MISO-PJM Biennial Review of JOA Report

Mid-Continent ISO
PJM Interconnection
1/20/2014
1. Background

On January 4, 2011, Midwest Independent Transmission System Operator, Inc. (MISO) and PJM Interconnection, LLC (PJM) filed a joint Settlement Agreement to resolve two MISO complaints against PJM and one PJM complaint against MISO. On June 6, 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 conduct a review of the processes and procedures used to implement the Joint Operating Agreement (JOA) between the two organizations. Accordingly, Utilicast, LLC was retained jointly by MISO and PJM to conduct this review. Utilicast completed the JOA Baseline Review report on January 20, 2012. This review found that both MISO and PJM were in conformance with the JOA provisions, but that there were opportunities for increased communication and documentation that might proactively prevent future conflicts. These items were detailed in a series of eighteen findings and recommendations.

The Settlement Agreement also specifies that beginning two years after the issuance of the JOA Baseline Review and every two years thereafter, MISO and PJM shall conduct a review of the changes made to each Party’s processes used to implement the JOA since the previous review, or in the case of the first review, since the JOA Baseline Review.

This report is the first Biennial Review. Changes in processes and procedures over the last two years are determined via the following documentation:

- Change Management Logs
- Status of JOA Baseline Review Recommendations
- FERC Orders

The Change Management Log is a document which is jointly maintained by PJM and MISO and tracks systemic changes and process and procedure changes on an ongoing basis. That Log is detailed in section 2 of this report. The JOA Baseline Review Recommendations are the result of the initial JOA Baseline Review report, as detailed above. The FERC Orders section encompasses any orders relating to the JOA that have been implemented in the last two years as directed by FERC.

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2. Change Management Log

2.1. Change Management Log Summary
The following table is a summary of the implemented changes in processes or systems as detailed in the Change Management Log.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
<th>Status</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PJM - Auto M2M Initiate Message</td>
<td>Enhance communication by automatically issuing M2M notification to MISO</td>
<td>Implemented</td>
<td>10/26/2011</td>
</tr>
<tr>
<td>2</td>
<td>MISO/PJM - Use of actual Schedules instead of Transmission Service Requests (TSR)</td>
<td>Use schedules in firm flow entitlement calculation, rather than TSRs.</td>
<td>Implemented</td>
<td>12/1/2011</td>
</tr>
<tr>
<td>3</td>
<td>MISO-Market Flow Calculation for External Asynchronous Resource (EAR)</td>
<td>Enhance MISO’s MFC to allow for inclusion of EARs</td>
<td>Implemented</td>
<td>5/1/2012</td>
</tr>
</tbody>
</table>
| 4    | MISO - M2M Data Exchange and Market Flow Calculator | 1. Enhance M2M Data Exchange to share additional data points  
2. Share data in common format  
3. Update MFC | Implemented | 1/15/2013 |
| 5    | PJM Enhanced Market Flow Calculator (MFC) | 1. Incorporate revised import and export models in PJM’s MFC  
2. Enable MFC in PJM’s simulation environment  
3. Provide PJM capability to perform MFC with MISO and NYISO data | Implemented | 1/15/2013 |
| 6    | PJM Enhanced Data Exchange | Share a common set of MFC data in an agreed-upon format | Implemented | 1/15/2013 |
| 7    | PJM-Real Time Data Exchange | Additional Real Time M2M data elements to be shared with MISO | Implemented | 1/15/2013 |
| 8    | PJM WebImpact Hourly Integration of FFE | Changes to integrate the hourly FFE over the entire hour instead of just coordination periods | Implemented | 2/28/2013 |

2.2. Discussion
The Change Management Log is a jointly maintained document that details any system or process change related to the MISO/PJM Joint Operating Agreement. Each entry on the Change Management Log is agreed to by both RTO’s, and it is used as a vehicle to ensure all parties are informed of changes that could potentially impact the implementation of the JOA.
Items in the log are classified as open or closed. Open items are undergoing discussion or are in the process of being implemented. Closed items are assigned a status of approved if implemented. The Change Management Logs are discussed on a weekly basis and posted to the MISO and PJM websites on a quarterly basis.

