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PJM and MISO PROPOSAL Congestion Management Seams Issue WHITEPAPER Version 2a

January 14th VERSION

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OUTLINE

1. EXECUTIVE SUMMARY
2. PURPOSE
3. PROBLEM STATEMENT
4. PROPOSAL GOALS
5. ASSUMPTIONS
6. PROPOSAL
   a) Explanation of System Flows
   b) Determine List of Flowgates
      i) Process/Criteria to Determine
      ii) Draft List of Flowgates
   c) Process to Utilize/Monitor Selected Flowgates
      i) Calculation of Market Flows
      ii) Integration of AFC Calculations and Reservations
      iii) Determining NNL Flows Day Ahead
      iv) Comparing Real Time Flows to Day Ahead
      v) PJM Actions when Real Time exceed day ahead
      vi) Interface with the IDC
7. RESOLVED & OUTSTANDING ISSUES
8. EXPECTED VALUE of this PROPOSAL
9. CONCLUSION
10. APPENDICES
    A. Definition of Terms
    B. Possible NERC Policy Impacts
    C. MISO/PJM AFC Coordination Process
    D. NERC Parallel Flow Calculation Procedure Reference Document
    E. IDC Impacts
    F. List of Coordinated Flowgates

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1. EXECUTIVE SUMMARY

a. Attached is the second draft of the PJM MISO Congestion Management Proposal Whitepaper. This second draft differs significantly from the first draft, because it provides far more detail in the areas of Market Flow Calculation, NNL determination, the Tagging of In/Out/Through transactions, and flowgate determination. These additional details are the result of multiple meetings between the RTO's as well as meetings with the NERC community and the industry's associated stakeholders. Some of these review meetings included:

1) Joint NERC CMS, IDCWG, and the MISO/PJM Review Team (NERC ORS and RCWG) Meeting
2) NERC Interchange Sub-committee Meeting
3) MISO/PJM Open Stakeholders Meeting – December 16th

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b. As PJM and MISO expand and implement their respective markets one of the primary seams issues that must be resolved is how congestion management will be implemented in areas that currently do not have similar markets. There are additional equally important MISO and PJM seams issues before FERC, NERC and the Stakeholders. These additional seams issues include ATC/AFC coordination, Contract Tie Capacity, Different Definitions and Procedures, Facilities in Close Electrical Proximity Under Different RTOs, Michigan and Wisconsin Hold Harmless, Single Rate, Tariff, and operational and financial impact on market participants of adding new member(s). These additional seams issues are being addressed in other forums and will be resolved before the PJM market expands.

c. MISO is actively working with PJM and Stakeholders on the development of the Congestion Management (TLR/Market and Market/Market) proposed solutions. MISO and PJM have made significant progress in exploring and developing alternatives for resolving the issues. However, Stakeholders have expressed concern with some of the proposed solutions. Accordingly, MISO is looking forward to additional feedback from the January 16, 2003 Reliability Seams Workshop, written comments on this revised white paper, and any alternative proposals by Stakeholders before considering making recommendations on the solution alternatives. There are still outstanding issues related to allocation of transmission usage and prioritization of flows, tagging of flows in, out, or across market, and the criteria for determining Market/TLR coordination flowgates. MISO will continue to work with PJM and Stakeholders on the development of proposed solutions to the congestion management seams issues. These outstanding issues are detailed in the Resolved & Outstanding Issues section of this paper.

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d. This Whitepaper provides PJM/MISO's conceptual design of the means to resolve this seams issue. The intent of sharing this conceptual design is to facilitate further discussion as well as identify issues as PJM and MISO, finalize their proposed future procedures and systems. The concepts are intended to provide a framework for other RTO's as they implement markets over large regions.

e. This proposed solution will greatly enhance current IDC granularity by leveraging currently developed real-time applications to monitor and react to system flows on flowgates within the regions that do not have markets. In brief the proposal includes the following concepts:

1) Market RTOs will agree to observe limits on an extensive list of coordinated flowgates.

2) Like all control areas, Market RTOs will have Network and Native Load (NNL) impacts upon the coordinated flowgates.

3) Market RTOs will determine these NNL values using various forms of analysis and constrain its day ahead market to honor the NNL contributions upon the selected flowgates.

4) In real-time, Market RTOS will calculate and monitor when the actual and projected flows exceed these NNL limits.

5) Market RTOs will post the NNL MW flow and additional non-firm economic market flow and the actual and projected market flow to the IDC.

6) When there is a TLR3a or higher called on one of these selected coordinated flowgates, and the Market RTO's actual/projected market flows exceed the NNL limits, Market RTOs will redispatch in order to provide the required MW relief, per the IDC congestion management report.

7) When there is a TLR 5a or 5b, all TPs will curtail or redispatch their respective systems to provide their shares of NNL reductions.

8) Because the IDC will have the real-time/projected flows throughout the Market RTO's system (as represented by the impacts upon various coordinated flowgates) the IDC will have enhanced granularity.

Please direct all questions and comments to Tom Bowe (610-666-4776; bowet@pjm.com) or David Zwergel (317-249-5452 and Dzwergel@Midwestiso.org)

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2. PURPOSE

The purpose of this Whitepaper is to provide the philosophy and conceptual design behind PJM/MISO's proposal to resolve the Congestion Management Seams Issue. It is PJM and MISO's intent that comments subsequent to the publishing of this Whitepaper, will allow us to work with NERC in coordinating the required project work. By working together to quickly resolve this seams issue, the NERC Community is addressing an issue that is fundamental to the industry moving toward the Standard Market Design (SMD).

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3. PROBLEM STATEMENT

a. PROBLEM SUMMARY – As PJM/RTO's expand their market footprints, the markets may internalize all generation under a single dispatch and the resulting energy flows are no longer tagged. All generators in a single market/single dispatch can equally serve all loads on network service. Because these flows are no longer tagged the NERC Interchange Distribution Calculator (IDC) no longer has the ability to capture these flows in its calculations. This impact of larger markets is typically referred to as "a loss of IDC granularity." As a result the IDC's diminished granularity it is argued that the IDC output is not as accurate (the schedules selected for curtailment may not be as effective in providing relief) and the RTO flows are no longer available for curtailment (an issue of comparability). As a result of these issues the fundamental questions include:

1) How are parallel flows effectively managed
2) How do non-market operational areas control system flows once the IDC loses current granularity?
3) Are there other ways to maintain and/or enhance IDC granularity?
4) What are the curtailment priorities?

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b. PJM and MISO have further defined this problem/seams issue in its FERC filings and with the NERC MISO/PJM Review Team in the following manner:

1) *BACKGROUND - Parallel flow issues that require close coordination among neighboring utilities exist today throughout the Eastern Interconnection. Parallel flows are a result of the interdependency of the generation dispatch and the transmission system usage between neighboring systems. Parallel flows will continue to exist under larger RTO operations that will likewise require close coordination to maintain reliable operations. Specific issues related to parallel flows issues include: Congestion Management Procedures and ATC/AFC Coordination.*

2) *STATEMENT OF ISSUE – **Congestion Management -** MISO will continue to use a TLR-based congestion management process prior to implementation of the MISO market, and an LMP congestion management*

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process after MISO implements its market. PJM, under its market operations, will use their LMP-based congestion management process and TLR. Because there are two different congestion management methods until a joint and common market is implemented, the RTO's will need to closely coordinate operations to ensure reliability.

3) *COMPLEXITIES*
   a. *In an LMP based market there are no internal transactions to tag. A security constrained economic dispatch is used to dispatch generation for the entire region. Generation transfers are used to adjust the tie line schedules based on the results of the security constrained economic dispatch for multiple control zones.*
   b. *The security constrained economic dispatch currently does not automatically honor external system constraints. Identifying and mitigating congestion impacts due to external system influences requires a different approach than contract path and use of TLR.*
   c. *An effective coordination agreement between MISO and PJM is necessary to minimize the probability of Level 5 TLR's.*
   d. *Market-to-market interfaces must also be addressed once MISO implements its market. Market-to-non-market interfaces will continue to be addressed with other areas of the Eastern Interconnection.*

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4. GOALS of the PROPOSAL: PJM and MISO have committed to developing a solution to the congestion management seams issue by focusing the solution on achieving the following goals:

a. Develop a congestion relief process whereby transmission overloads can be eliminated through a shared/effective reduction in flowgate or constraint usage by MISO, PJM, and other Reliability Coordinators.
b. Develop a procedure for managing congestion when flowgates are impacted by tagged and non-tagged energy flow.
c. Agree on a predefined set of flowgates or constraints to be considered by both organizations, and a process to add to this set as necessary.
d. Allocate usage of flowgates or constraints - Develop agreement by which each RTO will consider its own flowgate or constraint usage as well as the usage of the other RTO when it determines the amount of flowgate or constraint capacity remaining.
e. Develop a procedure for determining priorities of energy flows.
f. Agree on steps to be taken by the two RTOs to unload a constraint on a shared basis.
g. Confirm that the solution will be equitable solution for all parties.
h. Determine whether procedure(s) for managing congestion will differ based on where flowgate is located (I.e., Inside PJM, Inside MISO, Outside PJM and MISO).
i. Determine the best way to calculate net flow due to one LMP market's impact on flowgates outside of that market

5. ASSUMPTIONS

a. Point to Point schedules sinking in, sourcing or passing through PJM/RTO will still be tagged.
b. The IDC is needed for at least the interim between the interconnection's current state and SMD application
c. The LMP market can compute the impacts of the market dispatch on the flowgates at every LMP cycle (5 minutes).
d. Market RTO's EMS has the capability to monitor and respond to real-time and projected flows created by its real-time dispatch
e. The Reliability Coordinator where the flowgate resides will be responsible for monitoring the flowgate, determining the amount of relief needed, and entering the required relief in the IDC.
f. The IDC can be modified to accept the calculated values of the impact of real-time generation in order to determine which schedules require curtailment in conjunction with the required Market RTO's redispatch
g. The IDC will calculate the total amount of MW relief required by the Market RTO (schedule curtailments required plus the relief provided by redispatch).
h. The developed process will be totally auditable and independent.

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PROPOSAL

a. SUMMARY: The MISO/PJM proposal has three significant elements these elements include:

1) **Process to determine the external Flowgates that RTO's with markets will monitor**

2) **Definition of what flows will be assessed and what RTO actions do these flows trigger**

3) **Process to provide the detailed analysis of these flows to the NERC IDC in order to maintain/enhance IDC granularity.**

b. Process/Criteria to Determine Externally Monitored Flowgates: Market RTO will conduct sensitivity studies to determine which external flowgates (outside the Market RTO) The Market RTO's control zone's (currently the Control Areas that exist today in the IDC) NNL flows have a significant affect upon. The Market RTO will perform the following 3 studies to determine which flowgates the Market RTO will monitor and help control:

Study 1) – IDC Base Case (no transmission outages – using the IDC tool)
The IDC can provide a list of flowgates for any user-specified Control Area whose GLDF (Generator to Load Distribution Factor (NNL)) impact is 5% or greater. The Market RTO will use the IDC capabilities to develop a preliminary set of flowgates. This list will contain external flowgates that are impacted by 5% or greater by the current Control Areas that will be joining the Market RTO as Market control zones/areas. Using the *present* control area representation in the IDC (e.g. pre-RTO expansion), if any one generator has a GLDF (Generator to Load Distribution Factor) greater than 5% as determined by the IDC, this flowgate will become a candidate for monitoring by the Market RTO.

As an example, consider the PTDF flowgate #3301:

Flowgate #3301 - Tazewell-Mason 138 kV line

This flowgate is located in the Central Illinois Light Company control area, which is joining the MISO RTO. GLDF obtained from the IDC indicate that there are two units in the Com-Ed control area (Com-Ed is joining the PJM RTO) which have a GLDF greater than 5%.

Although there are about 150 generators in the Com-Ed area that do not have a GLDF greater than 5% (and some units which have a negative GLDF), the fact that there is at least one generator with a GLDF greater than 5% qualifies this flowgate for inclusion in the PJM RTO list of flowgates that this proposal will respect.

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Study 2) – IDC PSSE Base Case (no transmission outages–offline study)

In order to confirm the IDC analysis and to provide a better confidence interval that the Market RTO has effectively captured the subset of flowgates that it has a significant impact upon, a MUST power-flow study will be conducted. The Market RTO will perform off-line studies (using the IDC PSSE base case) to confirm the IDC analysis and will study lowering the % impact threshold to capture any significantly impacted flowgates that fall below the 5% limit.

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Study 3) – IDC PSSE Base Case (transmission outage offline study)

In order to determine outage conditions, if any, that may cause the Market RTO future control zones/areas to have a significant impact on external flowgates, The Market RTO will perform 2nd contingency (n-2) analysis (internal and external outages). This study will be performed offline using MUST powerflow capabilities. Similar to Study 2, the Market RTO will lower % impact threshold to capture any significantly impacted flowgates that fall below the 5% limit.

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Study 4) – Control Area to Control Area –

For those situations where CAs are being added into a market, there will be a flowgate analysis performed to determine which flowgates are impacted by greater than 5% for transactions between each of the CAs joining the market and between each of the CAs joining the market and the market they are joining. This study will use Transfer Distribution Factors (TDFs) from the IDC. Flowgates that are impacted by greater than 5% as determined by the IDC will become a candidate for monitoring by the Market RTO.

Additional ways to help determine this list of flowgates include:

a. PJM and MISO will work with NERC and the TLR history to further validate this list of proposed flowgates.
b. Request all Control Areas in the Eastern Interconnection to provide PJM a list of flowgates (including outage conditions) they believe will be affected by the future PJM control zones NNL flows. This list would be evaluated by PJM and MISO through power-flow studies.
c. PJM will also implement the rulings of the Michigan/Wisconsin Hold Harmless proceedings.
d. This list will be reviewed by various Regional and NERC Committees (ORS/OC) to ensure its appropriateness.
e. Use of a 5% threshold in the studies may not capture all flowgates that experience a significant impact due to market operations. The RTOS have agreed to adopt a lower threshold at the time NERC implements the use of a lower threshold in the TLR process.

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c. Draft List of Flowgates

The following two lists are intended to contrast initial study results and historical information regarding TLR activity. The first list the ECAR staff provided and the second list the MISO staff provided. Those flowgates that PJM's initial analysis have shown the need for inclusion into this proposal are highlighted in **BOLD**.

