-Québec TransÉnergie has been created to update the PJM/NY/NE methodologies and procedures for operation of the Phase II HVDC interconnection between New England and Québec.

Representatives of PJM, NYISO, ISO-NE and TransÉnergie will participate in this group and will achieve the following tasks:

- Document the existing methodology used by NYISO and PJM to establish the TÉ-NE interconnection limit and how it is implemented at ISO-NE to control the TÉ-NE HVDC line transfer at reliable levels.
- Discuss the TTC/ATC calculation done by ISO-NE to forecast the effective limit for different time horizons.
- Document the existing methodology used by ISO-NE to post TÉ-NE line transfer capacity (TTC).
- Identify any TÉ and ISO-NE posting rules that may need to be modified to send more accurate ATC values on TÉ-NE line to the market participants.
- Document some real time curtailments on TÉ-NE HVDC line to have a better understanding on how the limit is applied.
- Revise or improve the existing methodology to capture the real time MW margin that may exist on the NY and PJM systems.

- Reviewing, if applicable, the communication protocol between areas if needed to implement the new methodology.
- Identify other means to increase TÉ-NE HVDC line transfer as better coordinated operation, transmission reservation, or other means that could be the base of a second part of investigation.

1.2 Purpose

The actual report captures the findings of the discussion among the participants of the working group. This report will be presented to the TÉ-ISONE Interconnection Committee, the NE IRH Committee, the PJM Operating and Market Committees and the TÉ-NYISO Interconnection Committee.

2 Description of the existing methodology

2.1 Procedure to Determine the Real-time Transfer Capability on TÉ-NE HVDC

The following process is followed each hour by ISO-NE:

The ISO-NE operator reviews the level of Phase II flow for the next few hours using the transaction scheduling software (TRANSMART).

If the scheduled flow on TÉ-NE HVDC is expected to be below 1200 MW

The ISO-NE operator coordinates with the operators at Hydro-Quebec, Sandy Pond and the REMVEC Satellite Control Center.

If the scheduled flow is expected to be above 1200 MW but below the PJM base limit (usually 1400 MW)

The ISO-NE operator contacts the NYISO operator to obtain permission to use margin on the NY system.

The NYISO operator verbally communicates the margin that ISO-NE is authorized to use.

The ISO-NE operator enters this value into the appropriate data well (“authorized margin”) on the L/O TÉ-NE HVDC display.

The ISO-NE operator adjusts the schedule in TRANSMART, if necessary, and coordinates this schedule with the operators at Hydro-Quebec, Sandy Pond and the REMVEC Satellite Control Center.

When the TÉ-NE HVDC schedule is expected to drop below 1200 MW, the ISO-NE operator notifies the NYISO operator that ISO-NE no longer needs margin on their system and enters zero in the appropriate data well (“authorized margin”) on the L/O TÉ-NE HVDC display.

If the scheduled flow is expected to be above the PJM base limit (usually 1400 MW)

The ISO-NE operator contacts the NYISO and PJM operators to obtain permission to use margin on those systems.

The NYISO and PJM operators verbally communicate the margin that ISO-NE is authorized to use.

The ISO-NE operator enters these values into the appropriate data wells ("authorized margin") on the L/O TÉ-NE HVDC display

The ISO-NE operator adjusts the schedule in TRANSMART, if necessary, and coordinates this schedule with the operators at TÉ, Sandy Pond and the REMVEC Satellite Control Center.

When the TÉ-NE HVDC schedule is expected to drop below the PJM base limit (usually 1400 MW)

The ISO-NE operator notifies the PJM operator that ISO-NE no longer needs margin on their system and enters zero in the appropriate data well ("authorized margin") on the L/O TÉ-NE HVDC display.

PJM and NYISO operators will verbally communicate to ISO-NE any changes to base limits or margin sensitivities.