The following section summarizes the implemented changes per the log:

1. **Auto M2M Initiate Message** – This is a PJM initiated project, and its purpose was to allow for automated M2M-Initiated messages to MISO whenever an internal PJM constraint which is also a flowgate is activated in Dispatch Management Tool (DMT). After the initiation of the activated message, PJM follows-up with a phone call to request MISO to activate the flowgate. This feature also automates M2M-Close messages to MISO whenever the corresponding PJM internal constraint is closed in DMT. After the initiation of the closed messaged, PJM follows-up with a phone call to MISO to confirm the termination of the M2M coordination.

   This initiative does not address a specific recommendation from the Baseline Review but rather it addressed the need to automate additional steps in the M2M flowgate coordination process. It was implemented on October 26, 2011.

2. **Using Schedules instead of TSRs** – This is a jointly initiated project by PJM and MISO, and its purpose was to implement the use of actual Schedules in the calculation of firm flow entitlements, rather than Transmission Service Request values. Prior to the implementation of this change, the three market entities in the Eastern Interconnection (MISO, PJM and SPP) were representing the firm usage of transmission system in different manners in their respective business processes. This difference had raised questions about the relief obligation during congested operations, as well as potential equity issues. MISO, PJM and SPP believed that the schedules better represent the actual transmission usage and therefore should be used for the determination of firm transmission service impacts on the Reciprocally Coordinated Flowgates (RCFs) and/or Market-to-Market (M2M) flowgates. This initiative reflects a significant change from the previously implemented process of using existing firm point to point Transmission Service Reservations (TSRs) to determine transmission usage impacts on RCFs.

   This initiative increases the accuracy of firm flow entitlement calculation by utilizing actual tagged schedule values rather than the original TSR value. It was implemented on December 1, 2011. MISO and PJM processes are aligned as a result of the implementation of this project.

3. **MISO Market Flow calculation for External Asynchronous Resource (EAR)** – This is a MISO initiated project, and its purpose was to allow MISO to include External Asynchronous Resources (EARs) in its real-time and next-hour market flow calculations by modeling its amount at the Dorsey 500 KV bus in MISO market flows
that are calculated every 5 minutes. EAR is now modeled as a resource serving load to importing LBAs inside the MISO market (transfer component of market flows).

By making this change, it addressed an issue of MISO not receiving credit for moving EAR during TLR. Similar to generators within the MISO market, EAR responds to market signals every 5 minutes. Prior to including EAR in MISO market flows, if MISO had a relief obligation during TLR, it would bind its market to achieve the Target Market Flow. If EAR responded to the binding (i.e. either reduced EAR output or increased EAR output), the EAR response would not appear in the next market flow calculation and additional MISO market generators would be moved to achieve the target as if EAR had not responded at all.

This initiative does not address a specific recommendation from the Baseline Review. It was implemented on May 1, 2012.

4. **M2M Data Exchange and Market Flow Calculator** – This is a MISO initiated project, and its purpose was to enhance the existing Real-Time M2M Data exchange to exchange additional data as per Section 8.5.1 of Attachment 3, Interregional Coordination Process (ICP), of the JOA. As part of the Real-Time M2M Data exchange, MISO and PJM also exchange the configuration parameters, input data and output data of their respective Market Flow Calculators in order to shadow calculate each other’s market flow values for independent verification. The data is exchanged in a common format and at a frequency agreed upon with PJM.

The following market flow calculator software enhancements were also implemented by MISO in this project: (1) Updated the market flow calculator to use configuration parameters to model Total exports/imports, LBA exports/imports, Dynamic Schedules, EAR imports, DC Line, etc.; (2) Updated the market flow calculator to accept inputs in the common format as agreed upon with PJM; (3) Updated the market flow calculator to provide capability to calculate the market flows using MISO and PJM data; (4) Updated the market flow calculator to provide the capability to re-calculate the market flows using historical input data.

This initiative addresses the Baseline Review recommendation related to Data Exchange, and was implemented on January 15, 2013. This project, in association with the projects detailed in items 5 and 6 below, aligned MISO and PJM processes.

5. **PJM Enhanced Market Flow Calculator** – This is a PJM initiated project, and its purpose was three-fold: (1) Enhanced the previous MFC with revised models of import and export, the generators and loads in the market footprints and GLDF thresholds; (2) Accommodated the need for market flow recalculation in the simulation environment as well as in the real-time production environment using the same platform-independent code set; (3) Provided the capability to calculate the market flows for PJM data, MISO data and NYISO data.
This initiative addresses several Baseline Review recommendations and was implemented on January 15, 2013.