1. Comparison to List of ECAR's Most Congested Flowgates

History of TLRs Last 12 Months

KANAWA RIVER – MATT FUNK 39 TLRs	AEP	
WYLIE RIDGE 500-345 kV #7 XFMR	36 TLRs	PJM
CLOVERDALE - LEXINGTON 500 kV	26 TLRs	AEP & VP
GHENT 345-138 kV XFMR	25 TLRs	
BLACK OAK - BEDINGTON 500 kV	24 TLRs	PJM
CLIFTY CREEK - NORTHSIDE 138 kV	18 TLRs	
SOUTH CANTON 765-345 kV T3 XFMR	15 TLRs	
BLUE LICK 345-161 kV XFMR	14 TLRs	LGEE
COOK - PALISADES 345 kV	5 TLRs	
BEDINGTON - DOUBS 500 kV	4 TLRs	
GHENT - BATESVILLE 345 kV	4 TLRs	
TWIN BRANCK - ARGENTA 345 kV	4 TLRs	
NEWTONVILLE - CLOVERPORT 138 kV	4 TLRs	
BROWN – SOUTH FAWKES	3 TLRs	
BLUE LICK – BULLIT 161 kV	3 TLRs	
JACKSONS FERRY - ANTIOCH 500 kV	2 TLRs	
KYGER CREEK - SPORN 345 kV	2 TLRs	
CLIFTY CREEK - CARROLLTON 138 kV	2 TLRs	
BENTON HARBOR - PALISADES 345 kV	1 TLR	
MT. STORM - MEADOWBROOK 500 kV	1 TLR	
WEST LEXINGTON - BROWN 345kV	1 TLR	
KAMMER 765-500 kV XFMR	1 TLR	
TWINBRANCH 345-138 kV XFMR	1 TLR	
BROWN – WEST LEXINGTON 345 kV	1 TLR	
FT. MARTIN - PUNTYTOWN 500 kV	1 TLR	
COOK - OLIVE 345 kV	1 TLR	
ARGENTA - PALISADES	1 TLR	

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2. Comparison to List of MISO's Most Congested Flowgates

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Top MISO TLR Flowgates 12/15/2001 - 9/30/2002				
	Number of TLR Events			
FG Name	TLR 3	TLR 4	TLR 5	Total
N.Appleton-LostDauphin 138 for Kewaunee 345-138 TR	28	37	0	65
KEWAUNEE XFMR+KEWAUNEE-N APPLETON	27	16	0	43
Stiles-Pioneer 138 for N.Appl-WhiteClay138	14	23	0	37
EAU CLAIRE-ARPIN 345 KV	27	0	4	31
LOR5-TRK RIV5 161KV/WEMPL-PADDOCK 345KV	27	0	1	28
MWSI	26	0	0	26
Ghent 345/138 Xfmr for loss of Ghent-W. Lexington 345	16	7	0	23
PADDOCK XFMR 1 + PADDOCK-ROCKDALE	21	0	0	21
Stiles-Amberg 138 & Stiles-Crivitz 138 flo Morgan-Plains 345	0	18	0	18
Blue Lick 345/161 XFMR-Baker-Broadford	15	2	0	17
Northside-Clifty Creek 138 (flo) Trimble Co.-Clifty Creek 345	7	10	0	17
Albers-Paris138 for Wemp-Padock 345	16	0	0	16
N.PLATTE-STVL /GENTL-REDWIL	11	0	2	13
Brown South-Fawkes 138 kV	12	0	0	12
Blackhwk-Cor X54 for Paddock-ROR X39 138	11	1	0	12
ROCKDALE XFMR 2 + PADDOCK XFMR	8	2	1	11
Stiles-Amberg 138 for Morgan-Plains 345	2	9	0	11
Poweshiek-Reasnor 161 for Montezuma-Bondurant 345	11	0	0	11

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d. Process to Develop Flowgates on the Fly

1) For temporary Flowgates developed 'on the fly', the same sensitivity analyses as described under section 6B (Process/Criteria to Determine Flowgates) will be performed by the RTO. The intent of this process is to complete all of this analysis and changes in 60 minutes or less –or as close to real-time as possible.

2) If the temporary flowgate meets the criteria as specified, the RTO will incorporate the new flowgate into the monitoring process and the RTO will calculate both a market flow and NNL value as soon as possible. The RTO will provide these values to the IDC in the same manner as market flows and NNL values are provided to the IDC for permanent flowgates. Off-line load flows required to perform the analysis and determine any values needed will saved on a daily basis to expedite the required calculation.

3) As is presently the case for any temporary flowgate, the IDC will identify contracts sourcing out of or sinking into the RTO that exceed the IDC threshold level and are therefore subject to curtailment.

4) It is expected that discussions between the Reliability Coordinator creating the temporary flowgate and the LMP Market operator will occur to ensure that any contributing circumstances requiring the temporary flowgate are understood and known.

5) If in the event of a system emergency (TLR 5 or higher) and the situation requires a response faster than the process may provide, the RTO's will coordinate respective actions to provide immediate relief until final review.

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This procedure will address the concern that in the day ahead market we had not constrained the flows for this new flowgate and determined an NNL limit. PJM will write a procedure that in essence will have a daily saved case – do a power flow analysis - that we will use to establish needed base NNL values when required. ¶

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e. Defining Monitored Flows

1. The transfer of energy from generating resources to customer load results in flows across the transmission system. This associated energy flow is either scheduled or unscheduled as well as Firm or Non-Firm.

2. 'Unscheduled' flow (a.k.a. 'loop flow') is the result of physics. Energy will flow across the paths of least resistance which may of may not be path that the energy was scheduled, or 'contracted' to flow on. When energy is transferred between two willing parties some of that energy may flow on the transmission facilities of a third party. It is this flow across the third parties facilities that are referred to as loop flow or unscheduled flow.

3. Additionally, unscheduled flow can occur as the result of serving native customer load. As part of an interconnected system, each control area will impact other control areas' transmission facilities as the control area serves its own native load with its available capacity. Problems arise when these parallel flows far exceed the flows typically generated by network resources serving network load.

4. The combination of scheduled flow, unscheduled flow and native load (both internal and external to a control area) can result in actual flows exceeding the limit of a transmission facility. Controlling this flow is typically achieved through generation shifts via NERC TLR implementation or redispatch.

5. A primary concern related to larger markets/control areas is that as additional control areas are incorporated and the footprint of the new area expands, the internalized generation of this larger area now has the ability to serve all loads using network service. These flows then become intra-area transfers, which are no longer tagged in the NERC IDC. Consequently, the IDC does not have the ability to capture and control these intra-area flows; thereby, impacting the TLR process. The remedy to this concern involves separating the flows that are above and beyond the serving of native load – these flows being the result of the "economic dispatch".

6. "Market Flows" are defined by MISO/PJM as the flows generated from both the Economic Dispatch and the Network to Native Load (NNL) flows created by a control areas dispatch. As such there are firm and non-firm components to the Market Flows. The firm components consist of both the flows generated by NNL and those schedules flowing on Bucket 7F transmission reservations. Network and native load is all load that is served by the output of any network resources. The NNL Flows are in essence the parallel flows created by the firm use of one CA serving its load upon another CA's particular. For the purposes of this proposal, both the firm transmission (Bucket 7F) and the NNL will be referred to as "NNL".

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The following chart attempts to compare the priority of flows whether they be the result of transaction based impacts or LMP impacts.

	Transaction Based Impacts	LMP Based Impacts
MARKET FLOWS	Tagged Non-Firm Network 6-NN→	→ Economic Dispatch
	Network and Native Load →	→ Network and Native Load
	Tagged Firm 7F →	

7) The key to the problem is determining the impact of the RTO's "Economic Dispatch" on the various third party flowgates. When the values of these economic dispatch flows are known the flows can be treated as equivalent to non-firm network (Bucket 6NN). As such, the RTO/Interconnection can control these economic dispatch flows under the same TLR 3 actions used to reduce 6NN flows.

8) The proposed method of determining these Economic Dispatch Flows is to back out the firm NNL flows, leaving the remainder as the ED flows. The reverse engineering to determine these flows could be represented by the following equation:

ECONOMIC DISPATCH Impact on a Flowgate	=	RTO's Total Market Flows On Flowgate	-	RTO's NNL Impacts On the Flowgate

9) If the impact of the economic dispatch on the flowgate is greater than the Network Native Load impact, this difference will be available for curtailment under a TLR 3. Effectively, the impact of the PJM RTO economic dispatch over and above the impact of PJM RTO's Network Native Load is 'tagged' in the IDC with a priority of Non-Firm Network (6-NN).

10) The next two sections define how the RTO will calculate the Total Market Flows and determine the NNL value.

f. Determining Real-Time Market Flows

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1) The determination of "Market Flows" builds on the "Per Generator" methodologies that were developed by the NERC Parallel Flow Task Force. The "Per Generator Method Without Counter Flow" was presented to the NERC Security Coordinator Subcommittee (SCS) and the Market Interface Committee (MIC) and both committees have approved this methodology. This methodology is presently used in the IDC to determine NNL contributions (refer to Appendix D, Parallel Flow Curtailment Procedure Reference Document).

2) By expanding on the Per Generator Method, the 'Market Flow" calculation evolves into a methodology very similar the "Per Generator Method With Counter Flow" while providing a granularity on the order of the most granular method developed by the IDC Granularity Task Force.

3) Similar to the Per Generator Method, the calculation method is based on Generator Shift Factors (GSFs) of an LMP area's assigned generation and the Load Shift Factors (LSFs) of its load on a specific flowgate, relative to a system swing. The GSFs are calculated from a single bus location in the base case (e.g. the terminal bus of each generator) while the LSFs are defined as a general scaling of the LMP area's load. The Generator to Load Distribution Factor (GLDF) is calculated as the GSF minus the LSF.

4) The determination of the "Market Flow" contribution of a unit to a specific flowgate is the product of the generators GLDF multiplied by the actual MW output of that generator.

5) The total "Market Flow" of a specific flowgate is the sum of the "Market Flow" flow contribution of each generator in the LMP area.

6) The evolution of the Per Generator Method into the "Market Flow" calculation occurs from the following enhancements:

   a. The contribution from *all* LMP area generators will be taken into account.
   b. In the Per Generator Method, only generators having a GLDF greater than 5% are included in the calculation. Additionally, generators are included only when the sum of the maximum generating capacity at a bus is greater than 20 MW. These calculations will use counter-flows down to 0% with no threshold. NERC may need to modify the IDC to model counter-flows to ensure comparability.

   c. The contribution of all LMP area generators is based on the present output level of each individual unit.

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d. The contribution of the LMP area RTO load is based on the present demand at each individual bus.

7) By using the real-time values of generation and load, the "Market Flow" calculation is effectively implementing the most granular method of the six IDC Granularity Options considered by the NERC IDC Granularity Task Force (i.e. Option #1 – Every Generator to Every Load Bus).

8) Further considerations:

9) Units assigned to serve an LMP area's load do not need to reside within the LMP area's footprint to be considered in the "Market Flow" calculation. However, units outside of the LMP area will not be assigned when it is expected that those units will have tags associated with their transfers.

10) Additionally, there may be situations where the participation of a generator in the LMP market would be less than 100% (e.g. a unit jointly owned in which not all of the owners are participating in the LMP market).

11) Finally, imports into or exports out of the LMP area must be properly accounted in the determination of "Market Flows":

a. when the actual generation of the LMP area exceeds the total load of the LMP area, the LMP area is exporting energy. These exports are tagged transactions that must be accounted for in the "Market Flow" calculation. This will be done by scaling down the actual output level of each LMP area generator by the load to generation ratio.

b. when the actual generation of the LMP area is less than the total load of the LMP area, the LMP area is importing energy. These imports are tagged transactions that are not to be included in the determination of "Market Flows". As such, the LMP area's generation is not scaled (scaling = 1.00).

c. This scaling factor may be adjusted based upon the selection of which of the proposed tagging options is implemented.

12) Summary of calculations:

For a specified flowgate, the "Market Flow" impact of an LMP area is given as:

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Total "Market Flow" = Σ ("Market Flow" contribution of each unit in the LMP area)

where,

"Market Flow" contribution of each unit in the LMP area =
(GLDF) (Real-Time generator output) (Participation Percent/100)
(Scaling Factor)

and,

GLDF is the Generator to Load Distribution Factor

Real-Time generator output is the present MW level of the generator

Participation Percent is the share of the unit participating in the LMP area's market

Scaling Factor is the total LMP area load to total LMP area generation ratio (Scaling Factor equals 1.00 if the LMP area is importing).

13) The real-time and projected "Market Flows" will be calculated on-line utilizing the LMP area's state estimator model and solution. This is the same solution presently used to determine real-time LMPs as well as providing on-line reliability assessment and the periodicity of the Market Flow calculation will be on the same order.

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14) Inputs to the state estimator solution include the topology of the transmission system and actual analog values (i.e. line flows, transformer flows). This information is provided to the state estimator automatically via SCADA systems such as NERC's ISN link.

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15) Using an on-line state estimator model to calculate "Market Flows" provides a more accurate assessment than using an off-line representation for a number of reasons:

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a. The calculation incorporates:

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1. Actual real-time and projected generator output. Off-line models often assume an output level based on a nominal value such as unit maximum capability but there is no guarantee that the unit will be operating at that assumed level or even on-line. Off-line models may not reflect the impact of pumped-storage units when in the pumping mode, these units may be represented as a generator even when

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pumping – a real-time calculation explicitly represents the actual operating modes of these units.

2. Actual real-time bus loads. Off-line assessments may not be able to accurately account for changes in load diversity. Off-line models are often based on seasonal winter and summer peak load base cases. While representative of these peak periods, these cases may not reflect the load diversity that exists during off-peak and shoulder hours as well as off-peak and shoulder months – a real-time calculation explicitly accounts for load diversity. Off-line assessments may also reflect load reduction programs that are only in effect during peak periods.

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3. Actual real-time breaker status. Off-line assessments are often times bus models where individual circuit breakers are not represented; on-line models are typically node models where switching devices are explicitly represented. This allows for the real-time calculation to automatically account for split bus conditions and unusual topology conditions due to circuit breaker outages.

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b. The calculation rate of the on-line assessment is much quicker and accurate than an off-line assessment as the on-line assessment immediately incorporates changes in system topology and generators. Facility trippings and outages are automatically incorporated into the real-time assessment.