2.2 Determination by NYISO and PJM of the TÉ-NE HVDC Limit

2.2.1 TÉ-NE Base Limit base on PJM Interface Limit

Joint ISO-NE / NYISO / PJM studies identify external contingencies that can have a worse effect on the PJM and NY than the worst internal contingency for which these individual systems are normally protected. For example, the loss of Mystic 8 & 9 generating units or Millstone 2 & 3 generating units can, at times, be considered a single contingency. NYISO & PJM have been determining operating limits for Phase II (or Sandy Pond DC Tie), which constitutes a large single source contingency.

PJM allows flows on Phase II up to a base limit (around 1400 MW) which represents the maximum level of an ISO-NE source contingency allowable without special authorization.

On a daily basis PJM evaluates the maximum size of the ISO-NE Phase II contingency such that it is not more severe than PJM internal contingencies evaluated when PJM is operating to the PJM limit. This limit is referred to as the *PJM Base ISO-NE Phase II Contingency Limit.*

2.2.2 TÉ-NE Marginal Limit base on PJM Interface Limit

With additional analysis and communication between ISO-NE and PJM, the magnitude of the allowable maximum loss can be increased based on the system conditions. An operating *Margin* is made available for ISO-NE to increase the Phase II transfer. ISO-NE monitors the PJM interface limits and actual flow. ISO-NE can request PJM to forecast the available Margin over an agreed upon time period. If available, PJM will authorize ISO-NE to use this margin. The *Margin* is calculated from the lesser of the East or Central (and under some conditions the Western) interfaces. The *Margin* is the smallest difference from the state estimator (SE) flow on the interface and the limit of that interface. The *Max Phase II Contingency Size* is equal to the *Base ISO-NE Phase II Contingency Limit* plus the authorized *Margin* (*the margin authorized for Phase II may not be as large the actual margin).*

In the PJM EMS the name of the contingency is "ISO-NE SANDY POND TIE (PHASE II) TRIP".

A *sensitivity factor* is used in the margin calculation of the Phase II Import limit. The *PJM Transfer Margin Sensitivity factor* is defined as the number of MW of increase in the *PJM Base ISO-NE Phase II Contingency Limit* allowed for each one (1) MW of Transfer *Margin*. Each PJM interface has an associated Transfer Margin Sensitivity. Usually, the PJM Transfer Margin Sensitivity Factors for the Phase II Import limit is 1.00 for all three PJM Transfer Interfaces. By exception, PJM notifies ISO-NE of any required change in the Transfer Margin Sensitivities and ISO-NE modifies their calculations to reflect the change in the factor. The normal '1.00' PJM Transfer Margin Sensitivity factor can change depending on transmission system topology. For example, when the 5018 line is out of service, this sensitivity factor can change to 0.6.

Max Phase II Contingency Size = Base ISO-NE Phase II Contingency Limit + (Margin X Sensitivity Factor)

2.2.3 TÉ-NE limit base on NY Interface Limit[2]

The calculation of the TÉ-NE Limit requires the examination of four (4) different sets of reactive conditions in NY. Three (3) of the NY calculations are based on station voltages; Rochester 345, Oakdale 345, Oakdale 230.The remaining NY calculation is based on MW flow across the Central East Interface.

[2] **PROCEDURE TO PROTECT FOR THE LOSS OF PHASE II IMPORTS, January 1991**

The TÉ-NE transfer limit is based on a similar set of equations for voltage station in the form of:

= Station Base NE/NB Contingency Limit + Station Margin Sensitivity x Authorized Voltage Margin

There is specific base limit, Margin sensitivity factor and authorized margin for each monitored substation.

The TÉ-NE limit equation due to C/E interface take the form of :

$$\frac{\text{(C/E Crit. Transfer Level - forecasted C/E Transfer)}}{\text{Phase II C/E Distribution Factor}}$$

Where:

C/E Crit. Transfer Level is the post-contingency transfer limit for the C/E interface based on NYISO reactive conditions;

Forecasted C/E Transfer is the forecasted C/E transfer for the next hour;

Phase II C/E Distribution Factor is the number of MW by which the C/E flow would be increased for each one (1) MW of the total loss of source in NE as a result of a single contingency.

The C/E limit is normally the most limitative of the four reactive limit conditions.