6. **PJM/MISO Enhanced Data Exchange** – This is a jointly initiated project by PJM and MISO, and its purpose was to provide agreed-upon details of fields, format and frequency for data exchange. A common format of data exchange was formulated and both MISO and PJM designed a shadow calculator to replicate each other’s calculations. The project also covered the data retention requirements and greater monitoring mechanism in order to provide enhanced transparency and audit capability to both MISO and PJM Market to Market processes. Any application or software enhancement needed to achieve these goals was also pursued through this project.

   This initiative addresses the Baseline Review recommendations related to Data Exchange and was implemented on January 15, 2013.

7. **PJM Real Time Data Exchange** – This is a PJM initiated project, and its purpose was to upgrade the real-time data exchange web services and communication process and incorporate additional, agreed-upon, data elements.

   This initiative addresses the Baseline Review recommendations related to Data Exchange and was implemented on January 15, 2013.

8. **WebImpact Hourly Integration of FFE** – This is a PJM initiated project, and its purpose was to align the calculation of the hourly integrated FFES. Specifically, PJM was integrating the hourly FFE value based on when the flowgate was in coordination. Whereas, MISO integrates the hourly FFE value over the entire hour even if the flowgate is not in coordination. PJM changed its hourly integration to occur over an hour instead of over the coordination period.

   This initiative addresses an inconsistency in the way PJM and MISO were calculating the hourly integrated FFES and was implemented by PJM on February 28, 2013. MISO and PJM processes are aligned as a result of implementation of this project.
3. Baseline Review Recommendations and MISO/PJM responses

In the JOA Baseline Review report, issued January 20, 2012, Utilicast identified multiple recommendations to improve the coordination of M2M activities between MISO and PJM. The following section summarizes the recommendations and their current status. Section 3.2 provides a narrative description of recommendation language and MISO’s and PJM’s responses to those recommendations and corresponding action items.

3.1 Summary

<table>
<thead>
<tr>
<th>Report Item</th>
<th>Topic</th>
<th>Recommendation</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.1</td>
<td>Documentation</td>
<td>All processes and procedures should be documented and shared with each Party (to the extent possible) to proactively prevent opportunities for misinterpretation.</td>
<td>Recently completed documents include:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Market Flow Methodology Document</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Data Exchange</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>In Progress:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• M2M Flowgate Process Document²</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Modeling</td>
<td>The Parties should improve their current level of communication and coordination with respect to changes in models.</td>
<td>Complete: Models exchanged quarterly along with report identifying model changes since previous quarter</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Data Exchange</td>
<td>Data Exchange project</td>
<td>Complete/Implemented:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Market Flow data exchange implemented on January 15, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Hourly FFE data exchange implemented on November 14, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Additional data exchange items will be addressed by the end of 2014</td>
</tr>
</tbody>
</table>