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Options for Calculating Transaction Distribution Factors: The preceding section outlined the proposed method to determine the effects of untagged market flows upon external flowgates. This section outlines various options that will ensure that the tagged transactions have as much if not more granularity within the NERC IDC. Any of the three options provides greater granularity in the calculations than currently provided by the IDC.

Option 1: PJM would calculate control area to control area distribution factors in the PJM EMS and upload these factors to the IDC for use in determining transaction impacts on constrained flowgates. PJM will calculate factors for all control area pairs of which PJM is a part, on all flowgates that have been identified for PJM/MISO congestion management coordination. The IDC will simply remove this set of factors from its calculations, and accept those calculated by PJM for use in its determination of transaction effects on the applicable flowgates. All transactions for which PJM is either the source or sink would be tagged as into or out of the entire PJM RTO. This option would provide the advantage of calculating transaction distribution factors based on marginal generation rather than a static model. The method by which transaction flow impacts are removed from network native load impacts in the Market Flow calculation requires further discussion.

Option 2: PJM would determine based upon the look-ahead solutions in the Unit Dispatch System the locations on the system where generation is expected to be marginal, and upload this information to the IDC. It may even be possible for PJM to indicate where the generation would move depending on the MW amount of curtailments that are necessary, if in fact the IDC would be able to use this information in its solution. This information would be transmitted in the form of adjustments to the generation participation factors that are already present in the IDC. The IDC could then utilize this information in the calculation of control area to control area distribution factors instead of the current methodology of utilizing a static model of all generators within a control area's boundaries. These locations could be on a zonal level (at a minimum) or as granular as individually identified generators. Note though, that this option carries the same limitation as Option 1 as far as explicitly accounting for transactions in the Market Flow calculation.

Option 3:

Assumptions (*See "Market – Proxy – Source/Sink TDF Diagram" below)*

- A separate proxy bus will be designated within PJM along the PJM border for each source/sink outside PJM.
- PJM will calculate the TDF for flow between the PJM Market [marginal generator(s)] and each proxy bus for each "shared" flowgate. It is understood that the marginal generator(s) for one shared flowgate may differ from the marginal generator(s) for another shared flowgate.

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- The IDC will calculate the TDF between each proxy bus and each source/sink outside PJM.
- Tag naming convention - Within the tag name, a dot would separate PJM from the name of the proper proxy bus within PJM. See the following examples:

For tags into PJM: Tag from **External Source** to **Proxy Bus** to **PJM**.
(eg. **TVA→PJM.TVAProxy**)

For tags out of PJM: Tag from **PJM** to **Proxy Bus** to **External Sink**.
(eg. **PJM.TVAProxy→TVA**)

Procedure

PJM uploads the following to the IDC for each "shared" flowgate for both the current hour and next hour:

- Transfer Distribution Factor (TDF) from PJM Market to each proxy bus (for tags out of PJM).
- TDF from each proxy bus **into** the PJM Market (for tags into PJM).
- **Note:** Market Flow impacts (NNL + ED = MF) would also be uploaded to IDC for all "shared" flowgates

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IDC would then calculate the total impact of each tag to/from PJM on a constrained flowgate by adding the following values:

- The TDF for the flowgate that was calculated and submitted by PJM for flows between the PJM Market and the proxy bus named in the tag
- The TDF for the flowgate that was calculated by the IDC for flows between the proxy bus and the external source/sink named in each tag

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Once the IDC has calculated the total impact of each tag to/from PJM on the constrained flowgate as described above, it can proceed in compiling a proper and accurate curtailment list – just as is done today. By providing the TDFs as described in this option, it will also be possible to calculate - for each shared flowgate - the effect of the market response when a tagged transaction into or out of PJM is curtailed.

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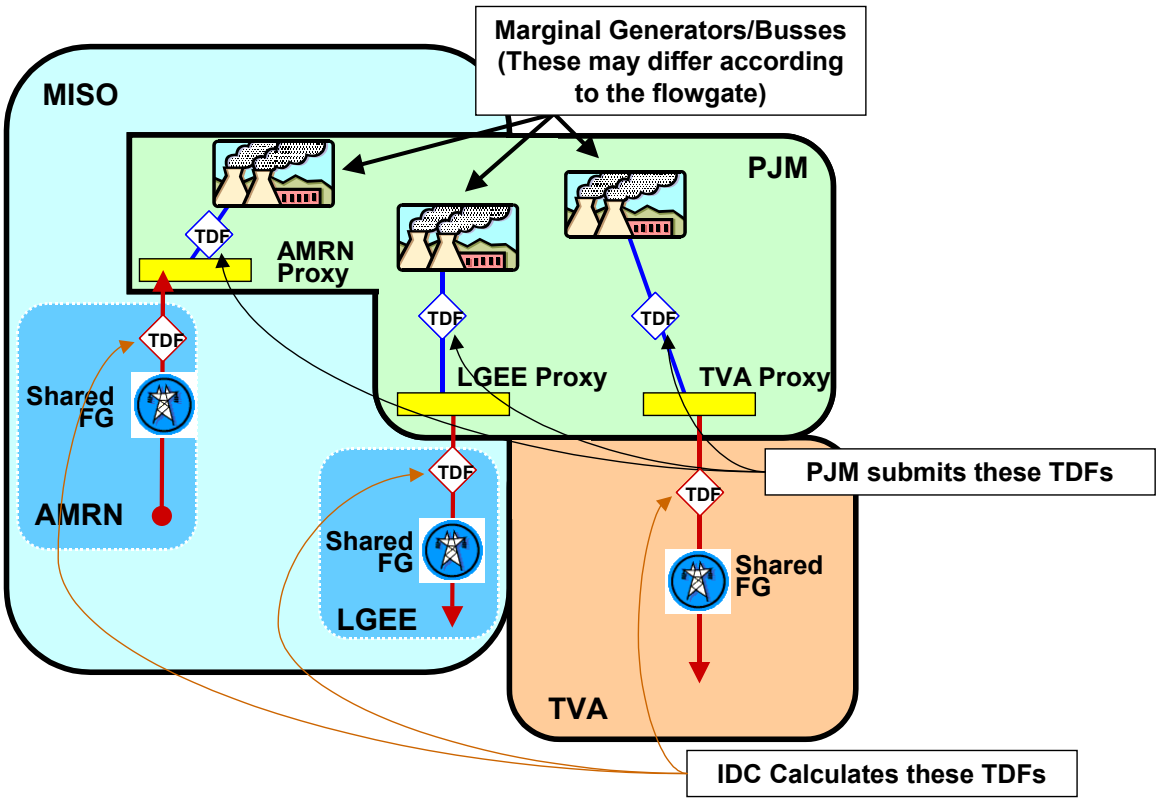
Market – Proxy – Source/Sink TDF Diagram



Determining the NNL Values -- To ensure that the NNL value is reliably constrained in both day ahead unit commitment and real time operations the NNL value determination can be represented by either of two options. In each Option the RTO's will implement, the **Michigan and Wisconsin hold harmless** settlement decisions (i.e., specified limits). If the RTO's determine a respective flowgate's NNL value to be less than the Wisconsin Michigan hold harmless values the RTO's will use the lesser of the NNL values in both Day Ahead and Real-time Operations. Both of these options will also decrement a flowgate's limit, by the TRM/CBM margin and any Network Service and Long Term Firm sold.

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Additionally, both options consider Historical NNL values (or those NNL values that would have occurred if all control areas maintain their current configuration – and their generation would continue to serve the required native load). Historic NNL than refers to the configuration of the system rather than a particular value. Therefore, these Historic values are determined using the traditional determination of expected usage and the allocation of flowgate capacity. The RTO's will use a 12 month period to determine the contributions from firm interchange transactions and NNL by each LSE within the each of the market area. NNL contribution for each LSE will be the net of their positive and negative generation to load contributions for each generator designated to serve their load (ICAP, etc.). The generation to load calculation will be made for each LSE in the market to determine the PJM NNL and will be made for the historical LSEs that existed prior to the formation of the New PJM Companies with their traditional generation to determine the PJM NNL. The NNL would only consider generation that was designated to serve native load during the hour or hours that are selected as representative for the time period. The allocation will be dependent on the selection of the hour or hours in the month. If the peak hour is selected, will have an allocation over a broader base because more generators will be running and more transactions will be scheduled compared to an off-peak hour.

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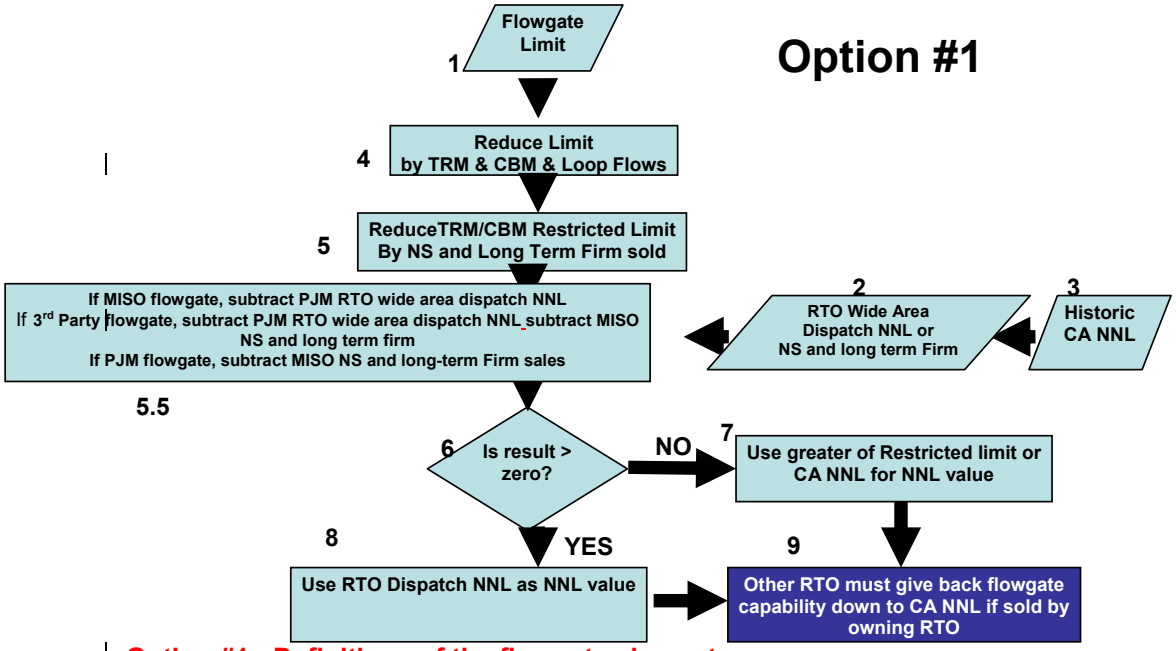
OPTION 1 – NNL Determination The following flowchart is a depiction of a proposed process in determining the NNL by considering the effect of an RTO Wide Area Dispatch



Option #1 - Definitions of the flowgate elements

1. Input – The Flowgate Limit, provided by TO/RC
2. Input – Market RTO Wide Area Dispatch – flows upon respective flowgate or NS and long term firm
3. Input – Using current Control Area footprints, of generations and loads, RTO calculates flows upon respective flowgate
4. RC/CA subtracts CBM and TRM values from flowgate capability and loop flow effects of other 3rd parties (i.e., IMO, TVA). Outputs a CBM/TRM/Loop Flow Restricted Capability
5. This restricted capability is further decremented by the owning RC/CA by the scheduled NS and Long Term Firm sold by the owning TP

5.5. RTO's subtract either the Wide Area Dispatch (MISO) or the NS and long term firm sales (PJM) from the restricted value.

6. Assess whether the Wide Area RTO Dispatch is greater than this restricted capability –
7. If it is greater– than the RTO will use the greater of the restricted limit or the Historic CA NNL
8. If it is not greater – than the other RTO utilizes the Wide Area Dispatch NNL as the NNL value
9. If the other RTO utilizes a value greater than the Historic CA NNL value, it must be able to give flowgate capability back to the owning RTO down to the CA NNL

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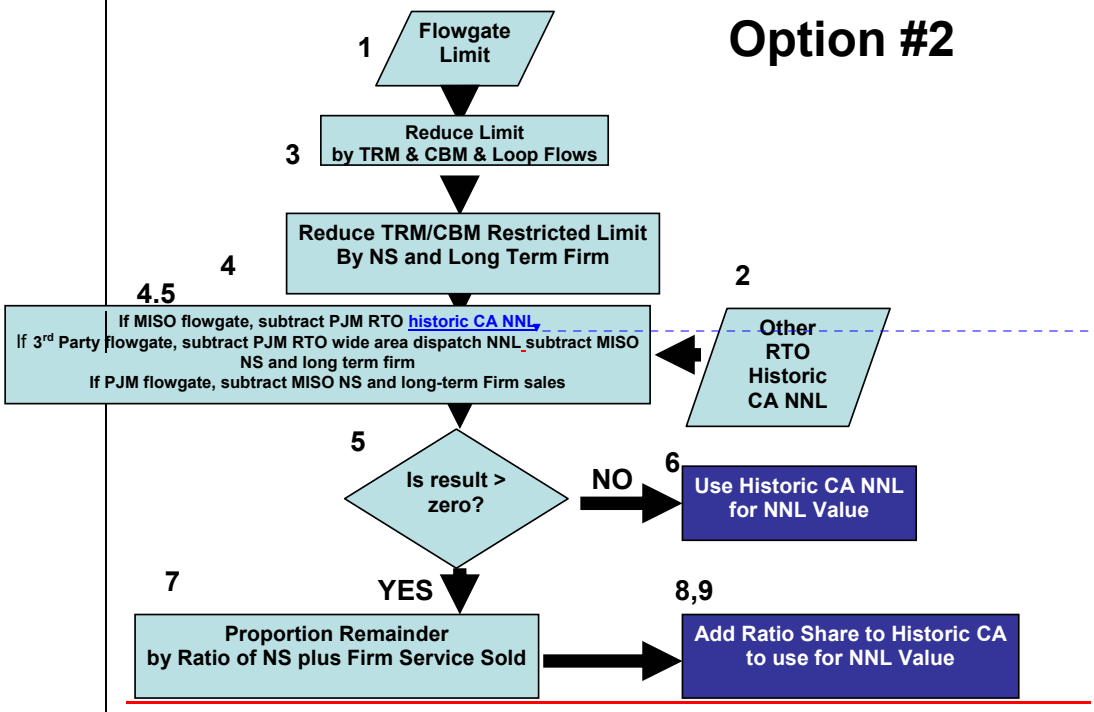
value if the owning RTO requests it to support sale of Firm or Network transmission service



Option #2 - Definitions of the flowgate elements

1. Input – The Flowgate Limit, provided by TO/RC
2. Input – Using current Control Area footprints, of generations and loads, RTO calculates flows upon respective flowgate
3. RC/CA subtracts CBM and TRM values from flowgate capability and loop flow effects of other 3rd parties (i.e., IMO, TVA). Outputs a CBM/TRM/Loop Flow Restricted Capability
4. This restricted capability is further decremented by the owning RC/CA by the scheduled NS and Long Term Firm sold by the owning TP.

