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JOA BASELINE REVIEW

PREPARED FOR:

MIS **pjm**

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LEGAL DISCLAIMER

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1.0 EXECUTIVE SUMMARY

On January 4, 2011, in accordance with Rule 602 of the Commission's Rules of Practice and Procedure, the Midwest Independent Transmission System Operator, Inc. (MISO) and PJM Interconnection, L.L.C. (PJM) filed a joint Settlement Agreement and Offer of Settlement (Settlement) to resolve two MISO complaints against PJM and one PJM complaint against MISO. On June 16, 2011, the Federal Energy Regulatory Commission (FERC) approved the Settlement, and accepted the proposed tariff revisions, effective the date of the order, subject to a compliance filing. In the Settlement, MISO and PJM agreed to a review of existing procedures for implementing the Joint Operating Agreement (JOA) and a process for reviewing future changes to implementation procedures. Specifically, the Settlement provides for an initial "Baseline Review" of the means and processes pursuant to which MISO and PJM implement the Market-to-Market (M2M) process under the JOA. Accordingly, having been jointly retained by MISO and PJM, Utilicast conducted the Baseline Review to ensure all processes and applications that support the M2M provisions described in the JOA are carried out in accordance with that document.

The work undertaken by Utilicast was not an audit of the current M2M processes and procedures in place at MISO and PJM, but rather a review to identify any areas of M2M coordination that are potentially out of conformance with the JOA and any areas in which MISO and PJM may have interpreted the JOA differently, resulting in inconsistent approaches to implementation of the M2M process. Utilicast focused on specific portions of the JOA that involve the M2M process and include (a) Data Exchange and Change Management from the Body of JOA, (b) Congestion Management Process, Market Flow Determination, and Coordinated Flowgate Determination from Attachment 2, and (c) M2M Interregional Coordination Process, Day-Ahead Market Coordination, Real-Time Market Coordination, Appropriate Use of the M2M process, M2M Settlement, System Modeling, and Outage Coordination from Attachment 3.

Utilicast's approach to the JOA Baseline Review was based upon a simultaneous "Top-Down" and "Bottom-Up" approach. The Bottom-Up approach involved a line-by-line analysis of the JOA that identified all requirements, rules, and actions required of each JOA participant. Upon identification of each item, Utilicast then sought documentation from MISO and PJM that could be used to provide evidence that the respective RTOs were following these JOA provisions. Where documentation was inadequate or did not exist, Utilicast conducted in-person interviews with Subject Matter Experts to verify RTO processes and procedures. The Top-Down review consisted of a functionally oriented higher level approach. Utilicast attempted to verify any provisions that were either interpreted differently by MISO and PJM, or implemented differently, but still achieved results in conformance with the JOA. Variations in implementation methodology between the two organizations that still resulted in overall consistent JOA conformance were noted as potential future collaboration recommendations. All of this information was synthesized into a separate Findings and Recommendations section.

Since the June 2011 FERC Order, PJM and MISO have made substantial progress in addressing the issues that brought them to that Settlement. They have focused on improved communication, data exchange, knowledge-sharing activities, and improved transparency. They have actively worked together, including joint working group initiatives, to improve their joint market activities. The Review Team believes to the best of its knowledge, observations and analysis of the Source Materials that the RTOs are in conformance with the provisions of the JOA. Utilicast has also identified areas within the M2M coordination where increased cooperation, transparency and continued knowledge sharing provide ample process improvement opportunities. The joint MISO/PJM Enhanced Data Exchange project will provide many of the recommended enhancements. This is expected to go into production in the 4th quarter of 2012. Table 1 below summarizes the key findings and recommendations.

TABLE 1: KEY FINDINGS AND RECOMMENDATIONS:

Topic	Report Section	Key Findings	Key Recommendations
Documentation	5.1	Strong documentation of the Parties' internal processes is generally lacking or absent. Specific areas recommending improvement are listed in this table, with further detail throughout the Findings and Recommendation sections in this report.	All processes and procedures should be documented and shared with each Party (to the extent possible) to proactively prevent opportunities for misinterpretation.
Modeling	5.2	There are differences in modeling practices.	The Parties should improve their current level of communication and coordination with respect to changes in models.
Data Exchange	6.1.1	The Parties conform to the JOA provisions.	Enhanced Data Exchange project, currently underway, should be completed on schedule (4th quarter, 2012).
Outage Coordination	6.1.2	The Parties normally conform to the JOA provisions. There were occasional situations where the RTOs had not notified each other of scheduled outages prior to the Day-Ahead.	Increase awareness of Outage Coordination communication needs and formalize communication procedures.
Change Management	6.1.3	The Parties conform to the JOA provisions.	Change Management documentation should be shared to further clarify each Party's processes and procedures.
Biennial Review	6.1.4	The Biennial Review has not yet been required.	The Parties should develop a review framework.
Flowgate Determination	6.2.1	The Parties conform to the JOA provisions.	The Parties should formalize process timelines to ensure proper turn-around time.
Real Time Market Flow Determination	6.2.2	Each Party models controllable devices differently (PARs, VFTs, DC Links). Neither Party has identified that the differences in modeling of controllable facilities has resulted in the inequitable settlement calculation of market flows.	The Parties should improve their current level of communication and coordination with respect to making changes to the market flow calculation logic. PJM and MISO should develop and share an overview document highlighting their respective modeling techniques and calculation methodologies.

Topic	Report Section	Key Findings	Key Recommendations
Market Flow Limit Determination - Forward Coordination Process	6.2.3	Since June 16, 2011, no revisions to historic firm flow entitlements have been made as a result of temporary system conditions in accordance with JOA language.	A formal procedure should be developed between the Parties defining conditions that may trigger a review of Historic Firm Flow Values and Ratios.
M2M Coordination	6.3.1	The Parties conform to the JOA regarding entering an anticipated M2M Flowgate into the dispatch tools before the completion of the Flowgate studies when a system event requires prompt attention. Since June 16, 2011 there has not been any event resulting in settlement adjustments from the above scenario.	Procedures regarding this process need to be formally documented.
Day-Ahead Energy Market Coordination	6.3.2	Neither Party has ever utilized the FFE sharing provision. There is a discrepancy in the DA model flowgate limit determination as PJM does not utilize MISO supplied FFE in its limit calculation for PJM internal flowgates.	The Parties should revisit the JOA language with regard to FFE sharing since there is little incentive to use this provision. The Parties should clarify JOA language regarding determination of flowgate limits.
Purpose of Market to Market	6.3.3.1	Parties operate M2M on an agreed-to set of flowgates.	Although in many cases internal documentation exists, common documentation of procedures regarding the addition and review of temporary M2M Flowgates should be developed.
Minimizing Less-Than-Optimal Dispatch	6.3.3.2	The Parties conform to the JOA provisions.	Although the Parties are currently in the process of updating required procedures and documentation, a firm date of completion should be agreed upon.
Use M2M whenever binding a M2M Flowgate	6.3.3.3	The Parties are operating in conformance with JOA provision, subject to the limitations of some current manual procedures.	The Parties should continue to evaluate potential improvements to the initiation and notification procedures under M2M to reduce any inherent time lags as much as possible.
Most Limiting Flowgate	6.3.3.4	The Parties conform to the JOA provisions.	Joint communication and coordination procedures should be formally defined and documented.

Topic	Report Section	Key Findings	Key Recommendations
Substitute Flowgate	6.3.3.5	The Parties conform to the JOA provisions.	A formal procedure regarding requirements for M2M Flowgate exceptions should be developed between the Parties.
Operating Guides	6.3.3.6	The Parties conform to the JOA provisions.	None.
Specific Conditions Applicable to Most Limiting Flowgate	6.3.4	The Parties conform to the JOA provisions.	Joint communication and coordination procedures should be formally defined and documented.
Specific Conditions Applicable to Operating Guides	6.3.5	The Parties conform to the JOA provisions.	None.
After-the-Fact Review	6.3.6	When exceptions to normal M2M occur, e-mails are exchanged, and events and exceptions are discussed as an agenda item on scheduled, weekly conference calls. No disputed settlements have occurred.	A formal procedure should be developed to address the handling of these exceptions.

2.0 BACKGROUND

The decision to conduct the JOA Review was based on an event chain that spanned over six years. It culminated in FERC's Order to conduct a Baseline Review. The following outlines the process that led to that decision.

With the implementation of the MISO energy markets in April, 2005, the JOA[1] between MISO and PJM established a Market-to-Market (M2M) process for coordinating relief of transmission constraints at designated flowgates[2]. The process is essential to ensure efficient dispatch of generation to manage these constraints, promote price convergence between the markets, and facilitate pricing and congestion management[3] in both areas. M2M success is contingent upon:

(a) Achieving convergence of shadow prices of the two RTOs once a coordinated constraint is activated, and
(b) Achieving reduction in shadow prices from the initial value through the coordination process.

Upon activation of a M2M constraint by the monitoring RTO (MRTO, the entity that is responsible for coordinating reliability for the constraint), the MRTO provides the reciprocating RTO, the non-monitoring RTO responding to the request (NMRTO) with its shadow price and the amount of relief requested. This shadow price measures the marginal cost of the MRTO to relieve the constraint, and relief is the desired reduction in flow from the NMRTO market. These values are incorporated into the Real-Time market calculations of the NMRTO to provide a reduction in flow up to the requested relief amount and at a cost up to the MRTO's shadow price.

Each market is entitled to its firm flow entitlement (FFE)[4] on each of the M2M constraints, and financial settlements between the RTOs are calculated on the actual market flows over the constraint relative to their entitlements. The M2M financial settlements average $140,000 daily with a daily high that is no greater than $4 million. Also, the number of M2M coordinated events on MISO and PJM coordinated flowgates increased notably in 2010, 23 percent and 16 percent respectively. Based on information published by the RTOs, it can be safely concluded that the M2M coordination process has successfully accomplished the goals of reduced congestion and shadow prices and continues to provide significant benefits to the markets in both of the RTOs.

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[1] The JOA, originally approved in 2004, addresses the problems caused by the irregular seam between MISO and PJM. Its purposes are to improve reliability and economic efficiency, and to administer a joint and common market that facilitates both RTOs' operations.

[2] Flowgates are facilities or groups of facilities that may act as significant constraint points on the system. JOA, section 2.2.24. A Substitute Flowgate is a M2M flowgate that does not represent the actual limit, but is being used in the M2M process to manage flows on another flowgate that may not be a M2M flowgate. Coordinated flowgates are those that one of the RTOs has subjected to four specific tests (specified in Attachment 2 to the JOA) and thereby determined the impact of the flows that the RTOs' operations place on the flowgates. JOA, section 2.2.12. A Reciprocal Coordinated Flowgate is either a coordinated flowgate affected by the transmission of energy by both RTOs or a flowgate that both RTOs mutually agree should be a coordinated flowgate and for which reciprocal coordination will occur. JOA, section 2.2.54.

[3] The JOA includes a Congestion Management Process and an Interregional Coordination Process to establish the process by which the Parties manage Reciprocal Coordinated Flowgates.

[4] The Firm Flow Entitlement ("FFE") represents the net allocation of capacity to each Party on M2M Flowgates used in the market-to-market settlement process. *See* JOA, Attachment 3.

M2M was a new, innovative and complex process. As with any new process, growing pains developed. These were eventually manifested in filings made to the FERC. On March 9, 2010, pursuant to section 206 of the Federal Power Act (FPA), MISO filed two separate complaints against PJM. The complaint filed in Docket No. EL10-45-000 alleged that PJM had failed to initiate the M2M redispatch provisions of the JOA between MISO and PJM (Redispatch Complaint). The complaint filed in Docket No. EL10-46-000 alleged that PJM erroneously calculated charges to MISO for M2M settlements made from 2005-2009, pursuant to the JOA's congestion management provisions (Billing Complaint). On April 12, 2010, in Docket No. EL10-60-000, PJM filed a complaint against MISO alleging that MISO had improperly used Substitute Flowgates in redispatch procedures and M2M settlements under the JOA (Substitute Flowgate Complaint). On June 29, 2010, the Commission consolidated the three complaint proceedings and established hearing and settlement judge procedures.

Subsequently, MISO and PJM submitted a joint Settlement Agreement resolving the disputes on January 4, 2011. Among other measures, the "Settlement" filing provides for a comprehensive initial "Baseline Review" by an independent third Party of the means and processes pursuant to which the MISO and PJM implement the M2M process under the JOA, including those provisions pertaining to M2M settlements. FERC issued an order on June 16, 2011 approving the Settlement.