² PJM and MISO currently consider a 25% threshold flowgate test for flowgate qualifications. Both parties are discussing the need to perform a 35% threshold test rather than a 25% threshold test. Until these discussions are concluded, Dynamic flowgate procedure and 35% flowgate coordination procedure will not be finalized.
<table>
<thead>
<tr>
<th>Report Item</th>
<th>Topic</th>
<th>Recommendation</th>
<th>Status</th>
</tr>
</thead>
</table>
| 3.2.4       | Outage Coordination | Increase awareness of Outage Coordination communication needs and formalize communication procedures | Complete/Implemented:  
  - Automated Data Exchange (SDX)  
  - Weekly outage coordination review  
  - Monthly long-term outage review.  
  In Progress:  
  - Outage Coordination JCM Initiative |
| 3.2.5       | Change Management | Change Management documentation should be shared to further clarify each parties' processes and procedures | Complete/Implemented:  
  - Process documentation complete  
  - Notice Forms developed  
  - SharePoint Site  
  - Quarterly Change Management Log posting |
| 3.2.6       | Biennial Review | The Parties should develop a review framework. | In Process:  
  - Weekly Coordination Call topic |
| 3.2.7       | Flowgate Determination | The Parties should formalize process timelines to ensure proper turn-around time. | In Process:  
  - M2M Flowgate Process Document  
  - Dynamic Flowgate Creation process doc |
| 3.2.8       | Real Time Market Flow Determination | 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. | Complete/Implemented:  
  - Market Flow documentation has been exchanged  
  - Enhanced data exchange project |
| 3.2.9       | Market Flow Limit Determination – Forward Coordination Process | A formal procedure should be developed between the Parties defining conditions that may trigger a review of Historic Firm Flow Values and Ratios. | Complete/Implemented:  
  - CMPWG reviews all FFE recalculations |
<table>
<thead>
<tr>
<th>Report Item</th>
<th>Topic</th>
<th>Recommendation</th>
<th>Status</th>
</tr>
</thead>
</table>
| 3.2.10      | M2M Coordination | Procedures regarding this process need to be formally documented. | In process:  
- Included as part of the M2M Flowgate Process Document  
- Dynamic Flowgate creation document |
| 3.2.11      | Day-Ahead Energy Market Coordination | 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. | Complete/Implemented:  
- Flowgate limit determination processes have been aligned  
In process:  
- FFE sharing provision process is under development  
- Ongoing MISO/PJM JCM initiative |
| 3.2.12      | Purpose of Market to Market | Although in many cases internal documentation exists, common documentation of procedures regarding the addition and review of temporary M2M Flowgates should be developed. | In Process:  
- Included as part of the M2M Flowgate Process Document  
- Dynamic Flowgate creation document |
| 3.2.13      | Minimizing Less-Than-Optimal Dispatch | Although the Parties are currently in the process of updating required procedures and documentation, a firm date of completion should be agreed upon. | Complete/Implemented:  
Joint review process developed |
| 3.2.14      | Use of M2M whenever binding a M2M Flowgate | 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. | Complete/Implemented:  
Both parties agree the current process is sufficient |
| 3.2.15      | Most Limiting Flowgate | Joint communication and coordination procedures should be formally defined and documented. | Complete/Implemented:  
All issues addressed by enhanced data exchange project |
| 3.2.16      | Substitute Flowgate | A formal procedure regarding requirements for M2M Flowgate exceptions should be developed between the Parties | In Process:  
Included as part of the M2M Flowgate Process Document |
### 3.2 Discussion

#### 3.2.1 Documentation

**3.2.1.1 Baseline Review Recommendation:**

“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.”

**3.2.1.2 MISO and PJM Joint Response and Changes:**

MISO and PJM have identified a set of major documents that guide processes and procedures for the M2M process. These include:

<table>
<thead>
<tr>
<th>Completed Documents</th>
<th>Ongoing (Under Development)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Flow Methodology document</td>
<td>Outage Coordination Procedure</td>
</tr>
<tr>
<td>Data Exchange</td>
<td>Dynamic Flowgate procedure</td>
</tr>
<tr>
<td>After-the-Fact Review Procedure</td>
<td>M2M Flowgate Process Document</td>
</tr>
<tr>
<td>Change Management Document</td>
<td>Less-than-Optimal Dispatch procedure</td>
</tr>
<tr>
<td>Flowgate Ownership document</td>
<td>Flowgate Determination guides</td>
</tr>
<tr>
<td>Generator Binding Thresholds</td>
<td></td>
</tr>
</tbody>
</table>

With improved coordination and incremental changes, additional documents may be identified as needed. MISO and PJM continue to work together to identify new documents as well as to update existing documents to reflect the new changes.
As a result of the Baseline Review recommendations, MISO and PJM have jointly developed the following documents:

- Market Flow Methodology document (under review)
- Data exchange document, with summary description posted at
- Change Management Document

3.2.1.3 Future action items:
MISO and PJM continue discussions on the following joint documents:

- Outage Coordination Procedure
- Dynamic Flowgate procedure
- M2M Flowgate Process Document
- Less-than-Optimal Dispatch procedure
- Flowgate Determination guides

3.2.2 Modeling

3.2.2.1 Baseline Review Recommendation:
“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.”

3.2.2.2 MISO and PJM joint response and changes:
MISO and PJM have agreed to exchange quarterly models with an accompanying report that identifies details of the changes in that model. Both MISO and PJM have been exchanging files with each other including the model difference report at each of their respective quarterly model updates.