4.5 RTO's subtract either their counterparts Historic NNL from the restricted value.

5. Assess whether this restricted capability is greater than the Historic CA NNL
6. If it is not greater – then the other RTO will use the Historic CA NNL as the NNL value
7. If it is greater – than there is a REMAINDER that will be apportioned based upon the firm and network service sold by the respective RTO's
8. This RTO proportion value is added to the historic NNL value and used as the NNL value in determining the market flows upon each flowgate

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NNL Options PRO's and CON's & Differences – Each option's pros are the other options cons and visa versa. Option 1 has the pro of being able to fully maximize the use of the transmission system. Yet its con is that until MISO has a market that will allow it to redispatch, MISO does not have the redispatch option to permit it to handle the possibility of having to give back firm capability on flowgates its members do not own. In contrast, Option 2 provides a clear fixed number, that the RTO's can sell service against and operate in real-time. However, if underutilized margins are not idenitied and shared amongst the RTO's the transmission system can be underutilized. This underutilization could impact peak day operations.

The two options have the following differences:

1. Option 1, the RTO wide area dispatch is used as the value to subtract the NS and Long Term firm sales from. In contrast Option 2 subtracts these values for the Historic/Projected NNL.
2. In Option 1, if the remainder of the Wide Area RTO dispatch, less the NS and long term sales, is greater than zero an RTO could reliably maximize the capability of the transmission system as long as the owning RTO did not sell additional firm capability. In Option 2 there is not "return or give-back" capability so the NNL values are less likely to maximize the transmission system.

4. Using either of these options, MISO and PJM expect that the RTO's will fully integrate the value of enhanced AFC Coordination, Market Forces, and agreed upon limits to ensure that the most reliable NNL value is used in real-time operations.

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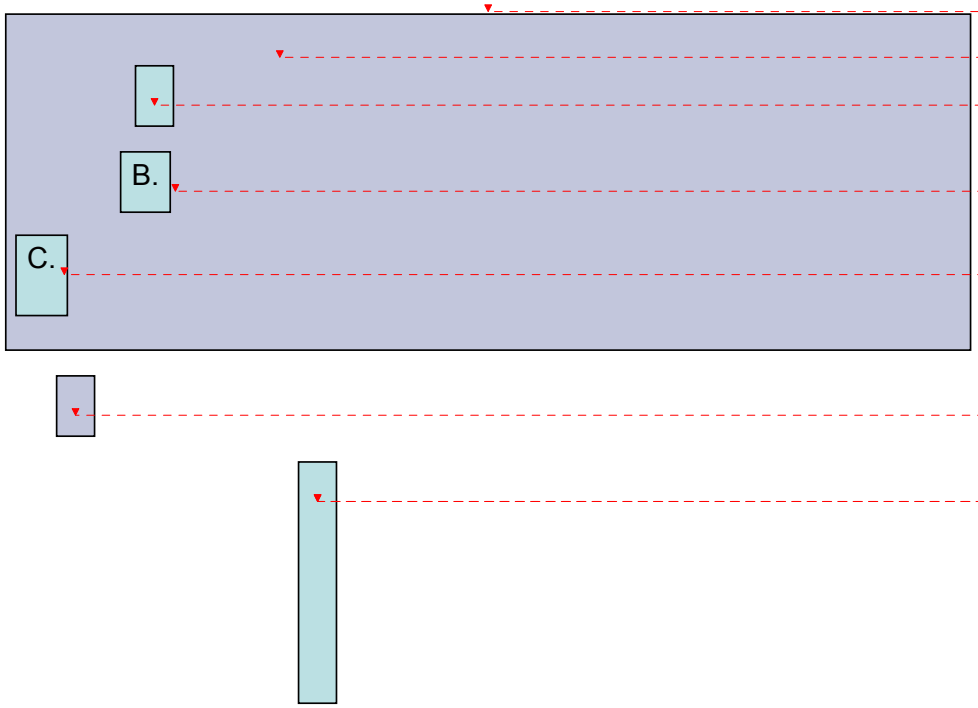

Deleted: Process to Determine NNL Values

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Residual Value

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Or ¶
the limits imposed in¶
A., B., or C.¶
In Real-Time Operations¶
As the NNL value

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1. The methods to define the NNL value to limit the flows on the selected set of external flowgates in PJM's Day Ahead Unit commitment include:¶
¶
<#>**METHOD A:** The NNL figure for a prescribed set of flowgates may be constrained by the final settlement of the Michigan and Wisconsin Hold Harmless deliberations. PJM and MISO will honor this settlement in their operations.¶
¶
<#>**METHOD B:** Additionally PJM will use the limits of the selected flowgates to conduct both capacity deliverability analysis and AFC calculations. Both the deliverability analysis and AFC calculations will determine potential NNL loadings on each flowgate. Details for the AFC coordination and calculations of NNL flows include the following:¶

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1) AFC Calculations:

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<#>To aid in the coordination and monitoring of the ATC the PJM and MISO have agreed to apply a common philosophy when determining flowgate reliability margins. The reliability margins are the Capacity Benefit Margin and the Transmission Reliability Margin and are the amount of transmission capability held in abeyance for system reliability purposes. ¶
<#>In addition to the reliability margins, the flow contribution on external flowgates due to an integrated PJM wide area dispatch will be accounted for in the ATC process through an additional margin that will reflect the impact on external systems of delivering energy across the expanded PJM energy market. ¶
<#>This margin adjustment will be determined by comparing the difference in flow on a given flowgate between that caused by a wide area PJM dispatch and that caused by the current individual control area dispatches. The difference in flow caused by the varying dispatch will reflect the composite NNL requirement versus each individual area control area NNL requirement. ¶
<#>This new margin will be subtracted from the flowgate capability to recognize the NNL flow contribution on each external flowgate and is the amount of transmission capability held in abeyance by external systems to account for the delivery of PJM resources to PJM load. ¶
2) Details on the Deliverability Analysis – will be published later.¶

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B. METHOD C:

Deleted: The last set of NNL calculations will be derived by the Reliability Coordinator or Transmission Provider responsible for the transmission facility/flowgate. This RC/TP will submit to PJM the impact of their firm schedules upon their flowgates, in the form of the remaining MW capability on the flowgate, by 1200 Eastern Time

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Deleted: 2. Once the day ahead commitment is run, PJM may find that the day ahead unit commitment will impose NNL flows lower than any of the other three previously constraining limitations. In this case, PJM would use this lower Day Ahead Commitment value as the NNL value in real-time operations. ¶

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¶
3. As an example: ¶
¶
<#>The limit for a monitored flowgate may have the following different limitations. ¶
¶
A. The Michigan-Wisconsin Hold Harmless limit is: **500 MW**¶
B. The Planning Deliverability Analysis + AFC limit is: **300 MW**¶
C. Actual Flowgate Limit, provided by the Owner, less¶
Firm Schedules is: **200 MW**¶
¶
<#>In the PJM's Day-Ahead Market, PJM will impose the most limiting of these three values as the constraint limit for this flowgate. As a day ahead constraint, PJM's unit commitment will not impose flows greater than **200 MW** on this flowgate.¶

Deleted: <#>At the completion of the Day-Ahead Market, if PJM finds that the Day Ahead commitment imposed a flow of **100 MW** on the flowgate, PJM will use this **100 MW** value as the NNL limit in the real-time market for the next day. ¶

Deleted: 4. Using this process, PJM expects that it will fully integrate the value of enhanced AFC Coordination, Market Forces, and agreed upon limits (settlement values) to ensure that the most reliable NNL value is used in real-time operations.¶

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d) Process to Utilize/Monitor Selected Flowgates –

1. Using NNL Flows Day Ahead

a. PJM executes a Day-Ahead Unit commitment for all of the generators throughout the RTO footprint. PJM's day ahead unit commitment uses a network analysis model that mirrors the real-time model found within PJM's state estimator. As such, the day ahead commitment respects facility limits and forecasted system constraints.
b. Using the NNL value derived from one of the two options, PJM will enter this NNL value as a facility limit for the respective flowgate.
c. The Day Ahead Unit commitment will not permit flows to exceed this NNL value as it selects units for this commitment.
d. This constraining of PJM's day ahead commitment will occur regardless of whether the other Control Areas foresee the need for upcoming TLR actions.

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2. Using NNL in Real-time Operations

a. PJM Capabilities:

1) PJM's real-time EMS has a very detailed state estimator and security analysis package that is able to monitor both thermal and voltage contingencies every few minutes. PJM's model will be at least as detailed as the IDC model for all of the identified/affected flowgates. Additionally, PJM will be continually working with MISO to ensure model synchronization. PJM will also initiate similar coordination whenever the IDC model is updated. The data PJM will utilize in its model will be either over ICCP links or over the NERC ISN.
2) The PJM state estimator and the Unit Dispatch System (UDS) will utilize all of these real-time internal flows and generator outputs to calculate both the actual and projected hour ahead flows on all of the selected flowgates.
3) Using real-time modeling, the PJM internal systems will be able to more reliably determine the PJM impact on flowgates created by the PJM dispatch, than the NERC IDC. The reason for this difference in accuracy is that the IDC uses very static SDX data that models generators as either at full output or off. In contrast PJM's calculations of system flows will utilize each PJM unit's actual output, updated every 5 minutes.

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b. PJM Real-time Actions

1) PJM will have the list of 3rd party flowgates modeled as monitored facilities in its EMS.
2) The limits PJM will use for these 3rd party flowgates will be the NNL values determined by the final NNL Option (i.e., Option 1 or 2).
3) PJM will upload the real-time and projected flows as well as the delta of the NNL and actual flows on these flowgates to the IDC (every 5 or 15 minutes).
4) When the real time actual or projected flows exceed these NNL values on a flowgate and the Reliability Coordinator who has responsibility for that flowgate has declared a TLR 3a or higher, PJM will redispatch its system to restore the facility loading to the NNL value.
5) PJM will implement this redispatch by binding the flowgate as a constraint in the PJM Unit Dispatch System (UDS). UDS calculates the most economic solution while ensuring that each of the bound constraints is resolved reliably.
6) Additionally the PJM Operator will make any transaction curtailments as specified by the NERC IDC.
7) PJM's redispatch/relief will be faster than the 30 minutes required by TLR schedule curtailments.
8) The RC calling the TLR will be able to see the relief provided on the flowgate as PJM continues to upload the PJM contributions to the real-time flows on this flowgate.

c. PJM Real-time Operations Example

1) Suppose the Day-Ahead Market calculates a NNL limit of **100 MW** and the Market Flows imposed by the PJM RTO are determined to be 150 MW. The RTO will provide both the NNL limit being used, the current flow of 150, and the difference of 50 MW to the IDC. This 50 MW has the non-firm priority of 6-NN and is available for curtailment upon the occurrence of a TLR 3. The exact amount of curtailment is allocated by the IDC as is presently done for tagged non-firm service.

2) If the Market flow imposed by the PJM RTO is calculated to be less than the Day-Ahead limit, the difference provided to the IDC is 0 – PJM RTO does not redispatch for a TLR 3 event.

3) Additional redispatch (or 'curtailment') of Market Flow below the limit determined Day-Ahead occurs under a TLR 5 event. Essentially, Market Flows up to the limit determined in the Day Ahead-Market are treated as firm service (e.g. NNL).

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7. RESOLVED & OUTSTANDING ISSUES – MISO and PJM have made progress in exploring and developing alternatives for resolving the reliability seam issues. The following provides a list of areas where there is agreement and areas where there are outstanding issues:

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MISO and PJM have agreed in principal on the following

1. Market Flow Calculation – RTO's LMP engine would calculate market flows on internal and external flowgates. Proposed methodology for calculation is defined in this white paper. MISO has agreed RTO's LMP engine would calculate market flows given the following conditions are met:
    a. RTO LMP Model - Model will include areas outside its market with at least as good of detail as the NERC IDC model has. Must use NERC SDX data for topology/generation/load updates for areas not observable of real time data (ICCP/ISN).
    b. RTO Market Flows will be calculated and provided to NERC IDC all for internal flowgates where TLR may be called. This is required in order for NERC IDC to calculate proper TLR relief.
    c. Tagging In, out, or Across Markets – E-tagged transactions will reflect at least the granularity as provided before PJM market expands.
    d. Data Exchange - MISO/PJM Data exchange agreement will be completed and implemented before PJM market expands to ensure models are synchronized.

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2. Control Area/Control Zone NERC Policy changes – Areas where changes will be required have been identified. A policy task force under the NERC Operating Reliability Subcommittee will recommend required policy changes or waivers.

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MISO and PJM Outstanding Congestion Management Seams Issues

1. Transmission Allocation – Two proposed options have been developed to determine magnitude of firm transmission allocation on each RTO's flowgates. It is uncertain if either method will be acceptable to all Stakeholders. Stakeholders have raised a concern that proposals will legitimize and provide entitlement to parallel flows. MISO is waiting for Stakeholder feedback on both options and any alternate proposals by Stakeholders before recommending either option or new alternative proposals.

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2. Tagging In, out, or Across RTOs – Three options have been proposed to tag Interchange Transactions. MISO and PJM will wait for Stakeholder feedback before recommending any of the options. Need to ensure tagged flow is properly backed out of market flows.

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3. Selection of Market/TLR Coordination Flowgates – Several study methods have been proposed. Proposed study methods may not be comprehensive enough or adequate to solve parallel flow problems. Stakeholders have expressed concern with proposed study methods. Present process for 5% threshold for impacts may not be adequate.