The Settlement Agreement reached between MISO and PJM involved a number of revisions to the JOA, the most prominent of which were related to:

- Enhanced Access to each other's data for verification;
- Market Flow Determinations;
- Calculation of Historic Firm Flows values to be used in calculating allocations;
- Establishing a productive Day-Ahead M2M process; and
- Improving Real-Time M2M processes.

The purpose of the Baseline Review is to identify areas of M2M coordination that are potentially out of conformance with the JOA, specifically the Congestion Management Process (Attachment 2) and the Interregional Coordination Process (Attachment 3). The review also addresses several topics covered in the "body" (main portion) of the Agreement that were changed as a result of the Settlement Agreement. The changes introduced through the June 16, 2011 FERC order have been in effect for less than half a year. This review is intended to ensure that PJM and MISO are executing these M2M processes consistently, coordinating their operations, and working together to expeditiously implement these objectives.

3.0   APPROACH AND METHODOLOGY

The purpose of the Baseline Review is to identify any areas of M2M coordination that are potentially out of conformance with the JOA. Further, the review is intended to identify any areas in which MISO and PJM may have interpreted the JOA differently and therefore are inconsistent in their respective approaches to implementation of the M2M process.

Utilicast's approach to the JOA Baseline Review was based upon a simultaneous "Top-Down" and "Bottom-Up" approach. The Bottom-Up approach involved a line-by-line analysis of the JOA that identified all requirements, rules, and actions required of each JOA participant. Upon identification of each item, Utilicast then sought documentation from MISO and PJM that could be used to provide evidence that the respective RTOs were following these JOA provisions. Where documentation was inadequate or did not exist, Utilicast conducted in-person interviews with Subject Matter Experts to verify RTO processes and procedures.
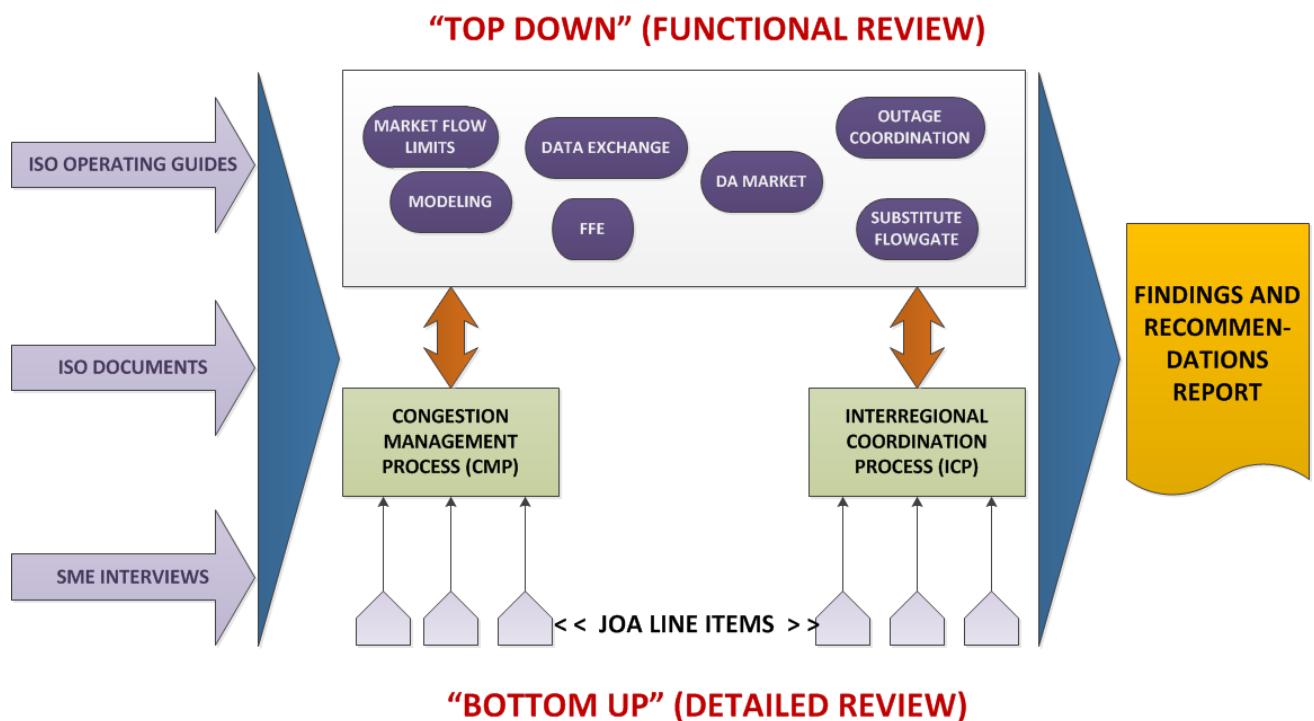

Figure 1 – Utilicast Baseline Review Approach

For the documentation review, Utilicast requested that MISO and PJM provide documents that could be used to verify JOA conformance. These documents included, but were not limited to, process flow diagrams, process and procedure documentation, operating guides, training programs, or any document that could support JOA conformance verification. Utilicast then reviewed each of these items and cross-referenced their content with the line-by-line JOA provisions, noting whether or not the item was in conformance.

Where documentation was insufficient to support verification, Utilicast noted the areas that needed follow-up. These areas were then consolidated into a list of additional questions that would need to be addressed by SMEs via in-person interview sessions. Utilicast then met with PJM SMEs at PJM offices on October 17 – 18, 2011 and with MISO SMEs at MISO offices on October 24 – 25, 2011. During these meetings SMEs addressed the identified gaps. Utilicast also conducted subsequent follow-up conference call meetings with both MISO and PJM to further clarify remaining questions.

While a Bottom-Up approach is essential in comprehensively verifying adherence to JOA provisions, contextual functional issues can be lost by focusing solely on this format. So, Utilicast also sought to verify conformance with JOA provisions from a functional or Top-Down approach as well. Utilicast sought information from both MISO and PJM regarding essential functional categories of the entire M2M process. At the same time, Utilicast also independently mapped M2M functionality to the line-by-line items that were developed in the Bottom-Up activities. Once again, using the previously provided documentation and SME interviews, Utilicast classified functional areas as in-conformance or out-of-conformance.

Also, during the functional or Top-Down review, Utilicast attempted to verify any provisions that although interpreted differently by MISO and PJM (regardless of whether they were implemented differently), still achieved results that conformed to the JOA. Variations in implementation methodology between the two organizations that still resulted in overall consistent JOA adherence were noted as potential future collaboration recommendations.

Finally, all of this information was synthesized into a Findings and Recommendations section. For narrative purposes and to facilitate ease of understanding, the Findings and Recommendations section is written from a functional viewpoint.

4.0   SCOPE OF THE BASELINE REVIEW

The baseline review focused on conformance in the areas as detailed in Figure 2 below:
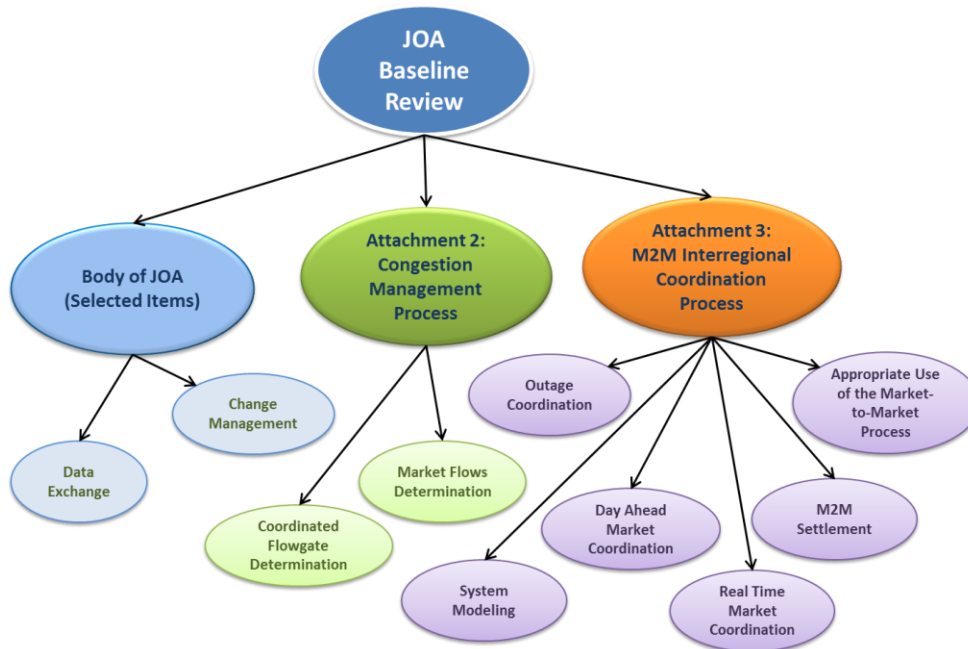
Figure 2 - JOA Baseline Review Scope

Utilicast focused on specific portions of the JOA. Only those areas of the JOA that specifically involve the M2M process and related peripheral areas were included within the scope of this report. These areas include:

1. Body of JOA
   a) Data Exchange
   b) Change Management
2. Attachment 2: Congestion Management Process
   a) Market Flow Determination
   b) Coordinated Flowgate Determination
3. Attachment 3: M2M Interregional Coordination Process
   a) Day Ahead Market Coordination
   b) Real Time Market Coordination
   c) Appropriate Use of the M2M process
   d) M2M Settlement
   e) System Modeling
   f) Outage Coordination

Finally, this report is a review, not an audit. Utilicast has accepted the Source Materials as factual representations of current processes and procedures. Further, representatives from both MISO and PJM were present for all SME interviews to ensure concurrence of all parties. Therefore, evidence of conformance as determined in SME interviews was viewed with equal validity as that of documented processes and procedures.

5.0 GENERAL FINDINGS AND RECOMMENDATIONS

The M2M process is a complex undertaking with many facets. Through a series of automated and manual steps, the coordination of the M2M processes ensures that the interaction between the RTOs is seamless. Each of the independent components is a point of potential differentiation between the RTOs when joint documentation is not in place. In many cases, the means of fulfilling a requirement does not need to be identical between the RTOs, and thus differences in the specific execution may exist. Figure 3 illustrates the key components that are a part of the M2M process.
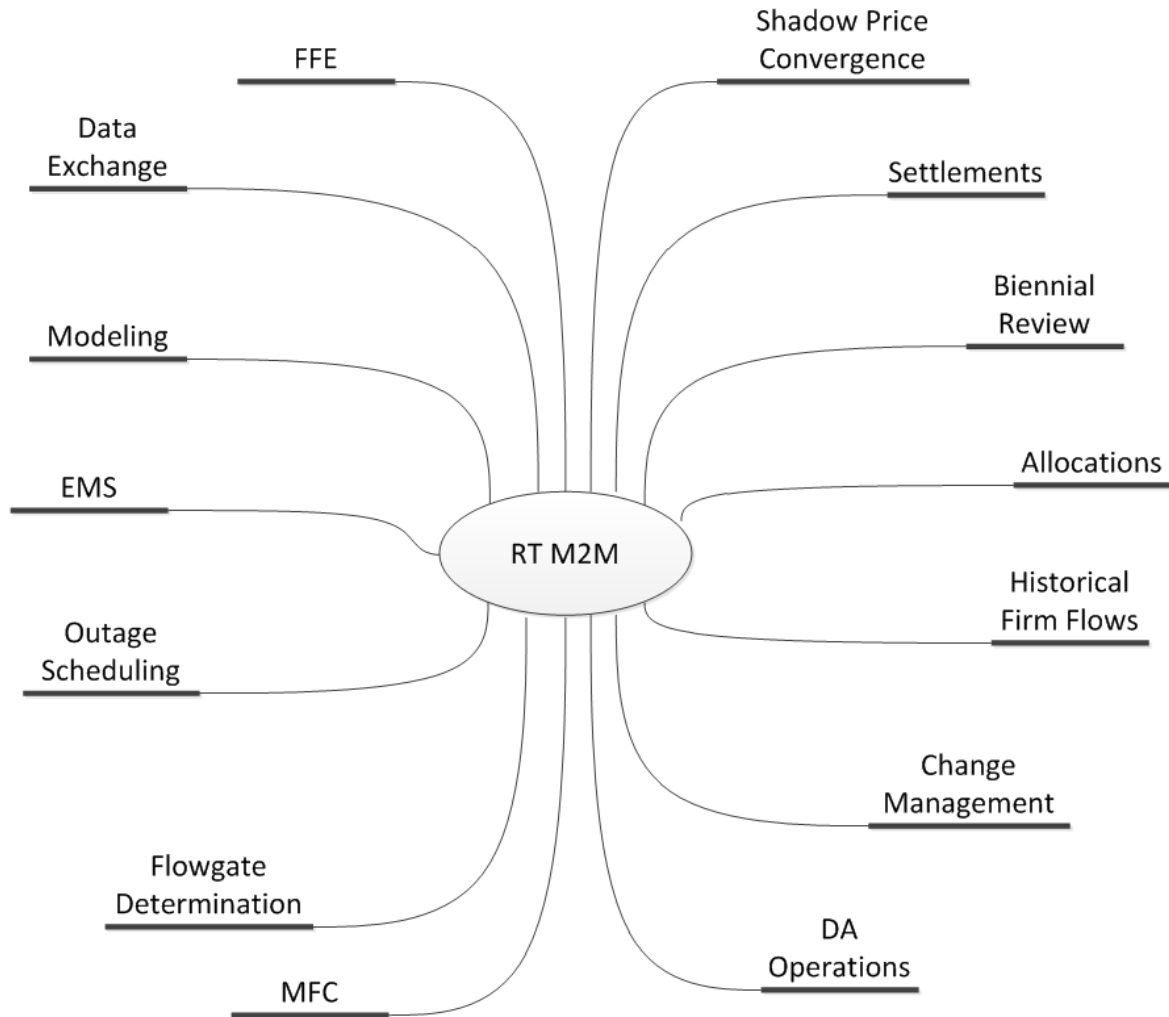
Figure 3 – Key Components of the Market-to-Market Process