2.3 Methodology used by ISO-NE to Forecast and Post TÉ-NE Line Transfer Capacity (TTC)

The forecast TTC values for the Phase II interface, which are posted each day for the following day and beyond, are derived from known limitations in the New England and Hydro-Quebec systems only and do not take into account any potential reduction in transfer capability resulting from restrictions which may be imposed by New York and/or PJM in near real-time based on their assessment of the maximum single resource contingency limits.[3] These Phase II limitations are imposed in near real-time once Margin levels are identified. This methodology allows for advance transmission service reservations and therefore corresponding transactions to be accepted up to the TTC or maximum possible hourly transfer capability prior to applying limitations caused by reduced levels of Margin.

[3] One of the reasons the process of developing forecasting TTC values does not take into consideration restrictions that may be imposed by New York and/or PJM in near real-time is that Transmission Providers for facilities where advance reservations were required (such as Phase II) did not want transmission sales to be restricted by TTC values that could possibly end up being greater than forecasted values. The amount of transmission that a Transmission Provider can offer is directly related to the forecasted TTC values. If the requirement for advance reservations is eliminated, as ISO-NE advocates, it would remove this impediment to forecasting more realistic TTC values that reflect ISO-NE's best judgment regarding limitations which may be imposed by New York or PJM.

Basis For TTC

TTCs for NEPOOL interfaces are forecast by the ISO based on thermal, voltage, or stability limitations of the ties that comprise the interface. Power flow analysis is used to ensure that physical limits will not be violated for credible contingencies.

Future Forecasts

The TTC forecast for periods beyond 40 days out is based on seasonal operating studies that take into account anticipated peak loads and generator maintenance schedules.

Within 40 days, a base TTC is calculated from historical "all lines in" data that takes into account seasonal load distributions. The base TTC is adjusted daily into a forecast value that accounts for:

- Forecast loads
- Actual and scheduled transmission and generator outages in NEPOOL and neighboring systems
- Changes in facility ratings
- Anticipated loading of generators
- Anticipated inter-Area schedules

Updates To TTC

The ISO evaluates all TTC values, with the exception of yearly values, for each interface a minimum of once per business day and whenever changes in system conditions warrant.

3 Possible Improvement to the Existing Methodology

3.1 Investigate the Possibility to Compare Hourly Scheduled Values with the PJM Anticipated TÉ-NE HVDC Limit

A study was performed to evaluate if the Margin values as calculated by the Day-ahead Markets in both New York and PJM provided a suitable approximation of the Real-time Margin value on these systems and provided suitable information to anticipate the TÉ-NE HVDC import limit in Day ahead or hour ahead time frame.

The results show that the RT margin on NY Central East was around 75% of the time higher then that foreseen in Day ahead and PJM RT margin was only 50% of the time higher than the Day ahead values. Therefore, the group concluded that the level of accuracy of the Day-ahead values being indicative of what may be expected for

Margin in Real-time are well below that desired level to serve as the basis of a reasonable forecast of expected Margin.

3.2 ICCP Address For Authorized Margins

ISO-NE operators get verbally from PJM and NYISO the authorized margin for Phase II and derive from them the Phase II real time limit. A*s a result of this effort, ISO-NE now posts to the ICCP network the authorized margin numbers so that NYISO, PJM, and HQTÉ can view what is being used in real time.* A description of the values on ICCP are presented in the following table:

DESCRIPTION	
PJM_EAST_AUTH	MARGIN
PJM_CENT_AUTH	MARGIN
PJM_WEST_AUTH	MARGIN
ROCH_345_AUTH	MARGIN
OAKD_345_AUTH	MARGIN
OAKD_230_AUTH	MARGIN
CENT_EAST_AUTH	MARGIN

3.3 Revision of the ISO-NE TTC/ATC Posting

Currently ISO New England does not revise the forecasted TTC/ATC values posted due to the very short timeframe that Margin values are actually known. If methods can be developed to accurately develop forecasts (for example, 24 hours in advance) of the level of Margin PJM and/or New York would expect to grant in real-time these posted values could be revised and have value to the Transmission Customer/Marketer. There is an issue with inaccurate forecasts placing undue restrictions on the interface such that energy that could have been allowed to flow when additional hourly Margin is granted was not even considered. This is due to the requirement that all transactions receive confirmed advance Transmission Service from at least one of the New England Phase II Transmission Providers prior to submittal to the New England Market.