4. Adding Flowgates on the Fly – Need to ensure calculation of market flows and transmission allocation process allows for adding flowgates on the fly as needed.

5. ATC/AFC Coordination – Need to complete and implement ATC/AFC Coordination agreement. Need to ensure ATC/AFC Coordination agreement is integrated into allocation and prioritization of firm and non-firm uses of transmission system. Need to ensure PJM economic dispatch of energy does not get unfair advantage over MISO Priority 6 – Network Service from undesignated resources.

6. Congestion Management Implementation Steps – For Market/TLR Coordination Flowgates, need to define step-by-step process for utilizing market redispatch vs. TLR to obtain relief. Need method to track that RTO provided appropriate relief.

7. Coordination Agreement – Need to draft and post for comment proposed overall MISO and PJM Coordination Agreement that would include ATC/AFC Coordination Agreement, Data Exchange Agreement, Outage Maintenance and Coordination Agreement.

8. System Capabilities & Comparability - PJM is concerned that they are advocating approaches that significantly improve current utilization of technology (i.e, NERC IDC, SDX), and yet other parties will attempt to require additional complexities, when these parties current systems will not provide the granularity that PJM's system will provide. PJM is concerned that as a result of PJM providing far more granularity than any other entity, the PJM transactions are far more likely to be cut than more effective transactions from other control areas. As a result of other systems not providing similar granularity, the IDC will not be as effective and more transaction would require curtailment to provide system reliability. PJM also has concerns that some parties only want to maintain the status quo by enhancing the NERC IDC rather than enhancing system reliability by leveraging real-time applications.

9. Transmission Revenue - PJM is concerned that some stakeholder comments seem to focus more on maximizing transmission service revenue rather than managing the parallel flows issue. The solutions to the congestion management seams issue must provide for fully utilizing system capability with an equitable and reliable manner.

10. PJM is concerned that while it can calculate, track and redispatch to curtail its use of third party systems there seems to be little reciprocity available from other

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systems. PJM is concerned with other control areas'/reliability coordinators' ability in particular to calculate its impact of Network service (designated and non-designated) on other systems.

11. PJM is concerned that current calculations and sales of firm service may have already oversubscribed the system. As a result, firm point to point service may have a higher priority on the NNL flows within an expanded market.

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Deleted: <#>Market Flow Calculation **– Need details on the methodology, process, and assumptions of proposed method to calculate market flows. Need to make sure Market Flow calculation results reflect the actual physics of the system and are superior to method used by the IDC today. Need examples on how the proposed method compares with IDC calculation.** ¶
<#>Transmission Allocation **– Need more details on how Market Flows are proposed to be prioritizing relative to NERC TLR priorities 0 –7 and the steps required on constrained flowgates. The prioritization essentially allocates usage of the transmission facilities.** ¶
<#>Control Area/Control Zone responsibilities **– Need to clearly define NERC Operating Policy changes, waivers, or certifications that are needed to permit security constrained dispatch over multiple existing Control Areas and to allow flows to not be tagged between Control Zones. Potential Policy 1, Policy 3, and Policy 9 changes may be required.** ¶
<#>Tagging in, out, or across Markets **– Need details of methodology for tagging transaction in, out, or across the market reflect at least the granularity available today in the IDC.** ¶
<#>Selection of Market/TLR Coordination Flowgates **– Need to ensure criteria for selecting flowgates includes all flowgates actually and significantly impacted by market flows. Present process for 5% threshold for impacts may not be adequate.** ¶

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9. POTENTIAL VALUE

In this paper's problem statement there were three fundamental questions posed. When this proposal is compared to these questions, it is evident that this proposal's implementation could provide significant value to the Eastern Interconnection.

1. **How do non-market operational areas control system flows once the IDC loses current granularity?**
   - As markets expand fewer energy transactions may be tagged because these deals will be part of larger markets' single system dispatches. This proposal provides a new methodology to utilize both transaction curtailments and effective redispatch to control for flows generated from economic dispatch.
   - Because the RTO's will provide the IDC with market flow values the IDC should still be able to provide reliable solutions for the non-market areas to control system flows.

2. **Are there other ways to maintain and/or enhance IDC granularity?**
   - This proposal is attempting to provide the IDC significantly more granularity than the IDC ever has had. This granularity enhancement will be in the form of absolute visibility of PJM's real-time flows on a select set of external flowgates.
   - By utilizing multiple means to determine the most restrictive value for NNL, PJM's larger market operations will provide far more control of the flows currently being generated by the current set of control areas. One of these means of determining the NNL values ties AFC calculations and coordination to real-time limits. Another method ensures that PJM respects firm service allocated by a Transmission Provider on their flowgates.

3. **What are the curtailment priorities?**
   - Curtailment priorities are being addressed by separating economic dispatch flows from NNL flows, and permitting the redispatch of the system under TLR 3 to mitigate congestion.
   - Redispatch is typically a faster solution than implementing schedule curtailments.
   - Currently, redispatch is only available to Reliability Coordinators under TLR 6 and after the curtailment of firm service.

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10. CONCLUSION

This Whitepaper is only the second phase of the conceptual design to resolve the Congestion Management seams issue. As a result of the stakeholders inputs and continued work between MISO, PJM, and the NERC community PJM and MISO will shortly be starting work in implementing the completed design. To facilitate this exchange of ideas, PJM and MISO are hosting the second Stakeholders Workshop. The workshop will be held **Jan 16th, 2003**, from 8 a.m. to 4 p.m. (CST) at the **Hyatt Regency O'Hare O'Hare International Airport** (9300 West Bryn Mawr Avenue River Road at Kennedy Expressway Rosemont, IL 60018;Telephone: 847-696-1234). MISO, PJM and SPP staff will facilitate discussion on proposals to mitigate parallel path flow issues between their service territories. Discussion of the proposals will center on the coordination of information related to the safe and reliable operation of the grid (i.e., this Whitepaper's proposal), including coordination of available transfer capability (ATC) and available flowgate capability (AFC) in the two regions. All interested parties are invited to attend by registering at the joint and common website - www.miso-pjm-spp.com. – under the "Info" portion of the site.

PJM and MISO welcome your input, issues, and recommendations so that this can be a solution the Eastern Interconnection can possibly use to improve reliability as the industry moves towards SMD.

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APPENDIX A – DEFINITION OF TERMS

Control Zones -

Within an RTO control area that is operating with a common economic dispatch, the RTO footprint is divided into control zones to provide specific zonal regulation and operating reserve requirements in order to facilitate reliability and overall load balancing. The zones must be bounded by adequate telemetry to balance generation and load within the zone utilizing automatic generation control.

Generation Transfers -

An RTO that covers a large geographic area and operates a single control area with a market with common economic dispatch but separate regulation zones, will monitor transfers of energy between regulating zones as part of the overall load and generation balancing function of the control area. The calculated difference between the actual generation within a regulation zone and the load within that zone is the generation transfer.

LMP Based System or Market -

An LMP based system or market utilizes a physical, flow-based pricing system to price internal energy purchases and sales.

Locational Marginal Pricing (LMP) -

Locational Marginal Pricing is the cost of supplying the next MW of load at a specific location, considering generation marginal cost, cost of transmission congestion, and losses. LMP's are equal when the transmission system is unconstrained. LMP's vary by location when the transmission system is constrained.

Market Flows -

Market flows are the calculated energy flows on a specified flowgate or transmission facility as a result of economic dispatch of generating resources within a large RTO Market.

Network Native Load (NNL) -

Network native load is load, within the RTO footprint, that the network customer designates for network integration transmission service and that is served by the output of any designated network resources.

Security Constrained Dispatch -

Security Constrained Dispatch is the utilization of the least cost economic dispatch of generating and demand resources while recognizing and solving transmission constraints over a single RTO Market.

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APPENDIX B -- Possible NERC Policy Impacts

The MISO/PJM Policy Review Task Force is working with the MISO and PJM to identify what Policy changes may be necessary to enable the expansion of the LMP market over the PJM RTO footprint. Appendix B will be modified as necessary to address other impacts that may be noted by the Task Force as their work progresses. The Policy Review Task Force is responsible for coordinating its work with the applicable NERC Subcommittees so that Policy changes can be developed and provided to the NERC Standing Committees for approval.

POLICY 1 – GENERATION CONTROL AND PERFORMANCE

As compliance to the Control Performance Standard (CPS) and Disturbance Control Standard (DCS) applies to the Control Area under NERC Policy 1, changes are anticipated if the RTO desires to report a consolidated CPS performance for the RTO "footprint" while enabling the Control Areas or "control zones" within the RTO to continue to report DCS compliance associated with their provision of Operating Reserves. The separate DCS reporting enables the Control Areas within ECAR, MAIN and MAAC to continue to participate as members of their respective Regional Reserve Sharing Group meeting that Region's reserve criteria. Specific sections of Policy 1 to be addressed are not listed, as the criteria for splitting the responsibility for reporting CPS versus DCS, and basing such reporting upon the metered boundaries of the RTO for CPS, versus the metered boundaries of the Control Areas or "control zones" for DCS, may require the addition of a section specifically to address the compliance reporting requirements.

POLICY 3 – INTERCHANGE

The security-constrained economic dispatch calculated by the RTO every five minutes results in a net interchange value being provided to each Control Area or "control zone" within the RTO footprint. Under a LMP market, neither the transactions internal to the LMP market, nor the resulting energy flow between the Control Areas or "control zones" within the market used to enable the security-constrained economic dispatch, will be provided to the IDC through tagging. As part of the resolution of the MISO/PJM seams issues, another mechanism to populate operations information into the IDC for use in TLR procedures is proposed in this document to address the loss of tagged transaction information once the Control Areas move into the LMP market.

Policy 3 changes would be needed to reflect that an alternative methodology is acceptable for provision of information into the IDC other than tagging for multiple Control Areas or "control zones" operating within a single market dispatch. Likewise, details around curtailments and reloading of transactions associated with tagging will have to be addressed to incorporate the methodology accepted. At a minimum the following Policy 3 sections will be considered:

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- Section D Interchange Transaction Modification; Requirement 2. Interchange Transaction modification for reliability-related issues. (and all sub-sections)
- Appendix 3A1 Timing Requirements for Re-Allocation when in a TLR Event
- Appendix 3A4 Curtailments and reloads
- Appendix 3D Transaction Tag Actions

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POLICY 9 – RELIABILITY COORDINATOR PROCEDURES

As part of the resolution of the seams issues brought before NERC, an alternative methodology will be proposed for providing information into the IDC for transmission assessment and curtailment other than through tagging individual transactions within the LMP market. With the new methodology, Policy 9 will have to define the responsibilities set forth for curtailment and the equivalent of reloading under LMP, similar to the responsibilities set forth for curtailment and reloading of tagged transactions. Reliability Coordinator responsibilities for next day analysis and current day operations will have to also consider the two methods of provision of information into the tools used for reliability assessment. Below are some of the Policy 9 sections that will be considered:

- Section A, requirement 1 Perform security analysis, subsection 1.1 data Needed by Noon on transactions
- Section A, Requirement 2 Study Results To Be Shared by 1500 hours CST
- Section C requirement 1, Interchange Distribution Calculator, Subsection 3.2.1.1 Use with an Interconnection Wide procedure (local procedure and re-dispatch0
- Appendix 9C1, General Comments Section needs to include word about equating “impact” to a transaction.

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ASSUMPTIONS

(1) All transactions into, out of, or across the Market RTO will be tagged according to the provisions stated in NERC Policy 3. The tag approval process assures that the necessary transmission service has been obtained from all applicable Transmission Providers.

(2) All tagged transactions implemented will be provided to the IDC according to Policy 3 through the tagging infrastructure for inclusion in the NERC TLR curtailment procedures and for FIST evaluations.

(3) In place of tagging transactions internal to the PJM market, systems will be implemented to provide information into the IDC according to the methodology accepted by stakeholders and NERC to reflect the PJM market operations and the resulting security-constrained economic dispatch.

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(4) Similar to the use of tagged information in the IDC, information provided according to (3) will also be included in the NERC TLR curtailment procedures and FIST evaluations.

(5) The information provided to the IDC will be sufficient to enable the assessment of transmission impacts according to the Firm and Non-Firm priorities agreed upon in resolution of the MISO/PJM seams issues. It is currently proposed that the calculated "impacts" be shown in the IDC in Buckets 0, 6, and/or 7.

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Required Policy Changes¶
Since the "impact" will not be considered a Tag, the only Policy changes that appear to be necessary will deal with issues around curtailments and reloading of transactions and how the "impact" aspect will be dealt with. These changes are based on the stated assumptions below.¶
¶
Policy 3¶
<#>Section D Interchange Transaction Modification; Requirement 2. Interchange Transaction modification for reliability-related issues. (and all sub-sections)¶
<#>Appendix 3A1 Timing Requirements for Re-Allocation when in a TLR Event¶
<#>Appendix 3A4 Curtailments and reloads¶
<#>Appendix 3D Transaction Tag Actions¶
¶
Policy 9¶
Needs a general statement in the introductory paragraphs concerning identification of economic dispatch "impact" and it's factoring into curtailment and reload philosophy.¶
¶
<#>Section A, requirement 1 Perform security analysis, subsection 1.1 data Needed by Noon on transactions (and I would guess "impacts")¶
<#>Section A, Requirement 2 Study Results To Be Shared by 1500 hours CST¶
<#>Section C requirement 1, Interchange Distribution Calculator, Subsection 3.2.1.1 Use with an Interconnection Wide procedure (local procedure and re-dispatch0¶
<#>Appendix 9C1, General Comments Section needs to include word about equating "impact" to a transaction.¶
¶
¶
Assumptions¶
<#>All PJM RTO external transactions will have obtained the necessary transmission service and will continue to be tagged using a Tag service.¶
<#>All tagged transactions will automatically be sent to the IDC for evaluation either by the TLR procedure or the FIST.¶
<#>All Internal PJM RTO economic dispatch directives will be calculated to determine their impact on all identified flow-gates used in the ... [1]

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APPENDIX C – To Be Published

APPENDIX D.

Parallel Flow Calculation Procedure Reference Document

Approved by OC November 16, 2000.