Not only does the M2M process contain many components, but complex and intertwined relationships exist between these components. Figure 4 provides a high-level overview of these M2M relationships. The last step in the Real-Time M2M process is the financial settlement. The updates to the M2M process seek to provide increased reliability with lower congestion cost and increased border LMP consistency. The M2M effort should support these goals while producing accurate and agreeable settlement terms.
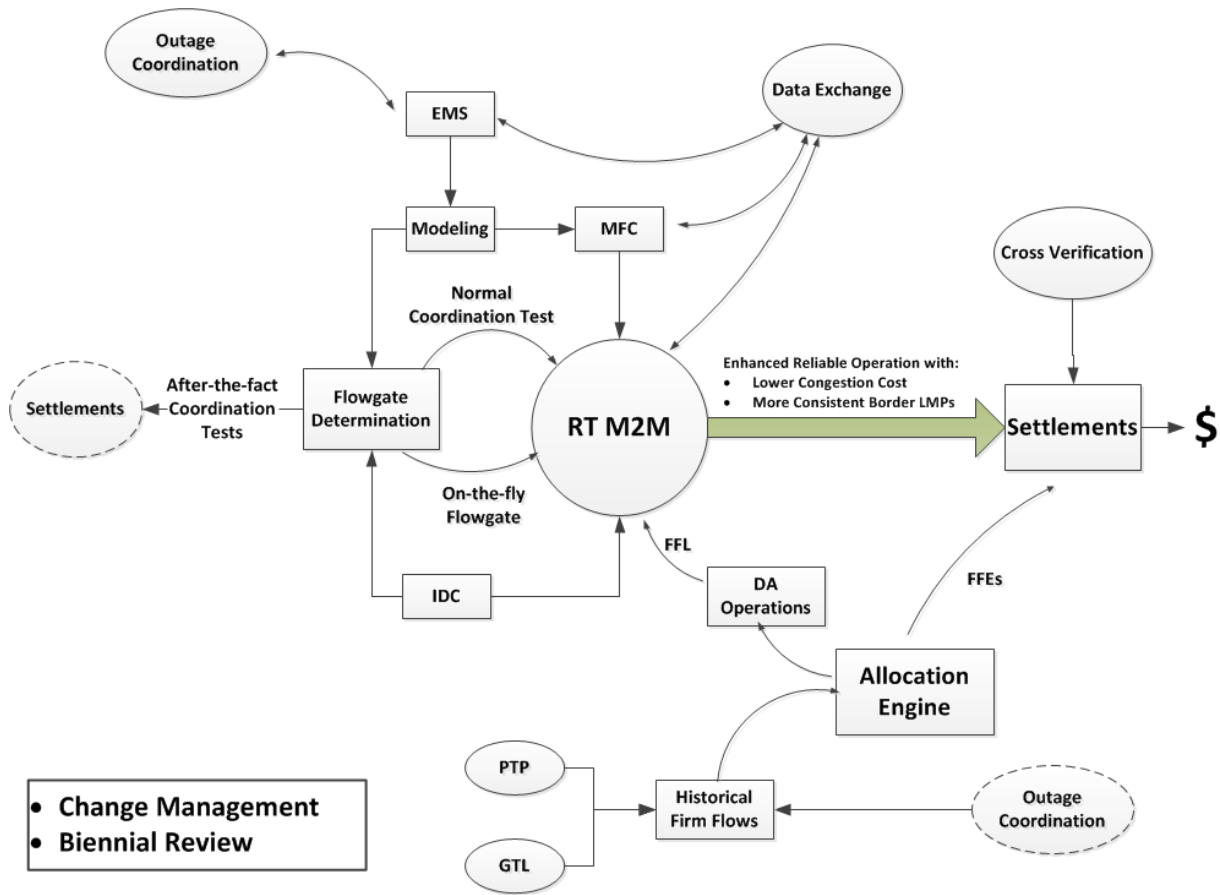
Figure 4 – The Key Relationships between Market-to-Market Components

Flowgate determination is the primary starting point of the greater process. This step determines which flowgates are eligible for M2M coordination by performing a series of simulation studies. The Market Flow Calculator (MFC) determines the Real-Time market flow values used in settlements. Its model and input data are derived from the EMS state estimator. The EMS also reflects a change in topology and a large component of exchanged operating data.

Historic firm flows are created and used by the allocation engine to determine FFEs. Both RTOs presently outsource the calculation of historic firm flows. The allocations are used in Day-Ahead operations and finally used for settlement for the Real-Time M2M events. These settlements determine final invoice values and are cross checked by each RTO to ensure the proper outcome. This review was conducted to facilitate the best common outcome of this complex process.

5.1   Documentation

Documentation of procedures, methods, and rules is essential to any complex management processes. It is crucial to the definition of activities, explanation of necessary details, and transparency of the methodologies involved. Where two separate entities such as PJM and MISO are working collectively, internal documentation establishes a means for accomplishing the tasks and processes involved within the framework of each of the partner organizations.

While the JOA does not stipulate procedural documentation requirements for the parties involved, effective and coordinated management of the JOA defined M2M processes requires that the parties involved each have well documented internal procedures. This is necessary because the tasks to be performed must be formally integrated into each Party's other work processes.

The Review Team found that there was a general lack of internal documentation on the part of both RTOs. In many cases, the RTOs do not have pre-existing documentation in place to address some M2M requirements. Rather, the RTOs approach such situations on an ad-hoc basis and directly consult the JOA language as needed. The ad-hoc approach may result in variability, inconsistency, and subjectivity of executing a JOA requirement. Therefore, Utilicast recommends that processes related to M2M operation be fully documented from an internal perspective, and, if applicable, shared with the necessary parties. Areas needing documentation updates or creation include, but are not limited to: Flowgate Removal, Historic Firm Flow Recalculation, After-the-Fact Review, Dynamically Created Flowgates, Modeling Philosophy, Substitute Flowgates, and Change Management. Each RTO must evaluate its own unique documentation to identify improvements and update these on an ongoing basis. Throughout the remainder of this document, Utilicast has specified instances where additional process and procedure development is warranted.

5.2   Modeling

5.2.1   JOA Language

From Article IV of the JOA, Section 4.1.3:

"Purpose: EMS models contain detailed representations of the transmission and generation configurations within each RTO and neighboring systems. The Parties depend upon EMS models for reliability coordination and market operations. The regular exchange of models is to ensure that each Party is using current and up-to-date representations of the other Party.

Requirements: The Parties will exchange their detailed EMS models once a year in CIM format or another mutually agreed upon electronic format, but shall provide each other with updates of the model information in an agreed upon electronic format as new data becomes available. This yearly exchange will include the ICCP/ISN mapping files, identification of individual bus loads, seasonal equipment ratings and one-line drawing that will be used to expedite the model conversion process. The Parties will also exchange updates that represent the incremental changes that have occurred to the EMS model since the most recent update."

Modeling is also addressed elsewhere throughout the JOA.

5.2.2   Discussion

Models are used in flowgate coordination tests, Unit Dispatch System (UDS) and market flow calculation for the M2M process. Both parties validate that the modeling data is consistent to ensure a common outcome. Differences in modeling techniques do exist, but they may not necessarily be relevant to market flow calculations or M2M coordination. Modeling issues need to be examined on a case-by-case basis.

5.2.3   Findings

The M2M process relies upon network models during its operations. The MFC requires a network model for analysis and calculation. The model used is derived from the network models, both internal and external. It is important that similar assumptions and modeling techniques are used, such that there are consistent results between the RTOs. Several unique modeling elements exist on the MISO and PJM systems that require special treatment.

In the MFC, MISO and PJM both model losses inclusive to load. Jointly Owned Units (JOUs) are represented as separate units as per the percentage of ownership.   Demand Response Resources (DRRs) are modeled by both RTOs as load with values obtained from State

Estimated results. MISO models DRR2 as both load and generation, while modeling DRR1 in the commercial model as CPnode generation and as load in the network model.

Pumped storage is modeled differently between the RTOs. PJM does not model non-conforming load in the MFC. Barring a net metered station, a generating station's service load is zeroed out, and pumping loads (negative generation) are also zeroed out. PJM is currently enhancing its MFC to capture negative generation over 20 MW, a change that will take effect during the first half of 2012. MISO currently has two pumped storage sites, and both are modeled in its MFC. Negative pumping generation is represented as a control zone load.

Phase angle regulators (PARs) are also modeled differently between PJM and MISO. MISO models PARs as an open circuit, while PJM models PARs as closed circuit, impedance only. There are also differences between the modeling of DC elements. PJM has the HVDC Neptune Interface and Linden Variable Frequency Transformer (VFT). PJM models its DC tie and VFT as an open circuit with a tagged export from the border or pseudo-generator at the receiving end. MISO does not have a DC tie with any external BA. MISO has internal DC lines and models them as open circuit, with pseudo generators and pseudo loads.

The RTOs exchange their updated network models on a quarterly basis. Both provide their full model to the other RTO in a commonly agreed format. MISO incorporates the full PJM model into its own network model and monitors all elements over 100Kv and selected elements under 100 KV. PJM models the MISO network out to predefined points depending on the metering provided and the effect on the solution. MISO and PJM implement effective dating modeling methodology and related outage coordination to integrate new elements in the model.

5.2.4 Recommendations

Differences in modeling philosophies between MISO and PJM could have implications on M2M coordination and results. Differences in modeling techniques exist that pre-date the Settlement. Although the modeling philosophies on special facilities (PAR, DC line etc.) may differ, at the time of the Settlement, impacts on the market flow calculations were not found to be significant.

As changes in models occur, both in topology and philosophy, the Parties should communicate and coordinate these changes for any potential impacts on market flow calculations and M2M results.

6.0   MARKET-TO-MARKET FINDINGS AND RECOMMENDATIONS

6.1   Body of the JOA

6.1.1   Data Exchange

6.1.1.1 **JOA Language**

From Article IV of the JOA, Section 4.2:

"Each Party shall provide the other Party with data to enable the other Party independently to verify the results of the calculations that determine the market-to-market settlements under this Agreement. A Party supplying data shall retain that data for two years from the date of the settlement invoice to which the data relates, unless there is a legal or regulatory requirement for a longer retention period. The method of exchange and the type of information to be exchanged pursuant to this Section 4.2 shall be specified in writing and posted on the Parties' websites. The posted methodology shall provide that the Parties will cooperate to review the data and mutually identify or resolve errors and anomalies in the calculations that determine the market-to-market settlements. If one Party determines that it is required to self-report a potential violation to the Commission's Office of Enforcement regarding its compliance with this Agreement, the reporting Party shall inform, and provide a copy of the self-report to, the other Party. Any such report provided by one Party to the other shall be "confidential information" as defined in this Agreement."