3.2.2.3 Future action items:
MISO and PJM will review the current exchange of quarterly EMS model information and develop/implement improved coordination processes. Changes/improvements to these processes will be provided via each RTO’s stakeholder reporting process.
3.2.3 Data Exchange

3.2.3.1 Baseline Review Recommendation:
“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.”

3.2.3.2 MISO and PJM joint response and changes:
This recommendation received the highest priority over the preceding two years. The first phase of the project was successfully implemented on January 15, 2013. In this phase, input data for market flow calculations is now exchanged, allowing each party to audit the others’ market flow calculation. Additionally the binding threshold data of each active M2M constraint is exchanged, allowing for mutual verification of optimal dispatch. These process and system updates are detailed in the Change Management Log Items # 4, 6 and 7 in section 2 of this report. On November 14, 2013, MISO and PJM included hourly FFE data for all M2M constraints in the data exchange.

3.2.3.3 Future action items:
MISO and PJM are targeting to add the interim Flowgate allocation data and interim Market Flow calculator data to the data exchange by the end of 2014.

3.2.4 Outage Coordination

3.2.4.1 Baseline Review Recommendation:
“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.”

3.2.4.2 MISO and PJM joint response and changes:
To address this recommendation MISO and PJM have reviewed the existing level of communications and proposed improvements. Currently, in addition to the automatic data exchange with SDX and regular weekly calls to review short-term outages, the parties have also initiated a new twice-monthly call to review long-term outages between the two entities. Additional outstanding issues are being addressed in the Joint and Common Market (JCM) initiatives (e.g. transmission outage impact on market, timely identification of outage driven constraints)

3.2.4.3 Future action items:
Continue with MISO/PJM JCM Initiatives. The latest status and working schedule can be found on JCM website:

3.2.5  Change Management

3.2.5.1  Baseline Review Recommendation:
“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.”

3.2.5.2  MISO and PJM joint response and changes:
MISO and PJM have established the Change Management process detailed above in section 2 to provide better transparency and management of M2M coordination. Any changes in one RTO’s practices that may directly affect M2M coordination and/or settlement, is subject to approval of the counterparty RTO. Several items have been approved via this new process, and those are detailed in section 2 above.

The change management log has been posted on the website link for both MISO and PJM:

MISO:  https://www.misoenergy.org/Library/Pages/ManagedFileSet.aspx?SetId=1256


3.2.5.3  Future action items:
MISO and PJM should continue to utilize the change management process.

3.2.6  Biennial Review

3.2.6.1  Baseline Review Recommendation:
“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.”

3.2.6.2  MISO and PJM joint response and changes:
This report provides the response to the Biennial Review recommendations. MISO and PJM assigned representatives to jointly review the changes implemented by each party since the JOA Baseline Review report was released in 2012. The parties worked together to develop this report format and its contents.
3.2.6.3  **Future action items:**
MISO and PJM will continue to track all settlement agreement related items, including the Biennial Review. Both RTOs have ongoing work plans to review M2M process related changes on a biennial basis.

3.2.7  **Flowgate Determination**

3.2.7.1  **Baseline Review Recommendation:**
“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.”

3.2.7.2  **MISO and PJM joint response and changes:**
This item is critical for both parties to test and implement M2M Flowgates in a timely manner. The determination of M2M Flowgates requires multiple departments’ coordination between both MISO and PJM. The parties are currently developing a Flowgate creation procedure document for real-time M2M Flowgates whose qualifying coordination tests cannot be run prior to the need date for the Flowgate.

There is no special treatment for untraditional network devices for MISO and PJM in determining M2M flowgates. MISO and PJM are consistent in assumptions to be used in modeling network devices while coordinating flowgate studies.

3.2.7.3  **Future action items:**
The parties are targeting a 2014 completion date for this procedure.

3.2.8  **Real Time Market Flow Determination**

3.2.8.1  **Baseline Review Recommendation:**
“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.”
3.2.8.2  **MISO and PJM joint response and changes:**
This recommendation has been addressed with the MISO/PJM data exchange project and its related documentation. The parties are aware of the differences in each other’s modeling philosophies and have incorporated the counterparty’s logic in their respective shadow calculations.