Version 1, Draft 1

[See also Appendix 9C1, "NERC TLR Procedure – Eastern Interconnection," Section F., "Transaction Contribution Factor"]

Subsections

A. Introduction

This Reference Document explains how to calculate the contribution of Network Integration Transmission Service and Native Load on a TRANSMISSION CONSTRAINT under TLR Level 5 (5a or 5b).

The provision of Point-to-Point (PTP) transmission service as well as Network Integration (NI) Transmission Service and service to Native Load (NL) results in parallel flows on the transmission network of other TRANSMISSION PROVIDERS. When a transmission facility becomes constrained, NERC Policy 9C, Appendix 9C1, calls for curtailment of INTERCHANGE TRANSACTIONS to allow INTERCHANGE TRANSACTIONS of higher priority to be scheduled (a process called "Reallocation") or to provide transmission loading relief. An INTERCHANGE TRANSACTION is considered for REALLOCATION or CURTAILMENT if its TRANSFER DISTRIBUTION FACTOR exceeds the TLR CURTAILMENT THRESHOLD, which is typically 5% for MONITORED TRANSMISSION FACILITIES. In compliance with the Pro Forma tariffs filed with FERC by TRANSMISSION PROVIDERS, INTERCHANGE TRANSACTIONS using non-firm Point-to-Point TRANSMISSION SERVICE are curtailed first (TLR Level 3a and 3b), followed by transmission reconfiguration (TLR Level 4), and then the curtailment of INTERCHANGE TRANSACTIONS using Firm Point-to-Point Transmission Service (TLR Level 5a and 5b). The NERC TLR Procedure requires that the curtailment of Firm Point-to-Point Transmission Service be accompanied by the comparable curtailment of Network Integration Transmission Service and service to Native Load to the degree that these three Transmission Services contribute to the CONSTRAINT.

To ensure the comparable curtailment of these three transmission services as part of TLR Level 5a or 5b, the NERC Parallel Flow Task Force (PFTF) has developed a method that allocates appropriate relief amounts to all firm PTP and NI/NL services in a comparable manner. A methodology, called the Per Generator Method Without Counter Flow, or simply the Per Generator Method, has been devised by the PFTF to calculate the portion of parallel flows on any CONSTRAINED FACILITY due to NI/NL service of each CONTROL AREA (CA). The Per

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Generator Method has been presented to the Security Coordinator Subcommittee (SCS) and the Market Interface Committee (MIC) and both committees have approved the methodology. The Interchange Distribution Calculator Working Group (IDCWG) has determined that the IDC tool could not be upgraded by the summer 2000 to automatically calculate the parallel flow contributions from NI/NL service. The SCS then directed the Distribution Factor Task Force (DFTF) to develop an interim procedure to implement the Per Generator Method as an integral part of TLR Level 5 for the summer of Year 2000. A description of this interim procedure is summarized in this reference manual.

B. Basic Principles

The basic principles for curtaining Interchange Transactions using Firm Point-to-Point TRANSMISSION SERVICE curtailment based on NERC Policy 9C, Appendix 9C1, are given below:

1. All firm transmission services, including PTP and NI/NL services, that contribute 5% (the CURTAILMENT THRESHOLD) or more to the flow on any CONSTRAINED FACILITY must be curtailed on a pro rata basis.

2. For Firm PTP transmission services, the 5% is based on TRANSFER DISTRIBUTION FACTORS (TDFs). For NI/NL transmission services, the 5% is based on generator-to-load distribution factors (GLDFs). The GLDF on a specific CONSTRAINED FACILITY for a given generator within a CONTROL AREA is defined as the generator's contribution to the flow on that flowgate when supplying the load of that CONTROL AREA.

3. The Per Generator Method assigns the amount of CONSTRAINED FACILITY relief that must be achieved by each CONTROL AREA NI/NL service. It does not specify how the reduction will be achieved.

4. The Per Generator Method places an obligation on all CONTROL AREAS in the Eastern Interconnection to achieve the amount of CONSTRAINED FACILITY relief assigned to them.

5. The implementation of the Per Generator Method must be based on transmission and generation information that is readily available.

C. Calculation Method

The calculation method is based on the Generation Shift Factors (GSFs) of an area's assigned generation and the Load Shift Factors (LSFs) of its native load, relative to the system swing bus. The GSFs are calculated from a single bus location in the base case. The LSFs are defined as a general scaling of the native load within each control area. The Generator to Load Distribution Factor (GLDF) is calculated as the GSF minus the LSF. Using the present NERC CURTAILMENT THRESHOLD of 5%, the reporting method looks for generation assigned to native load for which the Generation to Load Distribution Factor (GLDF) is greater than 5%. In cases where the Flowgate is considered limiting in the To → From direction, the sign of the GLDF is reversed. Generators are included where the sum of the generator PMAXs for a bus is greater than 20 MW, including off-line units (e.g., three 9MW generators add up to greater than 20 MW on a bus). Smaller generators that do not meet this criterion are not included. In the calculation process, all tested generators are listed as in-service and their MVA base is set to the PMAX value. SDX information is then applied for generator outages and deratings as applicable. This process may adjust the output of generators that are not intended to participate for an area. In such cases, the

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generation MVA base value should be adjusted (Percent = 0%) so that those units do not participate. All participation adjustments should be justifiable upon inquiry.
The original MVA base from the seasonal IDC case is not used because it is zero for many non-participating generators, such as nuclear units. The unit output in the case (PGEN) is not used because it may be turned on to a default 1 MW in some instances. The PGEN is not considered a good indicator of the unit's capability. The unit maximum capability (PMAX) is considered a good indicator of the unit ability to contribute.
A set of generation ownership data matches the generators to their Native Load areas. By default, the generator ownership data lists each unit as being 100% contributing to the Native Load calculations of the control area in which it is contained. There may be situations where the ownership would be less than 100%. Examples include: 1) a merchant generator who has tagged TRANSACTIONS; 2) a generator included multiple times for case modeling situations; or 3) a jointly-owned unit. Jointly-owned units may have multiple ownership listings to account for the multiple assigned areas. The joint ownership should be less than or equal to 100%.
Unit ownership can go beyond CONTROL AREA bus ownership. Units assigned to serve native load do not need to reside in the native load control area. However, units outside the native load control area should not be assigned when it is expected that those units will have tags associated with their transfers. Although the Native Load calculation has the ability to handle these ownership situations, the CONTROL AREAS and SECURITY COORDINATORS must supply the data or the default ownership will apply.
For each generator assigned to a CONTROL AREA'S Native Load, the amount of energy flowing on the CONSTRAINED FACILITY is calculated for the generator-to-Native Load transfer. The reporting is limited to those units that have a GLDF greater than or equal to 5%. The amount of transfer is based on the unit's maximum capability as listed in the base case (PMAX), and a comparison of Native Load level and the available generation assigned to the CONTROL AREA. The available assigned generation does not include small units that do not meet the 20 MW cutoff. When the available generation exceeds the load level, it is assumed that not all the generation is participating, and therefore, the PMAX values are scaled down by the load to generation ratio. If available, excess generation that is sold is expected to be tagged. If available assigned generation is less than the native load level, it is assumed that the area may be importing, and therefore the affected units are not scaled (scaling=1.00). Imports are assumed to be tagged.

Summary

If Available Assigned Generation > Native Load, Then Scale Down Pmax

If Available Assigned Generation < Native Load, Then Do not Scale Down Pmax

The amount of Energy on the Flowgate (EOF) that the native load area is responsible for is given as:

$$EOF_{area} = \sum EOF_{gen\ assigned\ to\ area}$$

The Energy on the Flowgate (EOF) for a specific assigned generator with a GLDF > 5% is given as:

$$EOF_{assigned\ gen} = (GLDF)(PMAX_{adjusted\ for\ SDX})(Percent_{Assigned}/100)(Scaling_{Area})$$

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D. Calculation Procedure

SDX data requirements

The factor calculation process uses available SDX data to update the current IDC seasonal case. Daily SDX data for transmission outages, generation outages and de-ratings, and daily load levels are applied to the calculation process. The SDX case updates are validated against tables to verify they match the seasonal case branch and generator lists. This is done to avoid process errors and to prevent the accidental insertion on new case data.

Transmission outages are applied by increasing the impedance to "9999" for out-of-service branches. The impedance adjustment is considered equivalent to the branch outage method, and it is preferred since it does not create islanding. Open transmission branches can also be placed back in-service based on SDX data.

Generator outages and de-ratings reported in SDX data are also applied to the case. The IDC seasonal case is initially adjusted such that the MVA base for all tested units is set to the PMAX value. By further adjusting the MVA base value, SDX generation data is then applied to the case to outage or de-rate units.

Daily SDX load levels are applied to the case. This information is used to update each control area's scaling factor. When daily load levels are not available through SDX, the seasonal value will be used as the default. The seasonal value is usually larger than the daily value.

The seasonal case is considered a solvable case. The applied daily SDX data makes the prepared daily case unsolvable. However, for factor calculation, a solved case is not required. Only a valid transmission topology is required.

Phase shifters are modeled as fixed angle. This is judged to be adequate for the present. However, in the relatively near future (when the MECS-IMO PARs are placed in service), ability to handle fixed MW operation will be needed.

Posting of Contribution Factors

The factors will be calculated by MAIN on a daily basis. The factors will be calculated some time after 1300 CST (or CDT) and will be posted before 1400 PM CST. This time was chosen because SDX data updates are required daily by 1300. The SDX data will be captured for those transmission and generation listings which cross 1401 CST.

A morning calculation may be performed to show the preliminary daily results. This run may be performed about 0800 CST. Specific midday re-runs may be requested by contacting MAIN. A message will be sent to the NERC DFTF after any new report postings. All reports will have a time stamp indicating when they were created. The reports will be posted on the MAIN web site at http://www.maininc.org/firmcurt/index.htm. This site is password protected for transmission use only. SECURITY COORDINATORS are expected to be given access to the reports via the SCIS system. Contact MAIN staff if access to the reports is needed. Reports are listed for each reliability flowgate. There is also a summary for each CONTROL AREA. Depending upon browser settings, the page may need to be reloaded/refreshed to view updated reports.

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E. Sample Calculation

An example of calculating firm transaction curtailments is provided in this section, assuming that the constrained flowgate is #3006 (Eau Claire-Arpin 345 kV circuit). The GLDFs for this flowgate are presented in Attachment 1. In this example, a total Firm PTP contribution of 708.85 MW is assumed to be given by the IDC.

From Attachment 1, the NI/NL contributions of all CONTROL AREAS that impact the CONSTRAINED FACILITY are listed below:

ALTE = 27.0 MW
ALTW = 41.1 MW
NSP = 33.1 MW
WPS = 26.2 MW
Total NL & NI contribution = 127.4 MW

Total Firm (PTP & NI/NL) contribution = 127.4 MW + 708.85 MW = 836.25 MW

NL & NI portion of total Firm contribution = 127.4/836.25 = 15.2%

PTP portion of total Firm contribution = 708.85/836.25 = 84.47%

Allocation of relief of the CONSTRAINED FACILITY to each CONTROL AREA with impactive NI/NL contribution is given below:

ALTE = 27.0 /127.4 x 0.152 = 3.2%
ALTW = 41.1 /127.4 x 0.152 = 4.9%
NSP = 33.1 /127.4 x 0.152 = 3.9%
WPS = 26.2 /127.4 x 0.152 = 3.1%

Assume that 50 MW of relief is needed. Then those CONTROL AREAS that impact NI/NL contribution and Firm PTP service are responsible for the providing the following amounts of flowgate relief:

Relief provided by removing Firm PTP = 0.845 x 50 = 42.25 MW
Relief provided by removing NL & NS contributions ALTE = 0.032 x 50 = 1.60 MW
Relief provided by removing NL & NS contributions ALTW = 0.049 x 50 = 2.45 MW
Relief provided by removing NL & NS contributions NSP = 0.039 x 50 = 1.95 MW
Relief provided by removing NL & NS contributions WPS = 0.031 x 50 = 1.55 MW

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Attachment 1

Native Load Responsibilities

Flowgate #: 3006 **Flowgate Name: EAU CLAIRE-ARPIN 345 KV**

Common Name	Generator Reference System	Generator Shift Factor (GSF)	Percent Assigned	GLDF Gen to Load Factor	Pmax (MW)	Energy on Flowgate
ALTE #364	Avail Assigned Gen: 1,514 Load Level: 1,796 Scaling: 1.000	ALTE_LD Load Shift Factor: -0.097				
NED G1 13.8--1 CA=ALTE	39000_NED_G1	0.022	100	.1195	113.0	13.5
NED G2 13.8--2 CA=ALTE	39001_NED_G2	0.022	100	.1195	113.0	13.5
Summary						**27.0**
WPS #366	Avail Assigned Gen: 1,691 Load Level: 1,910 Scaling: 1.000	WPS_LD Load Shift Factor: -0.193				
COL G1 22.0--1 CA=ALTE	39152_COL_G1	-0.094	32	.0993	525.0	16.6
COL G2 22.0--2 CA=ALTE	39153_COL_G2	-0.094	32	.0993	525.0	16.6
EDG G4 22.0--4 CA=ALTE	39207_EDG_G4	-0.118	32	.0752	331.0	7.9
Summary						**41.1**
NSP #623	Avail Assigned Gen: 8,492 Load Level: 8,484 Scaling: 0.999	NSP_LD Load Shift Factor: 0.206				
WHEATON5 161--1 CA=NSP	61870_WHEATO	0.298	100	.0919	55.0	5.0
WHEATON5 161--2 CA=NSP	61870_WHEATO	0.298	100	.0919	63.0	5.8
WHEATON5 161--3 CA=NSP	61870_WHEATO	0.298	100	.0919	55.0	5.0
WHEATON5 161--4 CA=NSP	61870_WHEATO	0.298	100	.0919	55.0	5.0
WHEATON5 161--5 CA=NSP	61871_WHEATO	0.293	100	.0874	57.0	5.0
WHEATON5 161--6 CA=NSP	61871_WHEATO	0.293	100	.0874	57.0	5.0
WISSOTAG69.0--1 CA=NSP	69168_WISSOT	0.266	100	.0601	37.0	2.2
Summary						**33.1**
ALTW #631	Avail Assigned Gen: 2,337 Load Level: 3,640 Scaling: 1.000	ALTW_LD Load Shift Factor: 0.065				
FOXLK53G13.8--3 CA=ALTW	62016_FOXLK5	0.147	100	.0819	88.5	7.3
LANS5 4G22.0--4 CA=ALTW	62057_LANS5_	0.116	100	.0506	277.0	14.0
LANS5 3G22.0--3 CA=ALTW	62058_LANS5_	0.116	100	.0505	35.8	1.8
FAIRMONT69.0--3 CA=ALTW	65816_FAIRMO	0.151	100	.0857	5.0	0.4
FAIRMONT69.0--4 CA=ALTW	65816_FAIRMO	0.151	100	.0857	6.0	0.5
FAIRMONT69.0--5 CA=ALTW	65816_FAIRMO	0.151	100	.0857	12.0	1.0
FAIRMONT69.0--6 CA=ALTW	65816_FAIRMO	0.151	100	.0857	7.0	0.6
FAIRMONT69.0--7 CA=ALTW	65816_FAIRMO	0.151	100	.0857	6.5	0.6
Summary						**26.2**

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Common Name	Generator Reference System	Generator Shift Factor (GSF)	Percent Assigned	GLDF Gen to Load Factor	Pmax (MW)	Energy on Flowgate
TOTAL Summary						127.4

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APPENDIX E
DRAFT NERC IDC Modification Requirements Per MISO & PJM LMP Implementation

Background:

The requirement of this change order was developed to ensure the reliability of the bulk electric system is always maintained, and to ensure the NERC IDC is capable of determining accurate flow gate reductions representative of the entities actually creating the flows on the system. The expanded PJM footprint includes additional control areas being consumed into the LMP market, and involves the termination of using transmission reservations and NERC tags to represent system flows for those control areas. The NERC IDC must be capable of receiving flow gate impacts created by the LMP market.