The current optimistic method allows for the Transmission Service to be issued in advance and thus allows transactions to be submitted to the New England Market with the intent that Margin will be granted when called upon. In the instance that not enough Margin is granted in the hour ahead timeframe, the New England Control Room Operators will impose curtailments to achieve the transfer level of the base limit plus any Margin that was actually granted. This hourly evaluation is continued until the Market signals for transfers above the base limit concludes.

3.4 *Automatic Authorization of the Margin Available*

Automatic authorization of available margin was reviewed by the study group as a potential improvement to the utilization of Phase II. At the present time NYISO and PJM are reluctant to implement any automatic authorization of real-time margin.

The NY Central East transfer limits, PJM East, Central and West transfer limits represent wide-area voltage stability limits and ensuring that the system operates within these limits at all times for both internal and external contingencies is critical to the reliable operation of the interconnected transmission system. Automatically authorizing margin based on raw real-time data alone may not capture upcoming conditions (such as line outages, generator outages, load changes, etc) known to system operators which provide a complete picture of the near term operation of the transmission system. NYISO and PJM asserts that the verbal communication between ISOs during the manual process of authorizing margin increases operator situational awareness and this benefit to reliable system operation is greater than the potential time-saving benefit of automatic authorization of margin.

3.5 *Revision of the Sensitivity Factor used by PJM*

PJM has indicated that it will revise its present methodology to better capture the real impact of loss of source in NE on the PJM interfaces or conversely, the impact of available margin on the PJM interfaces on the TÉ/NE transfer limit. Therefore, PJM will evaluate the distribution factors of loss of source in NE on the three PJM interfaces. The inverse of the distribution factors will be substituted to the sensitivity factors in the **Max Phase II Contingency Size** equation as shown below:

Max Phase II Contingency Size = Base ISONE Phase II Contingency Limit + ((Margin)x(Sensitivity Factor) / (distribution factor))

The distribution factor is the number of MW by which the flow across the respective PJM interface would be increased for each one (1) MW of the total loss of source in ISO-NE as a result of a single contingency. Based on loadflow analysis, PJM will implement 0.60 as the initial distribution factor. *….this will provide the operators with more meaningful indication of PJM interface response to loss of Phase II…*

In principle, where the existing methodology might indicate an additional 100 MW of transfer capability above the base level on Phase II, the proposed inclusion of the 0.60 distribution would indicate an additional transfer capability of 167 MW above the base level

3.6 Improve TE/NE Limit Posting Transparency

A proposal has been considered, where an informational posting would be developed indicating relevant real-time limits and flows from PJM and New York. This proposal is presented in Appendix 1. However, this real-time information would be of nominal value to the Market Participant as it is indicative of current conditions and should not be used as a reliable forecast value. *Before this proposal is advanced, a response from the interested parties is needed to determine the value of this proposal.*

4 Identify Other means to Evaluate the TÉ-NE HVDC Line Transfer Capability.

4.1 Use of IDC & TLR Process

4.1.1 HQTE Proposal

Using the IDC (Interchange Distribution Calculator) and the TLR process (TLR) as a tool for transaction curtailments on Phase II would benefit Market Participants on that tie as well as all other participants (Transmission Providers, Control Areas and Reliability Coordinators) in the transparency of the curtailment process. Indeed, the tool can communicate at the same time the information to all interested parties. Also, after the fact analysis of curtailments may be investigated at any time by the participants. The tool relies on Distribution Factors to determine the MW level of curtailments for each transaction that affect a specific flowgate instead of relying to human judgment to decide if curtailments need be and the appropriate level in MW to apply. Also, by having to report the TLR (Transmission Loading Relief) level each hour, monitoring of real time congestions in effect is more accurate and curtailment levels are optimized.