3.2.8.3  **Future action items:**
MISO and PJM will finalize the Market Flow Calculation methodology document as covered in section 3.2.1.2.

3.2.9  **Market Flow Limit Determination**

3.2.9.1  **Baseline Review Recommendation:**
“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.”

3.2.9.2  **MISO and PJM joint response and changes:**
This topic has been raised at the Congestion Management Process Working Group (CMPWG). The CMPWG determined that, as a result of the varied nature of forced outages and unique operating conditions that result from those outages, recalculations of Firm Flow Entitlements should be completed on a case-by-case basis. All requests for recalculation of entitlements due to forced outages will be evaluated by the CMPWG before approval. Approved cases will be documented for future reference as precedence.

3.2.9.3  **Future action items:**
MISO and PJM do not believe future action is needed for this topic.

3.2.10  **M2M Coordination**

3.2.10.1  **Baseline Review Recommendation:**
“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.”

3.2.10.2 MISO and PJM joint response and changes:
The JOA Baseline Review recommendation includes two parts. The first one covers the scenario in which flowgates experience significant impacts from the counterparty’s market activity but fail the IDC coordination test. This most commonly occurs on low voltage transmission facilities at the border between the RTOs. MISO and PJM are in the process of developing procedures for M2M flowgate qualification outside of the standard coordination test, including the specific criteria such as duration and frequency of impacts over M2M flowgate threshold. At the same time, MISO and PJM have developed temporary procedures for M2M flowgates that do not pass standard coordination tests and have added flowgates in real time M2M coordination using this temporary procedure.

The second part of the recommendation is related to dynamic flowgate creation and is covered by section 3.2.7 in this report.

3.2.10.3 Future action items:
MISO and PJM should continue to work together to finalize the M2M Flowgate Process document and the procedure for dynamic flowgate creation.

3.2.11 Day-Ahead Energy Market Coordination

3.2.11.1 Baseline Review Recommendation:
“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.”

3.2.11.2 MISO and PJM joint response and changes:
Over the past two years, MISO and PJM have worked collaboratively to align their Day Ahead processes with respect to setting flowgate limits for M2M constraints in the Day Ahead
market. MISO and PJM now use similar administrative processes and technical approaches to establish limits in their respective DA Markets.

The second portion of the Baseline Review recommendation was to revisit the JOA language regarding FFE sharing provisions. The two parties have been jointly working through the MISO/PJM JCM Initiative to develop a process that will allow this provision to be utilized through a coordinated study. The target completion date for this effort is August 2015.

**3.2.11.3 Future action items:**
MISO and PJM should continue to work towards their August 2015 completion date for the effort.

### 3.2.12 Purpose of Market to Market

**3.2.12.1 Baseline Review Recommendation:**
“Although in many cases internal documentation exists, common documentation of procedures regarding the addition and review of temporary M2M Flowgates should be developed.”

**3.2.12.2 MISO and PJM joint response and changes:**
MISO and PJM believe this recommendation is related to the M2M Flowgate Process document and the dynamic flowgate creation which are covered in sections 3.2.10 and 3.2.7, respectively.

**3.2.12.3 Future action items:**
MISO and PJM should continue to work together to finalize the M2M Flowgate Process document and the procedure for dynamic flowgate creation.

### 3.2.13 Minimizing Less-Than-Optimal Dispatch

**3.2.13.1 Baseline Review Recommendation:**
“Although the Parties are currently in the process of updating required procedures and documentation, the Parties should agree upon a firm date of completion.”

**3.2.13.2 MISO and PJM joint response and changes:**
MISO and PJM have established a joint review process in which each M2M event is jointly reviewed if a question arises on the counterparty’s dispatch behavior. Items discussed include: lowest binding percentage, shadow price calculation, and market flow calculation.

**3.2.13.3 Future action items:**
MISO and PJM should continue with the weekly coordination discussions.
3.2.14 Use of M2M whenever binding a M2M Flowgate

3.2.14.1 Baseline Review Recommendation:
“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.”

3.2.14.2 MISO and PJM joint response and changes:
PJM has implemented an automated initiation and notification process of M2M events, as listed in the Change Management log above, Item 4. While MISO still follows a manual process to initiate M2M, MISO has included real-time operator alerts in the form of a dashboard that ensures proper coordination of M2M events. Due to the time needed for operators to confirm and verify the real time operation conditions to avoid unnecessary M2M events, MISO and PJM believe the current process is sufficient and would like to defer the recommendation for future discussion.