6.1.1.2 **Discussion**

Section 4.2 was added to the body of the JOA to assure that MISO and PJM provide each other with data to enable the other to independently verify the results of the calculations that determine M2M settlements. It specifies that such data must be retained for two years from the date of the settlement invoice, unless there is a legal or regulatory requirement specifying a longer retention period. The method and type of data exchanged shall be posted to each Party's website. The Parties will cooperate in reviewing data and mutually resolving errors. Parties are required to self-report potential violations of the JOA to FERC and provide a confidential copy of such report to the other Party.

6.1.1.3 **Findings**

Interview sessions held with both Parties reflected that such data is exchanged. Existing data retention policies of both Parties meet or exceed the requirement that such data be retained for two years from the date of the settlement invoice. In accordance with Section 4.2, PJM posts the method of exchange and the type of information exchanged to its website at http://www.pjm.com/markets-and-operations/energy/market-to-market.aspx. MISO posts the method of exchange and the type of information exchanged to its website at https://www.midwestiso.org/WhatWeDo/StrategicInitiatives/Pages/Seams.aspx. Neither Party reported a potential violation of the terms of the JOA occurring. Therefore, self-reporting to FERC has not occurred. Both MISO and PJM have a procedure in place to inform partner RTOs or entities about a potential violation when they self-report the same to FERC.

PJM maintains an internal M2M Interim Data Exchange Requirements Specification defining data exchange requirements needed for M2M operation. The last update of this document occurred prior to the Settlement Agreement, but this update met the requirements of the Settlement Agreement submitted in January, 2011 and approved by FERC on June 16, 2011. MISO is currently working internally and with its vendor

to review and update the MFC in regards to data requirements involving M2M and has developed a set of high level requirements documents. PJM and MISO are also working together on an Enhanced Data Exchange project, to verify each other's M2M related calculation (market flow, FFE).

Although each Party independently performs settlement calculations, by common agreement MISO is responsible for the creation of settlement statements related to M2M. Documentation was provided by the Parties illustrating joint tie-out of billing settlements. Utilicast finds that the Parties are operating in accordance with Section 4.2 of the JOA Body.

6.1.1.4 Recommendations

To better enhance the speed and accuracy of data required for M2M settlement, the Parties should work expeditiously towards completion of the Enhanced Data Exchange Project. Operation of the Enhanced Data Exchange should be an item of review in the next biennial review of the JOA.

6.1.2 Outage Coordination

6.1.2.1 JOA Language

From Article VII of the JOA, Section 7.1:

The Parties have an interregional outage coordination process for coordinating transmission and generation Outages to ensure reliability.

The Parties agree to (paraphrased):

"Section 7.1.1: Share outage information daily or more frequently (if necessary).

Section 7.1.2: Use network applications to evaluate the impacts of critical facility maintenance on other Party's system reliability, in addition to its own."

6.1.2.2 Discussion

Transmission and Generation maintenance on either of the JOA Parties' systems must be coordinated since it can have a major impact on the reliability and markets of the neighboring systems.

These sections of the JOA emphasize that:

1. The Parties will share generation and transmission outage plans (including related data);

2. That this information will be shared promptly (daily or more often if necessary);

3. That exchanged information will be in a mutually agreed upon format;

4. That both Parties will also provide information as required to the NERC SDX Systems;

5. That both Parties will utilize network applications to evaluate the impacts of planned outages;

6. That both Parties will discuss weekly (or more often if required) the impacts of planned outages;

7. That both Parties will notify each other of emergency maintenance and forced outages (immediately, but not to exceed 30 minutes); and

8. That additional reviews (after maintenance is started) will be conducted, if necessary.

6.1.2.3 Findings

The communications requirements between RTOs are addressed as follows:

Joint Party: Bi-monthly coordination calls are made between MISO, PJM and TVA. Weekly coordination calls are also made between MISO and PJM, and additional near-term communications are made over changes and requests for study information. Information is also provided through the NERC SDX Database on a 15 minute update basis. Both parties share that data. Day-Ahead Reliability communications take place between the parties as necessary. Phone calls between Reliability Engineers take place on a real-time basis as needed.

PJM internally utilizes eDart as its Outage Scheduler. MISO internally utilizes "CROW" for scheduling outages.

PJM and MISO are normally satisfied with the Real-Time communications processes. MISO and PJM have had occasions where the other party had not been informed in advance of pending scheduled outages in the Day Ahead market.

6.1.2.4 Recommendations

Both RTOs satisfied the JOA criteria and have normally demonstrated good outage scheduling and coordination practices between each other. PJM and MISO need to be diligent in their timely notification of scheduled outages with each other.

6.1.3   Change Management

6.1.3.1 JOA Language
From Article XX of the JOA:

"20.1 Notice. Prior to making a change to any processes that would affect the implementation of the market-to-market process under this Agreement, including the determination of market-to-market settlements, the Party desiring the change shall notify the other Party in writing or via email of the proposed change. The notice shall include a complete and detailed description of the proposed change, the reason for the proposed change, and the impacts the proposed change will have on the implementation of the market-to-market process, including market-to-market settlements under this Agreement.
20.2 Response to Notice. Within a reasonable time after receipt of the Notice described in Section 20.1, the receiving Party shall: (a) notify in writing or by email the other Party of its concurrence with the proposed change; (b) request in writing or via email additional documentation from the other Party, including associated test documentation; (c) notify in writing or via email the other Party of its disagreement with the proposed change and request that issue regarding the proposed change be addressed pursuant to the dispute resolution procedures set forth in Article XIV of this Agreement. In the event that the receiving Party requests additional documentation as described in (b), within a reasonable time after receipt of such information, it shall notify the other Party in writing or via email that it concurs with the change or that it requests dispute resolution pursuant to Article XIV of this Agreement.
20.3 Implementation of Change. The Party proposing a change to its market-to-market implementation process shall not implement such change until it receives written or email notification from the other Party that the other Party concurs with the change or until completion of any dispute resolution process initiated pursuant to Article XIV of this Agreement. Neither Party shall unduly delay its obligations under

this Article XX so as to impede the other Party from timely implementation of a proposed change.
20.4 Summary of Proposed Changes. On a quarterly basis, the Parties shall post on their respective websites a summary of market-to-market implementation process changes proposed by the Parties in the prior quarter and the status of such changes."

6.1.3.2 Discussion

Article XX was added to the JOA to establish a new Change Management Process. It is Utilicast's opinion and the opinion of the Parties that Article XX refers to changes in the actual M2M process and not to changes to externalities that may indirectly have an effect on M2M. The Article provides that prior to implementing a change, the Party making the change shall give the other a complete and detailed description of the proposed change. The Article details the responsibilities of the receiving Party upon receipt of such notice. Changes shall not be made without concurrence of both Parties. Summaries of proposed changes are to be posted to the Parties websites on a quarterly basis.

6.1.3.3 Findings

As a temporary, interim step, a Microsoft Word form was used to provide notifications of changes that may affect the M2M process. Since the Settlement, a SharePoint site was established (as a joint MISO/PJM site). The initial Word form meets the requirements of Article XX, but the development of the SharePoint site is a definite process improvement. Postings of proposed changes are made to each Party's website. Utilicast finds that the Parties are operating in accordance with Article XX of the JOA.

6.1.3.4 Recommendations

The Parties have indicated that their internal change tracking and management processes include checks that any potential changes that may affect M2M processes are posted to the joint SharePoint site. Documentation should be exchanged between the Parties describing such procedures.

6.1.4 Biennial Review

6.1.4.1 JOA Language

From Article XXI of the JOA:

"21.1 Biennial Review: Commencing two years after the issuance of the Baseline Review Report described in the Settlement Agreement and Offer of Settlement ("Settlement") filed in Docket Nos. EL10-45-000 et al. and every two years thereafter, the Parties shall conduct a comprehensive review of the changes made to each Party's processes used to implement this Agreement since the previous biennial review, or in the case of the first biennial review, changes made since the issuance of the Baseline Review Report.

21.2 Posting of Biennial Review. The Parties shall post the results of each biennial review on their respective websites."

6.1.4.2 Discussion

Biennial reviews are a JOA requirement which has yet to occur. The first such report will be due two years after issuance of this Baseline Review. Therefore, this requirement cannot be accomplished until that time.

6.1.4.3 Findings

Neither of the Parties has a written plan for accomplishing this requirement at this

time.

6.1.4.4 **Recommendations**

Since neither of the Parties has a written plan for conducting this reporting process, an evaluation of the Parties' conformance will be held in abeyance until such time as the Parties develop written documentation on their methodologies for completing this requirement, and until the Biennial Report is actually conducted and posted in accordance with the JOA.

6.2 Attachment 2: Congestion Management Process (CMP)

As a result of the Settlement Agreement, changes to the CMP were made regarding market flow determination and recalculation of Historic Firm Flow values and Ratios.

6.2.1 Flowgate Determination

6.2.1.1 JOA Language

From Section 3.2 of Attachment 2 of the JOA (the CMP):

"An Operating Entity will conduct sensitivity studies to determine which Flowgates are significantly impacted by the flows of the Operating Entity's Control Zones (historic Control Areas that existed in the IDC). An Operating Entity identifies these Flowgates by performing the following four studies to determine which Flowgates the Operating Entity will monitor and help control. A Flowgate passing any one of these studies will be considered a Coordinated Flowgate. Only AFC Flowgates will be eligible for consideration as Coordinated Flowgates. A Flowgate must have AFCs computed and these AFCs must be used to sell Transmission Service in order to be a Coordinated Flowgate.

An Operating Entity may also specify additional Flowgates that have not passed any of the four studies to be Coordinated Flowgates. For Flowgates on which the Operating Entity expects to utilize the TLR process to protect system reliability, such specification is required. For a list of Coordinated Flowgates between Reciprocal Entities, please see each Reciprocal Entity's Open Access Same-Time Information System (OASIS) website.

Coordinated Flowgates are identified to determine which Flowgates an entity impacts significantly. This set of Flowgates may then be used in the congestion management processes and/or Reciprocal Operations defined in this document.

When performing the four Flowgate studies, a 5% threshold will be applied on an absolute basis without regard to the positive or negative sign of the impact. Use of a 5% threshold in the studies may not capture all Flowgates that experience a significant impact due to market operations. The Operating Entities have agreed to adopt a lower threshold at the time NERC and/or NAESB implements the use of a lower threshold in the TLR process".

6.2.1.2 Discussion

Flowgate determination is a leading step in the M2M process. It entails the identification of potential Flowgates, qualifying studies, and maintenance of existing Flowgates. The JOA provides a high amount of detail on the subject, providing for a consistent and common outcome. No issues have resulted from inconsistent results; however, there are still some recommendations for enhancements.

An operating entity is obligated to identify the Flowgates on which it has significant impacts via a series of four coordination tests. The significant impact is defined by an operating entity's GLDF or TDF impacts on a given Flowgate. Presently, the four studies use a 5% impact threshold as a cut off for the determination of a coordinated Flowgate. If a Flowgate passes a study at both operating entities, the Flowgate is then a Reciprocal Coordinated Flowgate (RCF). Once a RCF is determined, it can become available for M2M coordination. Operating entities may also mutually agree to deem a Flowgate as a Coordinated or Reciprocal Coordinated Flowgate even if it does not pass any of the coordination studies. Additionally, third parties may propose a potential coordinated Flowgate.

6.2.1.3 **Findings**

The Flowgate determination process is well defined in the JOA and has been well implemented. Both RTOs have an established 'gatekeeper,' a designated person responsible for the determination and management of the Flowgates. The gatekeepers follow defined respective internal processes for receiving and submitting Flowgate requests, as well as their entry into internal applications so they are available for M2M coordination. The aforementioned requests may include the addition, modification, or deletion of a coordinated Flowgate. Each RTO has also automated each of the Flowgate coordination studies. The traditional Flowgate determination process is executed well by both parties. Neither Party has had a dispute over the outcome of the Flowgate coordination studies.