Moving to the IDC would require though some modifications in the process of monitoring Phase II impact on PJM interfaces (East, Central and West). Actually, PJM applies a fix limit (1400 MW) on Phase II and approves/denies requested margins from ISO-NE. This fix limit is a Post Contingency Limit to prevent overload on PJM interfaces may a contingency occurs on Phase II.

A better approach suggests instead to determine one or more real time dynamic limit(s) that if overloaded would severely impact stability of PJM interfaces.

Applying the new limit(s) to appropriate IDC flowgates could then be monitored against congestions in real time with the IDC tool.

4.1.2 ISO-NE Response

Although there may be some merit to the concept of addressing immediate concerns by using the NERC IDC for controlling flows over Phase II, any potential gains would come at the loss of important beneficial features the current method of applying Margin offers. This would have an overall negative effect on regional control of procedures, local Markets and in general System Operations in the Northeast. Consider also that the use of IDC in this manner is not consistent with its design intentions and may have negative effects beyond what has already been identified. Therefore ISO New England does not support this proposal at this time.

(See additional information in Appendix 2).

4.1.3 NYISO Response

NYISO does not support the proposed use of the IDC as a tool for transaction curtailments on Phase II and is in general agreement with ISO-NE. .

4.1.4 PJM Response

PJM does not support the proposed use of the IDC as a tool for transaction curtailments on Phase II and is in general agreement with ISO-NE. The IDC is presently used to determine the impacts of Control Area to Control Area power transfers on a flowgate. The operation of Phase II differs from this in that it is not the transfer of energy across Phase II itself that creates the potential reliability concern, rather it is the in-rush of energy into the NE system upon its loss that is the concern. Use of the IDC to curtail transactions across Phase II could place restrictions on the MEN system which may be inconsistent with applicable interpool operating agreements which were developed to conform to the Presidential Permits.

5 Recommendations to Improve the Existing Methodology

5.1 Improve PJM Calculation Method

PJM will revise its present methodology to better capture the real impact of loss of source in NE on the PJM interfaces. *This will provide the operators with more meaningful indication of PJM interface response to loss of Phase II*. The inverse of the distribution factors will be substituted to the sensitivity factors in the **Max Phase II Contingency Size** equation as shown below:

Max Phase II Contingency Size = Base ISONE Phase II Contingency Limit + ((Margin)x(Sensitivity Factor) / (distribution factor))

In principle, where the existing methodology might indicate an additional 100 MW of transfer capability above the base level on Phase II, the proposed inclusion of the 0.60 distribution would indicate an additional transfer capability of 167 MW above the base level. ISO-NE and PJM are presently discussing how this information will be interfaced between their respective operators.

5.2 *Improve Posting Limit Transparency*

Publicly posting additional margin related information.

Develop and maintain a single public posting that would identify real-time values indicating limits and flows on the relevant interfaces in New York and PJM. An example of such a posting can be found in Appendix 1. In order to support a single posting all parties (New York, PJM and New England) must agree that the release of this information is appropriate and that each area is responsible for the accuracy of the information they are supplying.

While any information can be welcome, the user of the real-time information contained within this sample posting would have to realize that it is subject to change at anytime, it's not even a forecast based on analysis. It's simply raw real-time data. It does not provide a complete picture of what a System Operator is using to operate the system; at times other over reaching parameters may need to be considered. *Before this proposal is advanced, a response from the interested parties is needed to determine the value of this proposal.*

5.3 *Follow up on Future Curtailments*

The curtailment of transfer on Phase II has been a concern in the past because it was difficult to document them. These curtailments have been more rare in recent years but there is a need to put in place a procedure to analyze future curtailments in a more expeditious way. It is proposed that any significant curtailment to programmed deliveries on Phase ll should be examined by the parties involved.