Transactions going in and / or out, and through the PJM territory will continue to be tagged. Source / Sink bus points need to be determined in order to eliminate any type of gaming. During TLR, these tagged transactions will be curtailed as prescribed by the IDC, and could involve any of the current transmission priority buckets. The level of granularity and what E-tagging fields are used by the IDC to assign TDF factors to these transactions will be addressed in the near future.

In order to accomplish these changes necessary to incorporate the LMP markets into the IDC there will be NERC Policy, IDC software, algorithm, and database changes needed.

PROPOSED CHANGE DESCRIPTION:

IDC File Import Requirements:

The LMP market impact files will be sent to the IDC or specified location at least every fifteen minutes. These files will include market impact information for two transmission priorities or categories, for every flow gate identified by the LMP Market agreement. This may not include all flowgates in the NERC BoF. IDC TDF calculations will continue to be done for the LMP market regions on all Flowgates to ensure that all tagged transactions from / into the market are curtailed properly during the TLR process.

The two transmission priorities that will be included in the LMP market impact file are:

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a) Priority 6-NN (Economic Impacts of LMP Market)
b) Priority 7-F (Firm NNL Impacts)

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The LMP engine will transfer two types of files to the IDC or specified location. A Current hour file will be sent at least every fifteen minutes, and one next hour file will be sent at (and no later than) 25-minutes after the hour.
Each file will contain flow impact information for priority 6-NN and 7-F for each identified flow gate. The LMP engine information associated with the flow gate calculations will be posted on the market OASIS for review.

The file transferred to the IDC will be in XML format. The field specifications will be identified when development begins.

If there is an error with the gathering/uploading or content of the LMP market impact file the values from the last good file will be used until a correct file can be retrieved. There should be an error sent to the RC to alert them of the file error.

LMP Flow Gate Impact Calculation Protocol:

Flow gate impact protocol "proposals" are identified in the PJM / MISO Congestion Management White paper. The flow gate protocol process will be added to this NERC IDC change order once a defined process has been approved.

IDC Weighting Factor Algorithm Change Requirements:

Since the LMP markets will be sending the flow impact for specified flowgates there will be no calculated TDF for that impact for use during the curtailment process. The weighting factor algorithm that is used to calculate the curtailments for priority 6-NN and 7-FIRM will need to be changed.

The curtailment and reallocation of the priority 6-NN bucket will need to be modified to be like the curtailment in the priority 7-FIRM bucket to allow the flow impact information to be used to assign curtailment amounts on a pro-rata basis (based on the MW level of the MW total to all such Interchange Transactions). Consequently all transactions using 6-NN Transmission Service will be put in the same sub-priority group, and will be Curtailed/Reallocated pro-rata, independent of their current status (curtailed or halted) or time of submittal with respect to TLR issuance. This change will also require a NERC Appendix 9C1 change in language.

The curtailment and reallocation of the priority 7-FIRM bucket will be the same with the exception that NO NNL Responsibility should be calculated for any of the CAs that are in the LMP market. The flow impact that will be sent to the IDC will already include the NNL portion for each area and there would be double counting if the 7-FIRM process also assigned NNL responsibility.

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IDC Curtailment Report Change Requirements:

Non-firm schedule curtailments including transmission priority #1 through priority #5 will be prescribed for curtailment by the IDC as it is currently done.

Non-firm schedule curtailments of transmission priority #6 will include schedules identified by bucket #6 NERC tags, and by LMP market economic impacts. For non-firm priority #6 curtailments, the IDC curtailment report will prescribe a megawatt reduction requirement for the particular flow gate in TLR. The Reliability Coordinator associated with the LMP market having a reduction responsibility will initiate a re-dispatch order representative of the IDC LMP flow gate reduction order, as well as curtail NERC tags sinking into the LMP market. The status of the LMP economic impact will be "Re-Dispatch" until there is no longer a curtailment in the Priority 6-NN bucket where the status will return to "Proceed". The LMP market economic impact should never reach the "HOLD" status, as there will always be a value in the IDC for use (i.e. if there is a problems gathering the information the previous impact should be used).

Firm schedule curtailments of transmission priority #7 will include schedules identified by bucket #7 NERC tags, by control area NNL reductions, and by LMP market firm. The firm LMP market impact value used by the IDC will include firm schedules and NNL impacts created by the market as one number. For firm priority #7 curtailments, the IDC firm curtailment report will prescribe a megawatt reduction requirement for the particular flow gate in TLR. The Reliability Coordinator associated with the LMP market having a reduction responsibility will initiate a re-dispatch order representative of the IDC LMP flow gate reduction order, as well as curtail NERC tags sinking into the LMP market. The status of the LMP FIRM impact will be "Re-Dispatch" until there is no longer a curtailment in the Priority 7-FIRM bucket where the status will return to "Proceed". The LMP market Firm impact should never reach the "HOLD" status, as there will always be a value in the IDC for use (i.e. if there is a problems gathering the information the previous impact should be used).

IDC Screen Change Requirements:

Various IDC screen options will be modified in order to display LMP market impacts. For example, when selecting the "whole transaction" list option for a particular flow gate, the IDC will display the LMP priority #6 and #7 accordingly. Some examples are included below.

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NERC IDC Display Information:

The following pages represent NERC IDC screen displays. The displays provide information with respect to how the IDC works today, and how the tool will work with the proposed LMP market change order. The Eau Claire – Arpin flow gate was used in the examples. The displays provide information for:

1) IDC "Whole Transaction list" for Eau Claire – Arpin as the tool is today.
2) IDC "Whole Transaction list" for Eau Claire – Arpin with the proposed LMP market change order.
3) TLR level 3B "Eau Claire – Arpin" Curtailment Report (50mw's of relief), as the tool works today, and with the proposed LMP market change order.
4) TLR level 3B "Eau Claire – Arpin" Curtailment Report (155mw's of relief), as the tool works today.
5) TLR level 3B "Eau Claire – Arpin" Curtailment Report (155mw's of relief), with the proposed LMP market change order.
6) TLR level 3B "Eau Claire – Arpin" Curtailment Report (100mw's of relief), with the proposed LMP market change order.

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Eau Claire – Arpin Flow Gate Information:

The following IDC screen shot represents a NERC IDC "whole transaction" list as it works today.

Sink SC	Method	Tag Name	Reservation MW	Reservation Priority	Reliability Cap	Market Cap	Actual MW	Scl
EES	WL	MEC_TNSKDLJAN0278_EES	1 50	1-NS	1 50	1 50	1 50	
MISO	WL	OTP_OTPW010007985_MPS	20	1-NS	20	20	20	
PJM	CPM	NSP_NSPPOW0092573_PJM	280	1-NS	280	280	280	
		Total for 1-NS	450		450	450	450	
EES	WL	SECI_CRGL1ASH0107P_EES	25	2-NH	25	25	25	
MAIN	WL	MEC_AME010054962_PJM	150	2-NH	150	150	150	
MISO	CPM	NSP_NSPPOW0092737_OPPD	6	2-NH	6	6	6	
MISO	WL	WAUE_REMC010002263_MPS	250	2-NH	250	250	250	
TVA	WL	MEC_APMM1JAN3024_AECI	50	2-NH	50	50	50	
TVA	CPM	NSP_NSPPOW0092750_AECI	350	2-NH	350	350	350	
		Total for 2-NH	831		831	831	831	
PJM	WL	KCPL_CNCTET0005785_PJM	53	3-ND	53	53	53	
TVA	WL	NPPD_TEA01TEO3010_AECI	60	3-ND	60	60	60	
		Total for 3-ND	113		113	113	113	
MISO	CPM	ALTW_ALTMA10008672_ALTE	79	6-NN	79	79	79	
MISO	CPM	CE_ALTMA10008643_ALTE	200	6-NN	200	200	200	
MISO	CPM	CE_ALTMA10008651_ALTE	150	6-NN	150	150	150	
MISO	CPM	OTP_WEPM24000813J_WEC	200	6-NN	200	200	200	
MISO	CPM	WAUE_REMC010002261_WEC	300	6-NN	300	300	300	
TVA	WL	MEC_APMM1JAN2912_AECI	8	6-NN	8	8	8	
		Total for 6-NN	737		737	737	737	
MAIN	WL	MEC_CPS010101F00_AMRN	30	7-F	30	30	30	
MAIN	WL	MEC_MECBULET01105_CE	360	7-F	360	360	360	
MAIN	WL	MEC_MECBULET01106_AMRN	11	7-F	11	11	11	
MISO	CPM	ALTE_WPPI010040617_WPS	10	7-F	10	10	10	
MISO	CPM	ALTW_ALTMA10008479_ALTE	154	7-F	79	79	79	
MISO	CPM	ALTW_ALTMA10008656_ALTE	50	7-F	50	50	50	
MISO	WL	WAUE_UGPM010003879_MEC	300	7-F	300	300	300	
MISO	WL	WAUE_UGPM010003880_MEC	200	7-F	200	200	200	
MISO	CPM	WEC_CWPC010004010_WPS	4	7-F	4	4	4	
MISO	CPM	WEC_WPSM010001664_UPPC	65	7-F	65	65	65	

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TVA	WL	LES_APMM1JAN2910_AECI	40	7-F	40	40	40	
TVA	WL	MEC_AECIJAN1011_AECI	4	7-F	4	4	4	
TVA	WL	MEC_APMM1JAN2911_AECI	250	7-F	250	250	250	
TVA	WL	MEC_MECBULET01003_AECI	150	7-F	150	150	150	
		Total for 7-F	1628		1628	1628	1628	
		Global Total	3759		3759	3759	3759	

Eau Claire – Arpin Flow Gate Information:

The following IDC screen shot represents a NERC IDC "whole transaction" list with the proposed LMP market cha

Sink SC	Method	Tag Name	Reservation		Reliability Cap	Market Cap	Actual MW	
			MW	Priority				Sc
EES	CPM	NewCo_TNSKDLJAN0278_EES	50	1-NS	50	50	50	
PJM	CPM	NewCo_NSPPOW0092573_PJM	168	1-NS	168	168	168	
		Total for 1-NS	238		238	238	238	
EES	WL	SECI_CRGL1ASH0107P_EES	25	2-NH	25	25	25	
PJM	CPM	NewCo_AME010054962_PJM	50	2-NH	50	50	50	
EES	CPM	NewCo_APMM1JAN3024_EES	50	2-NH	50	50	50	
FPL	CPM	NewCo_NSPPOW0092750_FPL	105	2-NH	105	105	105	
		Total for 2-NH	230		230	230	230	
PJM	CPM	NewCo_CNCTET0005785_PJM	53	3-ND	53	53	53	
TVA	WL	SPC_TEA01TEO3010_AECI	60	3-ND	60	60	60	
		Total for 3-ND	113		113	113	113	
MISO	CPM	NewCo LMP Market Economic Disp.		6-NN				
PJM	WL	PJM LMP Market Economic Disp.		6-NN				
EES	CPM	NewCo_APMM1JAN2912_EES	8	6-NN	8	8	8	
		Total for 6-NN	8		8	8	8	
PJM	CPM	NewCo_CPS010101F00_PJM	30	7-F	30	30	30	
PJM	CPM	NewCo_MECBULET01105_PJM	160	7-F	160	160	160	
MISO	CPM	NewCo LMP Market NNL		7-F				
PJM	WL	PJM LMP Market NNL		7-F				
TVA	CPM	NewCo_APMM1JAN2910_AECI	40	7-F	40	40	40	
TVA	CPM	NewCo_AECIJAN1011_AECI	4	7-F	4	4	4	
TVA	CPM	NewCo_APMM1JAN2911_AECI	142	7-F	142	142	142	
TVA	CPM	NewCo_MECBULET01003_AECI	17	7-F	17	17	17	

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Total for 7-F	993	993	993	993
Global Total	2461	2461	2461	2461

Eau Claire – Arpin Flow Gate Information:

50MW of relief was required in this example. Only up to priority #3 was impacted.

The following IDC screen shot represents a NERC IDC "curtailment" list as it works today.

SC Requestor:	MISO	CA Requestor:	ALTE		TLR level:	3B	
Requested Relief:	50						
IDC MW Curtailed:	432	Trans. Curt.	8		Relief:	50	

Sink SC	Tag Name	Method	Tag Marginal Priority	Schedule MW	Active MW	Curtail MW	MW Cap
EES	MEC_TNSKDLJAN0278_EES	WL	1-NS	50	50	50	0
TVA	NSP_NSPPOW0092573_AECI	CPM	1-NS	168	168	168	0
EES	SECI_CRGL1ASH0107P_EES	WL	2-NH	25	25	25	0
MAIN	MEC_AME010054962_AMRN	WL	2-NH	50	50	50	0
SWPP	OPPD_CRGL1ABJ0108J_EDE	WL	2-NH	50	50	50	0
TVA	MEC_SEINC0000500_AECI	WL	2-NH	50	50	50	0
PJM	KCPL_CNCTET0005785_PJM	WL	3-ND	53	53	16	37
TVA	NPPD_TEA01TEO3010_AECI	WL	3-ND	60	60	23	37
			Total Curtailment:	506	506	432	74

****NOTE:** The curtailment report above (when only including transmission curtailment priorities of bucket 0 – 5) will not change w market change order proposal.