6.2.1.4 **Recommendations**

The Parties are in conformance with the ICP and CMP regarding Flowgate determination and studies. The coordination studies are performed to satisfaction, but it is recommended that process timelines be developed to ensure proper turn-around time and expedite any short notice Flowgate additions. With the additions of untraditional network devices, such as wind generation, similar assumptions about these devices must be made to establish common outcomes in the Flowgate coordination studies. The RTOs should examine this issue and develop joint guidelines to address these devices and their assumptions in a normalized fashion.

6.2.2   Real Time Market Flow Determination

6.2.2.1 **JOA Language**

From Section 4.1 of Attachment 2 of the JOA (the CMP):

"Additionally, there may be situations where the participation of a generator in the market that is not modeled as a pseudo-tie may be less than 100% (e.g., a unit jointly owned in which not all of the owners are participating in the market). This situation occurs when the generator output controlled by the non-participating parties is represented as interchange with a corresponding tag(s) and not as a pseudo-tie generator internal to each Party's Control Area. Such situations will be addressed by including the generator output in that Market-Based Operating Entity's Market Flow calculation with the amount of generation output not participating in the market being treated as a slice of system export tagged transaction. This is implemented by assuming that all the generating resources in the RTO contribute proportionally to the interchange (e.g., the export is not assigned to a specific generator).

Finally exports out of the market area, and tagged grandfathered transactions within the market area, must be properly accounted for in the determination of Market Flows. When the actual generation of the market area exceeds the total load of that area, the market area is exporting energy. The exports of tagged transactions must be accounted for in the Market Flow calculation. For export transactions, this will be accomplished within the calculation by including a new term that proportionally offsets the MW output of all unit(s) in the market by the amount of the market export. This ensures that the Market Flow calculation is measuring only the effect of internal generation serving internal load.

When the actual generation of the market area is less than the total load of the market area, that area is importing energy. These imports are tagged transactions that are inherently not included in the determination of Market Flows, as "Market Flows" are a

measure of internal generation serving internal load. The processes currently within IDC will address the counting of these transactions.

Below is a summary of the calculations discussed above.

For a specified Flowgate, the Market Flow impact of a market area is given as:

Total Directional "Market Flows"= $\sum$(Directional "Market Flow" contribution of each unit in the Market-Based Operating Entity's area), grouped by impact direction
where,
"Market Flow" contribution of each unit in the Market-Based Operating Entity's area
=(GLDFAdj) (Adjusted Real-Time generator output)
and,
GLDFAdj is the Generator to Load Distribution Factor
Where the generator shift factor (GSFAdj) uses Adjusted Real-Time generator output and
the load shift factor (LSFAdj) uses Adjusted Real-Time bus loads.
GLDFAdj = GSFAdj − LSFAdj
Adjusted Real-Time generator output is the output of an individual generator as reported by the state estimator solution that has been scaled down proportionally to account for total exports.
Adjusted Real-Time bus load is sum of all bus loads in the market as reported by the state estimator solution."

6.2.2.2 Discussion

Prior to the Settlement Agreement, PJM used a generation percent table to reflect unit specific exports in its MFC. In the Settlement Agreement, the Parties agreed to use a "slice of system" methodology, where all generation is scaled down proportionately to reflect the total amount of exports. As a result, the modeling of exports in the respective MFCs is consistent between the Parties.

Section 4.1 of the CMP was amended to facilitate use of "slice of system" methodology to account for exports in the MFC.   Two revisions were made to this section to assure use of "slice of system" methodology. First, language was added to require that generation, such as shares of a JOU that are not modeled as a pseudo-tie is treated as a tagged export transaction, as per the above. Second, the calculation set forth in this section was modified to account for the use of "slice of system".

6.2.2.3 Findings

PJM has modified its Market Flow Calculator to reflect "slice of system" to account for exports and in accordance with Section 4.1 of the CMP. MISO historically used "slice of system," and modifications were not required.

Both Parties model JOUs as individual units representing respective shares; they are treated as individual resources and not as tagged transactions.

Differences in modeling of controllable devices (PARs, VFTs and DC links) which may affect market flow calculations exist between the Parties.   MISO internal DC facilities and interface PARs are modeled as open circuits and therefore maintain a fixed schedule for market flow calculation purposes. PJM models DC ties and VFTs serving external load as open circuits and tagged transactions. PARs on external ties are modeled as closed circuits (free-flowing). PJM has no internal controllable devices. No issues involving market flow calculation have been identified as a result of these modeling differences.

6.2.2.4 Recommendations

Although the Parties are performing market flow calculations in accordance with amended Section 4.1 of the CMP, differences in the modeling of controllable devices have the potential to create a future issue, especially as these devices become more common across interfaces. PJM and MISO should develop and share an overview document highlighting their respective modeling techniques and calculation methodologies, especially for non-standard elements. The Parties indicated that work is progressing toward development of such a document.

6.2.3 Market Flow Limit Determination – Forward Coordination Process

6.2.3.1 JOA Language

From Section 6.5 of Attachment 2 of the JOA (the CMP):

"When a Flowgate experiences a transitory limit reduction or de-rating, there will be no change made to the historic allocations. In effect, the Operating Entity responsible for the Flowgate is expected to absorb the impact of the de-rating by not reducing the historic allocation of the other Operating Entities. This practice is consistent with the use of the higher-of logic in the historic allocation process. Where a change in system conditions, such as a significant transmission outage, affects flows on a longer term basis the Reciprocal Entities will discuss whether historic allocations, including an over-ride of the higher-of logic, should be rerun to recognize the effects of the change in system conditions in the historic allocations. The historic allocations shall be rerun only if the affected Reciprocal Entities mutually agree."

6.2.3.2 Discussion

Section 6.5 of the CMP was amended to clarify that when a Flowgate experiences a transitory limit or de-rating, the historic allocation will not change. The MRTO is expected to absorb the impact of the de-rating by not reducing the historic allocation of the other operating entities. Long term changes will trigger discussions between the Parties. De-ratings incorrectly impacting historic allocations have been a source of error in the past.

In addition, to more accurately reflect real-time usage of M2M Flowgates, Section 6.6 of the CMP was revised to state that Firm Transmission Service impacts will be based on schedules rather than reservations.

6.2.3.3 Findings

There have been no instances since June 16, 2011 where changes in system conditions would require a review of Historic Firm Flow Values. Neither Party has changed Historic Firm Flow Values due to temporary system conditions, in accordance with Section 6.5 of the CMP. Both Parties agree that a change in membership in either RTO would trigger a review, in accordance with the CMP. A formal procedure does not exist defining what may trigger a review.

The Parties coordinated a changeover from reservations to schedules on December 1, 2011.

6.2.3.4 Recommendations

A formal procedure should be developed between the Parties defining conditions that may trigger a review of Historic Firm Flow Values and Ratios. This may include conditions such as anticipated and forced outage of a transmission element greater than a defined time. The Parties indicated that the CMPWG is currently developing such documentation.

6.3   Attachment 3: M2M Interregional Coordination Process (ICP)

The most extensive amendments were made to the ICP of the JOA as a result of the Settlement Agreement. These primarily encompassed the areas of M2M coordination and the appropriate use of the M2M process. Other significant changes regarding the M2M process affecting settlement and modeling were made by amendments to the JOA body and the CMP and were discussed previously in this report.

6.3.1   Market-to-Market Coordination

6.3.1.1 JOA Language

From Section 1.1 of Attachment 3 of the JOA (the ICP):

"1.1 Only a subset of all transmission constraints that exist in either market will require coordinated congestion management. This subset of transmission constraints will be identified as M2M Flowgates in a manner similar to the method used in the CMP described above. The list of M2M Flowgates will be limited to only those for which at least one generator in the adjacent market has a significant Generation-to-Load Distribution Factor (GLDF), sometimes called "shift factor," with respect to serving load in that adjacent market. NERC rules currently establish that a significant shift factor is five percent or greater. If NERC adopts a lower threshold than 5%, the new threshold will be used to determine whether the generator has a significant GLDF for the purpose of this market-to-market ICP. Flowgates eligible for market-to-market coordination are called M2M Flowgates. For the purposes of market-to-market coordination (in addition to the four studies for RCFs described in section 3.2.1 of the CMP) the following will be used in determining M2M Flowgates.

1.1.1 M2M Flowgates include Reciprocal Coordinated Flowgates and any additional Flowgates that meet the criteria in this section (1.1) of the Interregional Coordination Process.

1.1.2 Midwest ISO and PJM will only be performing market-to-market coordination on RCFs that are under the operational control of Midwest ISO or PJM. Midwest ISO and PJM will not be performing market-to-market coordination on Flowgates that are owned and controlled by third party entities or on Flowgates that are only considered to be coordinated Flowgates.

1.1.3 Where the adjacent market does not have a generator with significant impact on a single-monitored element Flowgate (i.e. shift factor is less than 5%) but its market flows are a significant portion of the total flow (greater than 25% of the Flowgate rating), these transmission constraints will be included in the list of M2M Flowgates subject to market-to-market coordination. If the market flow impacts of the Non-Monitoring RTO exceed 25% of the Flowgate rating during real-time operations, the Flowgate will be added as a M2M Flowgate at the request of the Monitoring RTO.

1.1.4 The Parties will lower their generator binding threshold to match the lower generator binding threshold utilized by the other Party. The generator binding threshold will not be set below 1.5% except by mutual consent. (This requirement applies to M2M Flowgates. It is not an additional criterion for determination of M2M Flowgates.)

1.1.5 For the purpose of determining whether a multi-monitored element Flowgate is eligible for market-to-market, a progressive threshold based on the number of monitored elements will be used: a single monitored element Flowgate will use a 5% shift factor threshold; double monitored element Flowgate will use a 7.5% shift factor

threshold; and a Flowgate with three monitored elements will use a 10% shift factor threshold. Flowgates with more than three monitored elements will be used only by mutual agreement."

6.3.1.2 **Discussion**

Section 1.1 of the ICP was amended to specify the criteria used to determine M2M Flowgates, a new term defined in the amended JOA. Typically, if a generator in the adjacent market passes one of the coordination tests for a specified Flowgate, that Flowgate would be defined as a M2M Flowgate. However, exceptions can occur.

One notable exception was specifically added to Section 1.1. Section 1.1.3 notes that if market flow impacts of the Non-Monitoring RTO exceed 25% of the Flowgate rating during Real-Time operation, the Flowgate will be added as a M2M Flowgate at the request of the Monitoring RTO.

Another new requirement was added regarding generator binding thresholds. Section 1.1.4 was added stipulating that the Parties will lower their binding generation threshold to match the lower generator binding threshold utilized by the other Party, but not below 1.5%.

Section 1.2 was added to the ICP to permit the Parties to enter an anticipated M2M Flowgate into the dispatch tools before the completion of the Flowgate studies when a system event requires prompt attention. Financial settlements using anticipated M2M Flowgates are made under a hold harmless approach discussed later in this document.

Section 1.3 was added to the ICP to specify the conditions under which the Parties may remove M2M Flowgates from being eligible for M2M coordination. These conditions include the inability of Information Technology systems to support operation of a M2M Flowgate, transmission system changes that result in a Flowgate no longer passing the M2M Flowgate studies and mutual agreement of both Parties if M2M no longer becomes an effective congestion management tool on a Flowgate.

6.3.1.3 **Findings**

Temporary M2M Flowgates have been implemented since June 16, 2011. These temporary M2M Flowgates are reviewed by the Parties on a weekly basis. Any temporary M2M Flowgates put in as the result of an outage are removed once the outage condition terminates. In addition, the Parties are currently developing a draft procedure regarding requirements for M2M Flowgate exceptions. Addition of temporary M2M Flowgates has been in accordance with Section 1.1.3 of the ICP.

Section 1.1.4 of the ICP states, "The Parties will lower their generator binding threshold to match the lower generator binding threshold utilized by the other Party." MISO currently uses 1.5%; PJM typically uses 3%, but lowers it to 1.5% on MISO Flowgates. Although PJM matches MISO's generation threshold on MISO Flowgates, Utilicast feels the JOA is not clear in this regard.

Addition of anticipated M2M Flowgates per Section 1.2 of the ICP has been an infrequent occurrence, but has occurred with both Parties. All occurrences passed post-event testing, and none progressed to "hold harmless" settlement provisions.

Upon implementation of the Settlement Agreement, there was a cleanup exercise based on historical data and done on a case-by-case basis. As a result and upon mutual agreement, several M2M Flowgates have been removed. In exceptional cases, Flowgates that pass the criteria have been removed based on mutual agreement, per conditions specified in Section 1.3 (e.g. where the non-monitoring RTO cannot provide sufficient relief).