These limitations on Phase II could come from internal TÉ or ISO-NE system conditions or from systems conditions external to TÉ and ISO-NE: PJM and NY. The actual known external limitations on Phase II are one of the followings:

In NY:

CE limit for the loss of Phase II

Rochester 345kV voltage limit

Oakdale 345 kV voltage limit

Oakdale 230kV voltage limit

In PJM:

PJM west interface limit

PJM central interface limit

PJM east interface limit

These external limitations are supported by real time data acquisition that is available to ISO-NE and TÉ.

This simple process could be used to review curtailments:

- Any curtailment to Phase II deliveries should be verbally transmitted from ISO-NE to TÉ giving the reason of the limitation;
- Any external limitation that is not confirmed by real time data acquisition should be investigated further by a joint TÉ, ISO-NE, NYISO and PJM RT supporting staff.

The following information should be collected by the operators to help the investigation:

- Date, MW curtailed and duration;
- Collect NYISO and PJM real time data of the monitored interfaces;
- Is the limitation the result of a forced outage or a planned situation ? (give details, expected duration);
- Was the outage announced in advance?

A summary report which includes the collected information and the result of the investigation will be submitted to the Joint TÉ-ISO NE Interconnection Committee.

5.4 Other Recommendations

- Review relevant procedures such as the "**PROCEDURE TO PROTECT FOR THE LOSS OF PHASE II IMPORTS**" in line with the proposed recommendations of this report.
- Pursue the analysis of forecasted TTC for Phase II as a pilot program (propose to gather information and review it later).
- Investigate the possibility of monitoring of additional analysis parameters such as PJM voltage drop, etc.…

Appendix 1: Template for Hydro-Quebec Phase II limit

INTERFACES	Actual Margin MW	Authorized Margin MW	Base Limit MW	Import Limit MW
PJM EAST	1833	0	1400	1400
PJM CENTRAL	2044	0	1400	1400
PJM WEST	1693	0	1400	1400
NY Rochester 345kv	2170	310	1725	2035
NY Oakdale 345kv	2475	165	1855	2020
NY Oakdale 230kv	3870	0	2000	2000
NY Central-East	1078	999	0.28 (D Factor)	3568
Lowest Limit				1400
PHASE II RT Flow				**1350**

Notes: Export limit is the base limit plus the authorized margin. NY C/E export limit is based on the authorized margin divided by the D Factor. Margin associated with NY Station Voltages has been converted to MW.

Appendix 2: ISO-NE Response on IDC Proposal

Since the Phase II interconnection facility was first put into service, in accordance with the amendment to the Presidential Permit[4] to operate the facility, the level at which the facility can be operated has been limited by New York and PJM regarding the effects of the contingent loss of the facility on their respective systems when operated at high transfer levels. This requirement was implemented in operation through a join operating procedure which TransÉnergie has proposed to modify by the use of the NERC IDC methodology.

Making use of the NERC Interchange Distribution Calculator (IDC) and the practice of issuing Transmission Loading Relief (TLR) would seem to offer an approach that is more transparent, industry recognized, and more consistent in terms of the process by which adjacent Control Areas impose limits on neighboring systems when certain flows resulting from potential contingencies would adversely impact them.

Issues to Consider

There is some benefit to moving away from the current method of issuing Margin, in favor of using the NERC IDC Methodology. However, there are also serious detriments that would need to be addressed. The following is a Benefits vs. Detriments analysis to help sort it out.

Benefits

Potentially Increase Real-Time Available Capacity – If there are inefficiencies in the process and/or frequency by which Margin availability in the PJM and New York systems is currently determined, it's possible that this change could improve the situation. In effect, this would be maximizing the Margin, with TTC values set at 2,000 MW and reductions imposed only by exception when a TLR is called.

Increase Visibility - Any curtailments would be available for anyone interested to view. This would include identification of the Security Coordinator that initiated the TLR.