Eau Claire – Arpin Flow Gate Information:

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155MW of relief was required in the following example. Up to (and including) priority #6 was impacted.

The following IDC screen shot represents a NERC IDC "curtailment" list as it works today.

SC Requestor:	MISO	**CA Requestor:**	ALTE	**TLR level:**	
Requested Relief:	155				
IDC MW Curtailed:	1208	**Trans. Curt.**	24	**Relief:**	

Sink SC	Tag Name	Method	Tag Marginal Priority	Schedule MW	Active MW	Curtail MW
EES	MEC_TNSKDLJAN0278_EES	WL	1-NS	50	50	50
TVA	NSP_NSPPOW0092573_AECI	CPM	1-NS	168	168	168
EES	SECI_CRGL1ASH0107P_EES	WL	2-NH	25	25	25
MAIN	MEC_AME010054962_AMRN	WL	2-NH	50	50	50
TVA	MEC_SEINC0000500_AECI	WL	2-NH	50	50	50
PJM	KCPL_CNCTET0005785_PJM	WL	3-ND	53	53	53
TVA	NPPD_TEA01TEO3010_AECI	WL	3-ND	60	60	60
MISO	ALTW_ALTMA10008672_ALTE	CPM	6-NN	78	78	78
MISO	CE_ALTMA10008643_ALTE	CPM	6-NN	100	100	67
MISO	CE_ALTMA10008651_ALTE	CPM	6-NN	50	50	34
MISO	CE_ALTMA10008652_ALTE	CPM	6-NN	50	50	34
MISO	CE_ALTMA10008653_ALTE	CPM	6-NN	50	50	34
MISO	CE_ALTMA10008654_ALTE	CPM	6-NN	50	50	34
MISO	CE_MSCG01MS39921_ALTE	CPM	6-NN	25	25	17
MISO	CE_MSCG01MS39922_WEC	CPM	6-NN	25	25	17
MISO	CE_WEPM24000813Q_WEC	CPM	6-NN	100	100	68
MISO	MHEB_CRGL1AAA0107C_WEC	CPM	6-NN	100	100	100
MISO	MPW_WEPM24000813X_WEC	CPM	6-NN	50	50	48
MISO	MP_OTPW010007958_OTP	CPM	6-NN	50	50	29
MISO	MP_OTPW010007975_OTP	CPM	6-NN	30	30	17
MISO	NSP_WEPM24000813O_WEC	CPM	6-NN	100	100	50
MISO	OTP_WEPM24000813J_WEC	CPM	6-NN	100	100	60
MISO	WAUE_REMC010002261_WEC	CPM	6-NN	100	100	60
TVA	MEC_APMM1JAN2912_AECI	WL	6-NN	8	8	5
			Total Curtailment:	1522	1522	1208

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Eau Claire – Arpin Flow Gate Information:

155MW of relief was required in this example. Up to (and including) priority #6 was impacted.

The following IDC screen shot represents a NERC IDC "curtailment" list with the proposed LMP market change or

SC Requestor:	MISO	**CA Requestor:**	ALTE	**TLR level:**	
Requested Relief:	155				
IDC MW Curtailed:	1338	**Trans. Curt.**	10	**Relief:**	

Sink SC	Tag Name	Method	Tag Marginal Priority	Schedule MW	Active MW	Curtail MW
EES	NewCo_TNSKDLJAN0278_EES	CPM	1-NS	50	50	50
PJM	NewCo_NSPPOW0092573_PJM	CPM	1-NS	168	168	168
EES	SECI_CRGL1ASH0107P_EES	WL	2-NH	25	25	25
PJM	NewCo_AME010054962_PJM	CPM	2-NH	50	50	50
EES	NewCo_APMM1JAN3024_EES	CPM	2-NH	50	50	50
FPL	NewCo_NSPPOW0092750_FPL	CPM	2-NH	105	105	105
PJM	NewCo_CNCTET0005785_PJM	CPM	3-ND	53	53	53
TVA	SPC_TEA01TEO3010_AECI	WL	3-ND	60	60	60
MISO	NewCo LMP Market Economic Disp.	CPM	6-NN		80	
PJM	PJM LMP Market Economic Disp.	WL	6-NN		15	
EES	NewCo_APMM1JAN2912_EES	CPM	6-NN	50	50	50
			Total Curtailment:	611	706	1338

FIRM CURTAILMENTS:

****NOTE: The curtailment report above represents the identical process used when curtailing firm (transmission priority #7). The ex
that a firm curtailment report will include and display the control areas located outside the LMP market that have an NNL reduction res

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Eau Claire – Arpin Flow Gate Information:

100MW of relief was required in this example. Up to priority #6 was impacted.

The following IDC screen shot represents a NERC IDC "curtailment" list with the proposed LMP market change or

SC Requestor:	MISO	**CA Requestor:**	ALTE		**TLR level:**	3
Requested Relief:	100					
IDC MW Curtailed:	1338	**Trans. Curt.**	10		**Relief:**	1

Sink SC	Tag Name	Method	Tag Marginal Priority	Schedule MW	Active MW	Curtail MW
EES	NewCo_TNSKDLJAN0278_EES	CPM	1-NS	50	50	50
PJM	NewCo_NSPPOW0092573_PJM	CPM	1-NS	168	168	168
EES	SECI_CRGL1ASH0107P_EES	WL	2-NH	25	25	25
PJM	NewCo_AME010054962_PJM	CPM	2-NH	50	50	50
EES	NewCo_APMM1JAN3024_EES	CPM	2-NH	50	50	50
FPL	NewCo_NSPPOW0092750_FPL	CPM	2-NH	105	105	105
PJM	NewCo_CNCTET0005785_PJM	CPM	3-ND	53	53	53
TVA	SPC_TEA01TEO3010_AECI	WL	3-ND	60	60	60
MISO	NewCo LMP Market Economic Disp.	CPM	6-NN		80	
PJM	PJM LMP Market Economic Disp.	WL	6-NN		15	
EES	NewCo_APMM1JAN2912_EES	CPM	6-NN	50	50	50
			Total Curtailment:	611	706	1338

FIRM CURTAILMENTS:

****NOTE: The curtailment report above represents the identical process used when curtailing firm (transmission priority #7). The ex
that a firm curtailment report will include and display the control areas located outside the LMP market that have an NNL reduction res

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Phase I: (Day 1 Implementation, PJM effective Date February 1st, 2003) ¶
Utility/Control Area associations with respect to RTO membership are the only changes required to the IDC.¶
<#>Current PJM footprint does not change with respect to the LMP market. ¶
<#>New members joining PJM and MISO with respect to the RTO membership will continue to tag schedules and be curtailed as prescribed by the IDC.¶
¶
¶
Phase II: (Day 2 Implementation, PJM effective Date May 1st, 2003) ¶
The PJM LMP market expands to include all the new ECAR (i.e., AEP and Dayton) members within the PJM footprint. This Phase also applies to PJM's Market inclusion of Dominion on October 1st 2003 and ComEd, and IP on December 1st, 2003. On May 1st, he IDC must be capable of receiving flow gate impact files from LMP engines for flowgates impacted by the inclusion of AEP and DPL..¶
¶
<#>Transactions going in and / or out, and through the PJM territory will continue to be tagged. Source / Sink bus points need to be determined in order to eliminate any type of gaming. During TLR, these transactions will be curtailed as prescribed by the IDC, and could involve any of the current transmission priority buckets.¶
<#>The PJM market impact files sent to the IDC every fifteen minutes (Note: PJM is capable of sending these values every 5 minutes) include information for two transmission priorities or categories, for every flow gate that meets the sensitivity analysis review, and any other flow gate requested by an "entity outside the LMP". They are:¶
<#>Priority 6-NN (Economic Impacts of LMP Market)¶
<#>Priority 7-F (Firm NNL Impacts)¶
<#>The difference between these values¶
<#>Two types of files will be sent to the IDC. Current hour files will be sent every fifteen minutes, and one next hour file will be sent at (and no later than) 25-minutes after the hour.¶
<#>The PJM LMP engine information associated with the flow gate calculations are posted on the PJM OASIS for review.¶
¶
¶
Phase III: MISO / NewCo LMP market goes operational and encompasses the entire MISO / NewCo footprint, effective December 2003). NOTE*: NewCo* represe ... [2]

Required Policy Changes

Since the "impact" will not be considered a Tag, the only Policy changes that appear to be necessary will deal with issues around curtailments and reloading of transactions and how the "impact" aspect will be dealt with. These changes are based on the stated assumptions below.

Policy 3

- Section D Interchange Transaction Modification; Requirement 2. Interchange Transaction modification for reliability-related issues. (and all sub-sections)
- Appendix 3A1 Timing Requirements for Re-Allocation when in a TLR Event
- Appendix 3A4 Curtailments and reloads
- Appendix 3D Transaction Tag Actions

Policy 9

Needs a general statement in the introductory paragraphs concerning identification of economic dispatch "impact" and it's factoring into curtailment and reload philosophy.

- Section A, requirement 1 Perform security analysis, subsection 1.1 data Needed by Noon on transactions (and I would guess "impacts")
- Section A, Requirement 2 Study Results To Be Shared by 1500 hours CST
- Section C requirement 1, Interchange Distribution Calculator, Subsection 3.2.1.1 Use with an Interconnection Wide procedure (local procedure and re-dispatch0
- Appendix 9C1, General Comments Section needs to include word about equating "impact" to a transaction.

Assumptions

(1)All PJM RTO external transactions will have obtained the necessary transmission service and will continue to be tagged using a Tag service.
(2)All tagged transactions will automatically be sent to the IDC for evaluation either by the TLR procedure or the FIST.
(3)All Internal PJM RTO economic dispatch directives will be calculated to determine their impact on all identified flow-gates used in the IDC. These "impacts" will not need transmission service and thus will not be tagged.
(4)The calculated impacts will be provided to the IDC for use in TLR curtailments and for FIST evaluations.

The calculated "impacts" will be shown in the IDC in Bucket 0, 6, or 7

Phase I: (Day 1 Implementation, PJM effective Date February 1st, 2003)
Utility/Control Area associations with respect to RTO membership are the only changes required to the IDC.
1)Current PJM footprint does not change with respect to the LMP market.

2)New members joining PJM and MISO with respect to the RTO membership will continue to tag schedules and be curtailed as prescribed by the IDC.

Phase II: (Day 2 Implementation, PJM effective Date May 1st, 2003)
The PJM LMP market expands to include all the new ECAR (i.e., AEP and Dayton) members within the PJM footprint. This Phase also applies to PJM's Market inclusion of Dominion on October 1st 2003 and ComEd, and IP on December 1st, 2003. On May 1st, he IDC must be capable of receiving flow gate impact files from LMP engines for flowgates impacted by the inclusion of AEP and DPL..

1)Transactions going in and / or out, and through the PJM territory will continue to be tagged. Source / Sink bus points need to be determined in order to eliminate any type of gaming. During TLR, these transactions will be curtailed as prescribed by the IDC, and could involve any of the current transmission priority buckets.
2)The PJM market impact files sent to the IDC every fifteen minutes (Note: PJM is capable of sending these values every 5 minutes) include information for two transmission priorities or categories, for every flow gate that meets the sensitivity analysis review, and any other flow gate requested by an "entity outside the LMP". They are:
a)Priority 6-NN (Economic Impacts of LMP Market)
b)Priority 7-F (Firm NNL Impacts)
c)The difference between these values
3)Two types of files will be sent to the IDC. Current hour files will be sent every fifteen minutes, and one next hour file will be sent at (and no later than) 25-minutes after the hour.
4)The PJM LMP engine information associated with the flow gate calculations are posted on the PJM OASIS for review.

Phase III: MISO / NewCo LMP market goes operational and encompasses the entire MISO / NewCo footprint, effective December 2003). NOTE*: NewCo* represents the future name of MISO/SPP.
. Per implementation of phase II, the IDC is already capable of receiving flow gate impact files from LMP engines.
1)Transactions going in and / or out, and through the PJM and MISO / NewCo LMP markets will be tagged. In addition, some of the FERC non-jurisdictional entities within the MISO / NewCo footprint may choose not to participate in the LMP market, and therefore will continue to use the NERC tagging process. Source / Sink bus points need to be determined in order to eliminate any type of gaming. During TLR, these transactions will be curtailed as prescribed by the IDC and could involve any of the current transmission priority buckets. A list of these non-jurisdictional entities can be found in Appendix ?.
2)The PJM and MISO / NewCo LMP markets impact files sent to the IDC every fifteen minutes(5 minutes?) include information for two transmission priorities or categories for every flow gate that meets the sensitivity analysis review, and any other flow gate requested by an "entity outside the LMP". They are:
a.Priority 6-NN (Economic Impacts of LMP Market)
b.Priority 7-F (Firm NNL Impacts)

3)Two types of files will be sent to the IDC. Current hour files will be sent every fifteen minutes (5 minutes?), and one next hour file will be sent at (and no later than) 25-minutes after the hour. (info in the next hour file will be what?)
4)The PJM LMP engine information associated with the flow gate calculations is posted on the PJM OASIS for review.
5)The MISO / NewCo LMP engine information associated with the flow gate calculations is posted on the MISO / NewCo OASIS for review.

IDC Technical Requirements For LMP Engine Data Files:
1)Type of file transferred? XML format like new SDX?
2)What changes are required for the IDC to receive these input files?
3)The next page displays a flow gate "whole transaction list" via the modified IDC.
4)How is the LMP engine calculating impacts on flow gates outside LMP footprint? The ATC coordination agreements require reservation and LMP schedules impact flow gates internal and external to the LMP market. Therefore, the LMP model requirement will provide the ability to calculate impacts for TLR purposes.
5)The IDCWG could help determine the "sensitivity" flow gates. For starters, all flow gates having an NNL responsibility for all entities that are separate of the LMP today, but will be joining PJM will be considered.