No formal process has been established regarding Flowgate removal. However, active and terminated Flowgates are exchanged during the weekly conference calls. This

exchange is planned to become an automated part of the Enhanced Data Exchange project.

6.3.1.4 Recommendations

Both Parties meet the criteria defined in Section 1.1 of the ICP regarding determination of M2M Flowgates. Temporary M2M Flowgates that have been added have met the exception requirements outlined in Section 1.1 of the ICP.   However, a formal procedure regarding requirements for M2M Flowgate exceptions should be developed between the Parties. The Parties indicated they are currently in the process of developing a draft procedure, and Utilicast recommends they proceed in that endeavor.

Section 1.1.4 of the CMP requires clarification. In discussion with both Parties, it is unclear whether the lowest binding limit should be used for all M2M Flowgates, or only to respect the MRTO's limit.

The Parties conform to Section 1.2 of the ICP regarding entering an anticipated M2M Flowgate into the dispatch tools before the completion of the Flowgate studies when a system event requires prompt attention. However, procedures regarding this process need to be formally documented. These procedures should include instances where outages are scheduled inside the window required for a study and where M2M Flowgates must be created in real-time due to unplanned outages or emergency conditions.

As noted above, a review of existing M2M Flowgates was done by both Parties. Upon mutual agreement, a number of flowgates were removed in conformance with Section 1.3 of the ICP. As this becomes part of the Enhanced Data Exchange, additional documentation should not be required.

The Parties should proceed to incorporate this process in the Enhanced Data Exchange.

6.3.2   Day-Ahead Energy Market Coordination

6.3.2.1 JOA Language

From Section 4.1 of Attachment 3 of the JOA (the ICP):

"4.1 The following procedure will apply to modeling of M2M Flowgates in the Day-Ahead energy markets, unless either the Monitoring RTO or the Non-Monitoring RTO requests specific exceptions.

- Each RTO will model all M2M Flowgates, for which it is the Reliability Coordinator, in its Day-Ahead market and Day-Ahead reliability analyses, with the limit set equal to the applicable facility limit less the Firm Flow Entitlement of the Non-Monitoring RTO.

- Each RTO will model all M2M Flowgates, for which it is NOT the Reliability Coordinator, in its Day-Ahead Market and Day-Ahead reliability analysis with the limit set equal to its Firm Flow Entitlement for that M2M Flowgate.

- The Monitoring RTO will include an appropriate loop flow model in its Day-Ahead process. However, this loop flow model will not account for loop flows contributed by deliveries associated with the Non-Monitoring RTO market since these flows are accounted for the Firm Flow Entitlement.

An M2M Flowgate limit exception is a request to alter the M2M Flowgate limits, as described above, that will be modeled in the Day-Ahead markets and/or the Day-Ahead reliability analysis. The following procedure will apply for designating M2M Flowgate limit exceptions:

1. Prior to 0800 EST on the day before the Operating Day, if the Requesting RTO identifies a need to utilize more of an M2M Flowgate than it is entitled, it may request the Responding RTO to lower its Day-Ahead Market limit below its Firm Flow Entitlement by a specified amount for a specified range of hours.

2. If the Responding RTO agrees to provide the limit reduction, it will communicate the approved amount to the Requesting RTO by 1000 EST.

3. The Requesting RTO may increase its limit on the M2M Flowgate by the specified amount for the specified range of hours."

6.3.2.2 Discussion

The primary function of the Day-Ahead sections of the JOA is to ensure that each Party accounts for the FFE of the other in establishing Flowgate limits for its Day-Ahead market clearing processes. Further each Party is required to utilize a loop flow model for determining flows from entities that are not a party to this JOA.

Secondly, this section of the JOA provides the framework for the RTOs to share unused portions of historic firm flow entitlement flow values.

6.3.2.3 Findings

The JOA requires that *all* M2M Flowgates be modeled and included in reliability analyses. While both PJM and MISO do model all M2M Flowgates, they do not currently include all Flowgates in their analyses. Rather, they incorporate a subset based on pre-screening criteria that establishes Flowgates that are likely to be relevant in the Day-Ahead clearing process based upon reliability studies and recent Real-Time constraints. This pre-screening is primarily done for software performance reasons. Including all Flowgates, which could be hundreds, could result in slowing the Day-Ahead market clearing algorithms to unacceptable levels.

Secondly, PJM has indicated that it does not set Flowgate limits to the facility rating less the FFE from MISO as its Day-Ahead facility rating. Rather, PJM includes MISO market flows in its Loop Flow model to account for those flows. Since PJM does not model MISO generation, accounting for Day-Ahead market flows via the Loop Flow model is the only way to approximate MISO market flows. PJM then utilizes an iterative process to adjust Flowgate limits to achieve an optimum solution that drives toward Day-Ahead and Real-Time price convergence. While this process is found to be consistent with the spirit and intent of the JOA, the Review Team believes that the JOA language could benefit from clarification.

MISO enforces FFEs in its Day-Ahead clearing process in accordance with the JOA. However, there are occasions in which the Flowgate limit is adjusted that impact MISO's internal market flows and FTR funding.

Third, neither RTO has ever invoked the FFE sharing provisions of section 4.1. Accordingly, there has never been a resultant Day-Ahead settlement.

6.3.2.4 Recommendations

MISO and PJM should revisit the entire section of the JOA that pertains to the Day-Ahead market. There appears to be little incentive to utilize the FFE sharing provisions as currently contemplated in the JOA, and the parties should consider new methods for Day-Ahead coordination or alternatively striking it from the JOA.

Secondly, the JOA language with respect to the setting of facility limits is difficult, if not impossible, to implement given the current state of technology and infrastructure.

The current JOA language does not allow for discretionary changes to the facility limits. Therefore, the JOA language should be revised to reflect current practice.

6.3.3 Appropriate Use of the M2M Process

A new Section 8 was added to the ICP to incorporate the guiding principles described in the Settlement Agreement.   Section 8.1 sets forth these six guiding principles:

- Purpose of M2M;
- Minimizing Less than Optimal Dispatch;
- Use M2M Whenever Binding an M2M Flowgate;
- Most Limiting Flowgate;
- Substitute Flowgate; and
- Operating Guides.

These will be examined separately below. This section of the report will examine how current and planned procedures and processes meet the intent of these guiding principles.

6.3.3.1 Purpose of the M2M

6.3.3.1.1 JOA Language

From Section 8.1.1 of Attachment 3 of the JOA (the ICP):

"Purpose of Market-to-Market. Market-to-market was established to address regional, not local issues. The intent is to implement market-to-market coordination and settle on such coordination where both Parties have significant impact."

6.3.3.1.2 Discussion

Section 8.1.1 makes the general statement that M2M was established to address regional and not local issues.

6.3.3.1.3 Findings

Interviews with both Parties, procedures (both current and in development) and stakeholder presentations indicate that the Parties only operate M2M to an agreed set of defined M2M Flowgates. As noted in Section 6.3.1 of this Report, if conditions exist such that a temporary M2M Flowgate needs to be added, agreed-to procedures have been followed, and there have been no disputed financial settlements.

6.3.3.1.4 Recommendations

Although in many cases internal documentation exists, common documentation of procedures regarding the addition and review of temporary M2M Flowgates should be developed.

6.3.3.2 Minimizing Less-Than-Optimal Dispatch

6.3.3.2.1 JOA Language

From Section 8.1.2 of Attachment 3 of the JOA (the ICP):

"Minimizing Less than Optimal Dispatch. The Parties agree that, as a general matter, they should minimize financial harm to one RTO that results from market-to-market coordination initiated by the other RTO that produces less than optimal dispatch, which can lead to revenue inadequacy for FTRs, and impose the burden for such revenue inadequacy on one or both RTOs."

6.3.3.2.2 Discussion

The intent of Section 8.1.2 is that the Parties will coordinate M2M dispatch only for constrained M2M Flowgates.

6.3.3.2.3 Findings

As noted in Section 6.3.1 of this Report, if temporary M2M Flowgates were added, the Parties agreed to the necessity of the addition, and no contested settlements have occurred. The Parties are currently in the process of updating required procedures and documentation.

In addition, temporary M2M Flowgates were added only upon agreement of both Parties, and no disputed settlements resulted. Therefore, the Parties are operating in accordance with Section 8.1.2 of the ICP.

6.3.3.2.4 Recommendations

Although the Parties are currently in the process of updating required procedures and documentation, the Parties should agree upon a firm date of completion.

6.3.3.3 Use M2M Whenever Binding a M2M Flowgate

6.3.3.3.1 JOA Language

From Section 8.1.3 of Attachment 3 of the JOA (the ICP):

"Use Market-to-Market Whenever Binding a M2M Flowgate. The market-to-market process will be initiated by the Monitoring RTO whenever an M2M Flowgate is constrained and therefore binding in its dispatch."

6.3.3.3.2 Discussion

Section 8.1.3 was added to assure that, per the Settlement Agreement, M2M becomes active whenever a M2M Flowgate binds.

6.3.3.3.3 Findings

Both Parties have indicated that M2M becomes active as soon as a M2M Flowgate binds in the monitoring RTO's dispatch software, even for as little as one interval. However, some of the initiation and notification procedures are manual, resulting in time lags in initiation of M2M dispatch between the two Parties. PJM is currently working to automate initiation and notification procedures to reduce any time lags as much as possible. MISO has indicated that when a M2M Flowgate binds, it is entered into the M2M software and further automation would be unnecessary.

The Parties are operating in accordance with Section 8.1.3 of the ICP, subject to the limitations of some current manual procedures.

6.3.3.3.4 Recommendations

The Parties should continue to evaluate potential improvements to the initiation and notification procedures under M2M to reduce any inherent time lags as much as possible.

6.3.3.4 Most Limiting Flowgate

6.3.3.4.1 JOA Language

From Section 8.1.4 of Attachment 3 of the JOA (the ICP):

"Most Limiting Flowgate. Generally, controlling to the most limiting Flowgate provides the preferable operational and financial outcome. In principle and as much as practicable, market-to-market coordination will take place on the most limiting Flowgate, and to that Flowgate's actual limit (thermal, reactive, stability).

a. Market-to-market events that involve the use of a limit control that is below 95% of the actual limit will be subject to an after-the-fact review, unless the lower limit was agreed to by the RTOs prior to the market-to-market binding event. The review will determine if normal market-to-market settlements are appropriate. If market-to-market settlements are determined by the Parties not to be appropriate, then settlements will not occur on the M2M Flowgate. Sufficient real-time and after-the-fact data will be exchanged to enable these reviews. The Parties may agree to change the trigger for review to a lower number for specific Flowgates, however, either Party may request review of specific instances that are bound above the established binding percentage."

6.3.3.4.2 Discussion

Section 8.1.4 was added to ensure that M2M coordination occurs only when a M2M Flowgate exceeds 95% of its limit. If an exception to this occurs, this section requires an after-the-fact review of the incident.

6.3.3.4.3 Findings

The Parties indicated that M2M coordination occurs at a somewhat regular frequency on Flowgates at less than 95% of its limit. A daily e-mail exchange occurs that identifies any M2M Flowgates operated below 95%, with open issues handled on the weekly scheduled conference call. No disputed settlements have resulted. The Parties are operating in accordance with Section 8.1.4 of the ICP.

6.3.3.4.4 Recommendations

The Parties should formally define and document joint communication and coordination procedures.