[4] Amendment to the Presidential Permit PP-76 Authorizing the Vermont Electric Transmission Company to Construct, Connect, Operate and Maintain Electric Transmission Facilities at the International Border Between the United States and Canada (September 16, 1988). The Permit requires that the "combination of the Comerford and Sandy Pond converter stations shall be operated at appropriate levels of import, up to a maximum level of 2000 MW, that do not jeopardize regional reliability or place restrictions on the MEN system, unless such restrictions are agreed to by affected parties…" This Permit requires that the applicant "establish, from time to time, the total amount of power which may be exported from Hydro-Quebec over all DC transmission lines, with the permitted facilities operated in synchronous mode, without jeopardizing regional reliability or placing restrictions on the MEN system, unless such restrictions are agreed to by affected parties…" It also requires that "[P]rocedures shall be established by the applicant in conjunction with the other MEN member systems for determining the allowable level of operation of the facilities permitted herein during MEN system operating conditions which are not covered by the operating studies required…"

Detriments

Improper use of IDC. – IDC was designed to monitor and control parallel path flows. Not all contracts delivered on the Phase II facility impact parallel path flow, as they may not be sourced on the unconstrained side of the flowgates in PJM or New York. Listing all contracts imported on Phase II as having parallel path influence on those flowgates may lead to improper curtailment and other unforeseen problems.

Loss of Market priorities to reduce interface flow. - IDC imposes curtailments based on transmission priority, which doesn't necessarily have any relevance to Market Transactions or any unique Phase II tariff protocols. This can lead to a completely different transaction mix on the restricted interface.

Dependency on the IDC Model – Any erroneous curtailments over Phase II resulting from IDC modeling inaccuracies must go through NERC channels before changes can be implemented. This causes delays and loss of control that is currently held by the Control Areas directly involved. This would be viewed as a step in the wrong direction.

Prorata Curtailment. – Since IDC imposes cuts based on Transmission Priority alone, prorata curtailment of Firm Transactions could become commonplace. For the System Operator this introduces undesirable complexity in assigning small cuts to several transactions, when the current method and the use of Market signals offers greater efficiency in prioritizing transactions. This would be viewed as a step in the wrong direction.

Requesting Margin from PJM and New York is not unique to just Phase II. - Any contingent loss of MW supply in New England in excess of the established Base Limit still requires obtaining Margin in advance. If new generating facilities or external ties with capability greater than the established "Base Limit" were installed, the process of requesting and calculating Margin would need to continue (even if this proposal were implemented).

No gain in forward looking TTC Values - Currently TTC values are posted without regard to the level of Margin expected in real-time. In other words, the forecast TTC is reflective of the optimistic view that full Margin will be granted. This practice should not be changed until methods of reliably and accurately forecasting Margin by New York and PJM can be instituted. Using the IDC will not improve on this approach, TTC's will still be reduced in real-time, however reductions will be based on a Transmission Priority and not Market Priority. This would be viewed as a step in the wrong direction.

Constant State of TLR - System Operators could be issuing TLRs a large percentage of the time. It's conceivable this would be a daily event for several hours of the day, perhaps at times even all hours of the day.

Confusion within IDC – Since IDC is a tool designed to monitor and control parallel path flow over a particular Flow Gate, it would seem that unless modifications are

made within IDC, that other transactions having an impact on the subject PJM or New York Flowgate would be undesirably affected.

ISO-NE Conclusions and Recommendations

Do not use the NERC IDC to impose real-time limits on the Phase II Interconnection Facility.

Although there may be some merits to the concept of addressing immediate concerns by using the NERC IDC for controlling flows over Phase II, any potential gains would come at the loss of important features of the current method of applying Margin. This would have an overall negative effect on regional control of procedures, local Markets and in general System Operations in the Northeast. Consider also that the use of IDC in this manner is not consistent with its design intentions and may have negative effects beyond what we have identified in this document. Therefore ISO New England does not support this proposal at this time. The potential benefits that the use of IDC offered, can be gained through modifications to the current process.

Improve current methodology

Review of current methods and frequency by which New England, PJM and New York calculate transfer capability over the Phase II Facility. *This is primary goal of the Joint PJM, NY, NE & TÉ Working Group currently in progress.*

Investigate the potential for the accurate forecast of Margin for some period of time into the future (Next day, two days ahead, etc.).

Improve transparency

Publicly posting additional margin related information regarding expected transfer levels of the Phase II facility in near real-time.