6.3.3.5 Substitute Flowgate

6.3.3.5.1 JOA Language

From Section 8.1.5 of Attachment 3 of the JOA (the ICP):

"Substitute Flowgates. The Parties agree that, if the use of substitute Flowgates is minimized and the ability to coordinate on the most limiting Flowgate in the very near term is enabled, there should be very few instances where market-to-market coordination occurs without resulting settlement.

a. Generally, market-to-market coordination without the normal market-to-market settlement will be limited to times when: (1) a substitute is used for a period in excess of that defined in Section 8.1.5 (b) (ii) below, or (2) a substitute Flowgate (whether M2M or non-M2M) is used and the most limiting Flowgate is later determined to fail the market-to-market tests.

b. Where the most limiting constraint (monitored/contingent element pair) is not a defined M2M Flowgate:

i. Parties will add the Flowgate definition and activate market-to-market coordination on that Flowgate (as opposed to a substitute) as soon as reasonably practicable; or

ii. A substitute Flowgate may be used for a short time (generally less than an hour) until it is possible to coordinate using the most limiting Flowgate. Parties will attempt to use either: (i) the most limiting M2M Flowgate or (ii) the most limiting Flowgate that is modeled by both Parties, in that

order of reference. If possible, the Parties should use another Flowgate that is limiting. Optimal choices are Flowgates with the same or very similar Market Flow impacts (sensitivities) resulting in a very similar redispatch and market-to-market settlement.

c. A substitute Flowgate can be used in the market-to-market process pending the outcome of the coordinated Flowgate tests. The substitute Flowgate will be utilized only until the actual constraint can be entered in both the Monitoring and Non-Monitoring RTO systems as an M2M Flowgate. Market-to-market settlement is dependent on the outcome of the coordinated Flowgate tests on the actual constraint and the RTO requesting the use of a substitute Flowgate will do so at its own risk that market-to-market settlement may not occur.

d. A substitute M2M Flowgate will not be used to control for another constrained M2M Flowgate except in very limited circumstances and only where there is prior mutual agreement between Midwest ISO and PJM to do so. Mutual agreement is established only when it has been communicated and logged by the control center operators that the coordinated Flowgate is not the most limiting (i.e., it is a substitute Flowgate).

e. A substitute M2M Flowgate will not be used to control for a non-M2M Flowgate that has failed the Flowgate study or has not been entered into the study process.

f. Any use of substitute Flowgates should be clearly logged by both RTO operators with the actual start time, the actual end time and the reason for using a substitute Flowgate.

g. If the Monitoring RTO requests TLR on an M2M Flowgate but has not initiated the market-to-market process and is not binding its market for that Flowgate, the Non-Monitoring RTO is not required to bind its market for that Flowgate in order to meet the Non-Monitoring RTO's TLR relief obligation. It will be assumed that the Monitoring RTO is binding its market for the actual constraint and that the actual constraint is already active in the market-to-market process (if the actual constraint is an M2M Flowgate)."

6.3.3.5.2 Discussion

Section 8.1.5 was added to minimize the use of Substitute Flowgates and defines procedures to be followed when used.

6.3.3.5.3 Findings

As noted previously, MISO and PJM have a process in place to exchange on a daily basis all the relevant data related to the M2M Events on previous Operating Day(s). Also, during the weekly coordination call, MISO and PJM review and approve all the M2M Events in the previous operating week. Questions and concerns are documented and followed-up on the weekly calls. Since June 16, 2011, there has not been any M2M Event using a Substitute Flowgate and no instance which resulted in settlement.

6.3.3.5.4 Recommendations

As noted earlier, a formal procedure regarding requirements for M2M Flowgate exceptions should be developed between the Parties. The Parties indicated they are currently in the process of developing a draft procedure.

In addition, implementation of the Enhanced Data Exchange, expected in the 4th quarter of 2012, will automate the current information exchange procedures.

6.3.3.6 Operating Guides

6.3.3.6.1 JOA Language

Section 8.1.6 of Attachment 3 of the JOA (the ICP) states:

"Operating Guides that refer to market-to-market operation do so under the assumption that the Flowgates for which market-to-market operations take place are, or are expected to be, constrained. Operating Guides are written by operators and are not intended to result in settlement not otherwise contemplated by the JOA or this ICP. Safe Operating Mode (SOM) is reserved for abnormal conditions when existing operating guides and normal tool sets are not sufficient to manage abnormal operating conditions. After declaring SOM, operator actions may include using market-to-market tools in addition to direct dispatch. Operators may choose to use substitute M2M Flowgates with the dispatch tools to maintain reliable operations. Settlement determination will occur during the After-the-Fact Review set forth in Section 8.4 below. Generally, settlement for market-to-market coordination that takes place after SOM is declared will apply if the settlement would apply under normal conditions."

6.3.3.6.2 Discussion

New Section 8.1.6 states that Operating Guides are written by Operators and are not intended to result in settlement not otherwise contemplated by the JOA or the ICP (Attachment 3).

6.3.3.6.3 Findings

In accordance with each Party's policies, Operating Guides are reviewed annually. Use of Substitute Flowgates, per the Operating Guides, has not resulted in any disputed settlements.

6.3.3.6.4 Recommendations

Utilicast has no recommendations related to this section at this time.

6.3.4 Specific Conditions Applicable to Most Limiting Flowgate

6.3.4.1 JOA Language

Section 8.2 of Attachment 3 of the JOA (the ICP) states:

"8.2.1 Market-to-Market Events Not Requiring an After-the-Fact Review

The Midwest ISO and PJM operators will model all M2M Flowgates facilities with actual limits in their respective EMSs. The Midwest ISO EMS model uses design thermal limits of equipment. The Midwest ISO limits are updated in UDS following contacts with Transmission Owners prior to binding. The Midwest ISO and PJM operators will control the flows on these M2M Flowgates in their respective UDSs at a binding percentage that is 95% or greater of the M2M Flowgate actual limit.

8.2.2 Market-to-Market Events Requiring an After-the-Fact Review

All M2M events that involve the use of a limit control that is below 95% of the actual limit will be subject to an after-the-fact review to determine whether this was an

appropriate use of the market-to-market process and is subject to normal market-to market settlement. The following criteria will be used in making such a determination:

8.2.2.1 Reducing the UDS Binding Percentage to Provide Necessary Constraint Control:

a. A reduced UDS binding percentage below 95% of the actual facility limit can be applied to an M2M Flowgate by the Monitoring RTO provided the monitored element (for the defined contingency condition) of the M2M Flowgate meets the following conditions:

i. The monitored element is, or is expected to be, over its actual limit (post contingency if applicable) and the UDSs are not providing the desired relief.

ii. Transient system behavior necessitates controlling the M2M Flowgate to a target between 95% and 100% and providing some margin. To achieve this, in some instances, the UDS percentage may need to be below 95%.

iii. The limit for the monitored element changes due to equipment switching out of service. For instance the actual limit of a line is reduced when one of the breakers in a breaker-and-half configuration is out of service, or only one parallel transformer remains in service at one of the line end terminals.

iv. A constraint with a very high loading volatility such that loading is expected to exceed 100% of the actual limit, even when the UDS binding percentage is significantly below that value.

b. The reduced UDS binding percentage should only be applied for the time duration necessary to manage the initiating condition and shall be returned to normal as soon as possible.

c. Each time the Monitoring RTO reduces the binding limit control of an M2M Flowgate below 95% for an actual or relevant post contingency overload, the Monitoring RTO operator will make a best effort to notify the Non-Monitoring RTO operator of the new limit control, the reason for the change, and when the limit control is expected to be returned to normal (if known). Both RTO operators will log the event. This notification only applies to an operating condition causing a limit control change; it does not apply to the use of temperature adjusted limits, voltage limits or stability limits implemented as flow limits.

i. A limit reported by a Transmission Owner on the operating day shall require an accompanying reason. If the limit is set to control for underlying facilities, this shall be called out specifically. Any reason other than those specifically called out herein shall be reported.

d. The Monitoring RTO will operate to the most conservative limit when there are conflicting results between two different EMSs (either another RTO EMS or a Transmission Owner EMS) unless the reason for the difference is known.

8.2.2.2 Reducing the UDS Binding Percentage of a M2M Flowgate for Prepositioning

a. In some conditions system flows are expected to change quickly due to load pick-up, planned, and emergency outages, and the UDS may not be accurately predicting a resulting overload on the M2M Flowgate in the near future. When a reduction in binding percentage is initiated by the operator to mitigate expected impacts on an M2M Flowgate from a planned outage, that action shall be taken to prepare the system consistent with the time submitted on the outage ticket or as revised by the equipment operator. This reduction should

be for as short a time as practicable but may be extended if the outage is delayed. If possible, initiating the reduction in binding percentage shall be delayed until the outage begins.

b. M2M Flowgates may be de-rated for a short period of time to pre-position the system for an expected change. These expected changes can include:

> i. Change in unit status (anticipated as part of an upcoming outage, reacting to an imminent emergency outage, or change in commitment if the unit for which the commitment was changed cannot be adequately ramped to allow normal redispatch to manage any resulting constraints).

> ii. Transmission system topology change (either anticipated event or as part of an upcoming planned outage). In this case, every effort shall be made to add the expected constraint to the systems and bind on the expected constraint instead of using a substitute Flowgate.

> iii. Increase or decrease in wind generation output.

c. Reducing the limit to pre-position the system will be considered an appropriate use of market-to-market tools but subject to settlement adjustment for substitute M2M Flowgates applying a hold harmless approach discussed in the After the Fact Review process set forth in Section 8.4 below. The time duration of such events shall be limited to that necessary to pre-position to avoid excessive impacts on market prices."

6.3.4.2 **Discussion**

Section 8.2 was added to provide additional conditions relevant to the "Most Limiting Flowgate" guiding principle. Specifically, it defines exceptions to the principle when binding a M2M Flowgate below 95%. Such exceptions include: inability of UDS to solve, transient system behavior, limits changing due to equipment switching out of service and existence of a constraint with a very high loading volatility.

6.3.4.3 **Findings**

As discussed earlier in Section 6.3.3.4 of this Report, exceptions to the "Most Limiting Flowgate" guiding principle have occurred, were reviewed, and no disputed settlements have resulted.

6.3.4.4 **Recommendations**

As noted earlier above, joint communication and coordination procedures should be formally defined and documented in the event of exceptions to the "Most Limiting Flowgate" guiding principle.

6.3.5   **Specific Conditions Applicable to Section 8.1.6 (Operating Guides)**

6.3.5.1 **JOA Language**

From Section 8.3 of Attachment 3 of the JOA (the ICP):

"8.3.1 All op guides are subject to review by Midwest ISO and PJM through which either RTO can request removal of a reference to the market-to-market process. Where reference to the market-to-market process has been removed and not replaced by alternate congestion management actions, the use of SOM will be added to the op guide if it is not already included in the op guide. Before modifying existing op guides, one of the following conditions must be met:

a. One or more constraints are made available to assist in managing West-to-East flows across NIPS to avoid the conditions that prompted SOM; or

b. Midwest ISO and PJM will agree to a mechanism to manage congestion that will avoid the need for repeated SOM declarations on the same constraint.

8.3.2 In the event of severe abnormal system conditions, such as storm damage to critical facilities, the Inter-RTO Steering Committee shall meet as soon as practicable to agree upon the response, which shall be incorporated into a temporary operating guide."

6.3.5.2 **Discussion**

Section 8.3 of the ICP defines specific conditions applicable to Section 8.1.6 (Operating Guides).

6.3.5.3 **Findings**

Both MISO and PJM sign off on new/updated Op-Guides. Thus, Parties make sure that they are meeting requirements in Section 8.3.1 of ICP. In addition, delegates of Inter-RTO Steering Committee will make sure that the temporary Op-Guide is developed in the event of severe abnormal system conditions, such as storm damage to the critical facilities.

6.3.5.4 **Recommendations**

Utilicast has no recommendations for this section at this time.

6.3.6   After-The-Fact Review

6.3.6.1 **JOA Language**

Section 8.4 of Attachment 3 of the JOA (the ICP) states:

"8.4.1 Based on the communication and data exchange that has occurred in real-time between the Monitoring RTO operator and the Non-Monitoring RTO operator, there will be an opportunity to review the limit change and the use of the market-to-market process to verify it was an appropriate use of the market-to-market process and subject to market-to-market settlement. The Monitoring RTO will initiate the review as necessary to apply these conditions and settlements adjustments.

a. A review will verify that the limit used in the market-to-market coordination represented the actual limit of the monitored element of the original Flowgate that has passed one of the M2M Flowgate Studies. The Monitoring RTO will archive and make available data (including all UDS solutions) that supports the decision to change the M2M Flowgate limit. The Parties will mutually agree upon, and document in writing and post on the Parties' websites, the data that should be exchanged and/or archived to meet this requirement, and shall retain the data for the period applicable to other data used to audit settlements inputs and market flow calculations under this agreement.

b. A review will verify the outcome of the M2M Flowgate Studies and whether the potential Flowgate passed one of the M2M Flowgate Studies by both the Monitoring RTO and the Non-Monitoring RTO. The Monitoring RTO uses market-to-market tools before a M2M Flowgate is approved at its own risk regarding market-to-market settlement. After the M2M Flowgate Studies are complete, if the Flowgate did not pass at least one of the studies conducted by the Monitoring RTO and at least one of the studies conducted by the Non-Monitoring RTO, then settlements will be adjusted as follows.

i. If the Non-Monitoring RTO's integrated market flows are below its Firm Flow Entitlement for the hour, there will be a normal market-to-market settlement with a payment from the Monitoring RTO to the Non-Monitoring RTO for the hour.

ii. If the Non-Monitoring RTO's integrated market flows exceed its Firm Flow Entitlement for the hour, there will be no market-to-market settlement for the hour.

iii. If the Monitoring RTO was requested to initiate the market-to-market process on the Monitoring RTO's Flowgate to assist the Non-Monitoring RTO, the Monitoring RTO will be held harmless as follows.

a. If the Non-Monitoring RTO's integrated market flows are below its Firm Flow Entitlement for the hour, there will be no market-to-market settlement for the hour.

b. If the Non-Monitoring RTO's integrated market flows exceed its Firm Flow Entitlement for the hour, there will be a normal market-to-market settlement with a payment from the Non-Monitoring RTO to the Monitoring RTO for the hour.

8.4.2 The Non-Monitoring RTO may request the Monitoring RTO to implement the market-to-market process on its behalf. There will be an after the fact review performed to determine whether this market-to-market event should be subject to settlement. If the review finds it is subject to settlement, the usual criteria will be applied. If the review finds it is not subject to settlement, the usual criteria will be applied except that the Monitoring RTO shall be held harmless.

a. If the Non-Monitoring RTO's integrated market flows are below its Firm Flow Entitlement for the hour, there will be no market-to-market settlement for the hour.

b. If the Non-Monitoring RTO's integrated market flows exceed its Firm Flow Entitlement for the hour, there will be a normal market-to-market settlement with a payment from the Non-Monitoring RTO to the Monitoring RTO for the hour.

6.3.6.2 **Discussion**

Section 8.4 was added to set forth details and conditions of the "After-the-Fact Review".

6.3.6.3 **Findings**

Utilicast has determined that when exceptions to normal M2M occur, MISO and PJM have a process in place to exchange on a daily basis all the relevant data related to the M2M Events on previous Operating Day(s). Also, during the weekly coordination call, MISO and PJM review and approve all the M2M Events in the previous operating week. Questions and concerns are documented and followed-up on the weekly calls.

Since June 16, 2011, there has not been any instance which resulted in settlement adjustment because of the scenarios listed in Section 8.4.1 of ICP.

6.3.6.4 **Recommendations**

A formal procedure should be developed to address the handling of these exceptions.

In addition, implementation of the Enhanced Data Exchange, expected in the 4th quarter of 2012, will automate the current information exchange procedures.

7.0   CONCLUSIONS

Since the June, 2011 FERC Order, PJM and MISO have made substantial progress in addressing the issues that brought them to that Settlement. They have focused on improved communications, data exchange, knowledge-sharing activities, and improved transparency. They have actively worked together, including joint working group initiatives, to improve their joint market activities.

While much progress has been demonstrated during the past half year, there are still issues that need to be resolved. These issues are currently being addressed expeditiously and conscientiously due to their potential impacts on the market. The Review Team has identified areas where enhancements will improve the Parties' M2M coordination. Documentation, both internal and collective, needs to be addressed to further improve coordination, communications, and transparency. Compatible specifications will help both Parties better co-manage their interconnected markets. Differences in market flow calculations need to be addressed and documented. Whenever possible, calculations need to be made more consistent. Day-Ahead market handling needs to be addressed including reconsideration of the JOA language. Modeling differences still remain to be formally communicated and resolved. As noted in several instances in the Findings and Recommendations, the joint MISO/PJM Enhanced Data Exchange project will provide many of the recommended enhancements. This is expected to go into production in the 4th quarter of 2012.

The Review Team believes to the best of its knowledge, observations and analysis of the Source Materials that the RTOs are in conformance with the provisions of the JOA. However, as explained above and in detail in the Findings and Recommendations sections, Utilicast has identified several areas within the M2M coordination where increased cooperation, transparency, and continued knowledge-sharing provide ample process improvement opportunities. Likewise, Utilicast recommends a comprehensive review and update of the JOA language regarding the Day-Ahead coordination section.

APPENDIX A – ACRONYMS

TERM	DEFINITION
AFC	Available Flowgate Capability
BA	Balancing Authority
CF	Coordinated Flowgate
CIM	Common Information Model
CMP	Congestion Management Process
CMPWG	Congestion Management Process Working Group
CROW	MISO Outage Scheduler
CZ	Control Zones
DA	Day-Ahead
DNR	Designated Network Resource
DRR	Demand Response Resource
eDART	PJM Market Management Tool
EMS	Energy Management Systems
FERC	Federal Energy Regulatory Commission
FFE	Firm Flow Entitlement
FFL	Firm Flow Limit
FG	Flowgate
FPA	Federal Power Act
FTR	Financial Transmission Rights
GLDF	Generation-to-Load Distribution Factor
GSF	Generation Shift Factor
GTL	Generation-To-Load
HVDC	High Voltage Direct Current
ICCP	Inter-Control Center Communication Protocol
ICP	Interregional Coordination Process
IDC	NERC Interchange Distribution Calculator
ISN	Interregional Security Network
ISO	Independent System Operator
IT	Information Technology
JOA	Joint Operating Agreement
JOU	Joint Operated Unit
kV	Kilovolt
LBA	Local Balancing Authority

TERM	DEFINITION
LMP	Locational Marginal Price
LSF	Load Shift Factor
M2M	Market-to-Market
MF	Market Flow
MFC	Market Flow Calculator
MRTO	Monitoring RTO
MISO	Midwest Independent System Operator, Inc.
MW	Megawatt
NERC	North American Electricity Reliability Corporation
NMRTO	Non-Monitoring RTO
NNL	Network and Native Load
NSI	Net Scheduled Interchange
OASIS	Open Access Same-Time Information System
OM	PJM Operating Memo
OTDF	Outage Transfer Distribution Factor
PAR	Phase Angle Regulator
PJM	PJM Interconnection, LLC
RC	Reliability Coordinator
PTP	Point-to-Point
RCF	Reciprocal Coordinated Flowgate
RT	Real-Time
RTO	Regional Transmission Organization
SCADA	Supervisory Control and Data Acquisition
SCED	Security Constrained Economic Dispatch
SDX	System used by NERC to exchange system data
SME	Subject Matter Expert
SMWG	Seams Management Working Group
SOM	Safe Operating Mode
TDF	Transfer Distribution Factors
TLR	Transmission Loading Relief
TVA	Tennessee Valley Authority
UDS	Unit Dispatch Systems
VFT	Variable Frequency Transformer

APPENDIX B – DEFINITIONS

ALLOCATION – A calculated share of capability on a Reciprocal Coordinated Flowgate to be used by Reciprocal Entities when coordinating AFC, transmission sales, and dispatch of generation resources.

AVAILABLE FLOWGATE CAPABILITY (AFC) – The rating of the applicable Flowgate less the projected loading across the applicable Flowgate less TRM and CBM. The firm AFC is calculated with only the appropriate Firm Transmission Service reservations (or interchange schedules) in the model, including recognition of all roll-over Transmission Service rights. Non-firm AFC is determined with appropriate firm and non-firm reservations (or interchange schedules) modeled.

AFC FLOWGATE – A Flowgate for which an entity calculates AFC's.

Control Area –An electric power system or combination of electric power systems to which a common automatic generation control scheme is applied.

Control Zones – Within an Operating Entity Control Area that is operating with a common economic dispatch, the Operating Entity 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.

Coordinated Flowgate (CF) –A Flowgate impacted by an Operating Entity as determined by one of the four studies.

Designated Network Resource – A resource that has been identified as a designated network resource pursuant to a transmission provider's Open Access Transmission Tariff.

Firm Flow – The estimated impacts of Firm Transmission Service on a particular Coordinated or Reciprocal Coordinated Flowgate.

Firm Flow Entitlement - The firm limit on net market flow that a market entity can have for a Reciprocal Coordinated Flowgate. In the interregional coordination process, an extra usage is subject to financial settlement.

Firm Flow Limit – The maximum value of Firm Flows an entity can have on a Coordinated or Reciprocal Coordinated Flowgate.

Firm Market Flow – The portion of Market Flow on a Coordinated or Reciprocal Coordinated Flowgate related to contributions from the native load serving aspects of the dispatch (constrained as appropriate by the Firm Flow Limit).

Firm Transmission Service – The highest quality (priority) service offered to customers under a filed rate schedule that anticipates no planned interruption or similar quality service offered by transmission providers by contract that do not require the filing of a rate schedule. Firm Transmission Service only includes firm point-to-point service, network designated transmission service and grandfather agreements deemed firm by the transmission provider as posted on OASIS.

Flowgate – A representative modeling of facilities or groups of facilities that may act as significant constraint points on the regional system.

Freeze Date – The cutoff date chosen by Reciprocal Entities to be used in the calculation of Historic Firm Flows.

Gen to Load (GTL) – See Network and Native Load.

Generator Shift Factor – A factor to be applied to a generator's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or Flowgate, referenced to a swing bus.

Historic Firm Flow – The estimated total impact an entity has on a Reciprocal Coordinated Flowgate when considering the impacts of (1) its historic Designated Network Resources serving native load, and (2) imports and exports, based on Firm Transmission Service reservations that meet the "Freeze Date" criteria.

Historic Firm Gen-to-Load Flow – The flow associated with the native load serving aspects of dispatch that would have occurred if all Control Areas maintained their current configuration and continued to serve their native load with their generation.

Historic Ratio – The ratio of Historic Firm Flow of one Reciprocal Entity compared to the Historic Firm Flow of all Reciprocal Entities on a specific Reciprocal Coordinated Flowgate.

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.

Load Shift Factor – A factor to be applied to a load's expected change in demand to determine the amount of flow contribution that change in demand will impose on an identified transmission facility or Flowgate, referenced to a swing bus.

Locational Marginal Pricing (LMP) –The market clearing price for energy at a given location in a Market-Based Operating Entity's market area.

Market Flows – The calculated energy flows on a specified Flowgate as a result of dispatch of generating resources serving market load within a Market-Based Operating Entity's market.

Market-Based Operating Entity – An Operating Entity that operates a security constrained, bid-based economic dispatch bounded by a clearly defined market area.

Network and Native Load (NNL) – The impact of generation resources serving internal system load, based on generation the network customer designates for Network Integration Transmission Service (NITS). NNL is also referred to as Gen to Load.

Non-Firm Market Flow – That portion of Market Flow related to a Market-Based Operating Entity's market operations in excess of that entity's Firm Market Flow.

Operating Entity – An entity that operates and controls a portion of the bulk transmission system, with the goal of ensuring reliable energy interchange between generators, loads, and other operating entities.

Reciprocal Coordination Agreement – An agreement between Operating Entities to implement the reciprocal coordination procedures defined in the CMP.

Reciprocal Coordinated Flowgate (RCF) – A Flowgate that is subject to reciprocal coordination by Operating Entities, under either this Agreement (with respect to Parties only) or a Reciprocal Coordination Agreement between one or more Parties and one or more Third Party Operating Entities. An RCF is:

> 1. A CF that is (a) (i) within the operational control of Reciprocal Entity or (ii) may be subject to the supervision of Reciprocal Entity as Reliability Coordinator, and (b) affected by the transmission of energy by two or more Parties; or
> 2. A CF that is (a) affected by the transmission of energy by one or more Parties and one or more Third Party Operating Entities, and (b) expressly made subject to CMP reciprocal coordination procedures under a Reciprocal Coordination Agreement between or among such Parties and Third Party Operating Entities; or

3. A CF that is designated by agreement of both Parties as an RCF.

Reciprocal Entity – An entity that coordinates the future-looking management of Flowgate capacity.

Security Constrained Economic Dispatch – The utilization of the least cost economic dispatch of generating and demand resources while recognizing and solving transmission constraints over a single Market-Based Operating Entity Market.

Settlement – As referred to in this report, the Settlement agreement between MISO and PJM as approved by FERC in its June 16, 2011 Order.

Transfer Distribution Factor – The portion of an interchange transaction, typically expressed in per unit, that flows across a Flowgate.

Transmission Service – Services provided to the transmission customer by the transmission service provider to move energy from a point of receipt to a point of delivery.

The source for this glossary was largely gathered from the MISO/PJM JOA and provided documentation