3.2.14.3 Future action items:
Progress to date has met the JOA requirement for initiating M2M. No future action is needed.

3.2.15 Most Limiting Flowgate

3.2.15.1 Baseline Review Recommendation:
“The Parties should formally define and document joint communication and coordination procedures.”

3.2.15.2 MISO and PJM joint response and changes:
MISO and PJM believe this recommendation is related to the M2M Flowgate Process document and the dynamic flowgate creation which are covered in sections 3.2.10 and 3.2.7, respectively.

3.2.15.3 Future action items:
MISO and PJM should continue to work together to finalize the M2M Flowgate Process document and the procedure for dynamic flowgate creation.

3.2.16 Substitute Flowgate

3.2.16.1 Baseline Review Recommendation:
“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.”
3.2.16.2  **MISO and PJM joint response and changes:**
MISO and PJM believe this recommendation will be addressed by the M2M Flowgate Process document and the Enhanced Data Exchange which are covered in sections 3.2.10 and 3.2.3, respectively.

3.2.16.3  **Future action items:**
MISO and PJM will continue to work together to finalize the M2M Flowgate Process document.

3.2.17  **Specific Conditions Applicable to Most Limiting Flowgate**

3.2.17.1  **Baseline Review Recommendation:**
“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.”

3.2.17.2  **MISO and PJM joint response and changes:**
MISO and PJM believe the Enhanced Data Exchange which is covered in section 3.2.3 addresses this recommendation.

3.2.17.3  **Future action items:**
MISO and PJM should continue with the review of M2M activities during weekly coordination discussions.

3.2.18  **After the fact review**

3.2.18.1  **Baseline Review Recommendation:**
“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.”

3.2.18.2  **MISO and PJM joint response and changes:**
MISO and PJM have developed a procedure to review M2M activities on daily and weekly basis. With the enhanced data exchange, improved data will be used in the review.

3.2.18.3  **Future action items:**
MISO and PJM should continue with the weekly coordination discussions.
# 4. FERC Filings

## 4.1. Summary

<table>
<thead>
<tr>
<th>FERC Order</th>
<th>Description</th>
<th>Status</th>
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<tbody>
<tr>
<td>ER11-3979-000</td>
<td>Both RTO’s revised the methodology for determining the Firm Flow Entitlements in the market-to-market settlement calculation to use point-to-point transmission service schedules instead of reservations. Additionally, this filing includes all changes associated with the Settlement to the JOA, CMP and ICP process.</td>
<td>Effective December 1, 2011</td>
</tr>
<tr>
<td>ER13-1052-000</td>
<td>Both RTOs to calculate Market Flows reflecting the impacts of a jointly-owned unit’s transaction tags on a unit-specific basis.</td>
<td>Effective March 8, 2013</td>
</tr>
<tr>
<td>ER13-1054-000</td>
<td>Both RTOs to calculate Market Flows by using the Slice of System methodology to scale loads for tagged import transactions in a manner similar to the current use of the methodology to scale generation for tagged export transactions. Include tagged imports in Market Flow Calculations</td>
<td>Effective June 18, 2013</td>
</tr>
</tbody>
</table>
4.2. Discussion

Each of the orders listed above were initiated to ensure consistency in the calculation between both RTO’s.

ER11-3979-000

FERC Order ER11-3979-000 approved MISO and PJM’s joint request to revise the methodology for determining the Firm Flow Entitlements in the market-to-market settlement calculation to use point-to-point transmission service schedules instead of reservations. Additionally, all the changes for the JOA, CMP and ICP associated with the Settlement were included in this order. The Settlement changes concentrated on updates to existing sections, creation of new procedures and processes, access of data to allow shadow market flow calculations to be performed, aligning de-rating of historic Firm Flow Values to be consistent with the higher-of logic, and a new limitation of resettlements to the past year.

All of the corresponding software changes, related to the Firm Flow Entitlement calculation changes associated with this order, were implemented on December 1, 2011. The data exchange to allow shadow market flow calculation was implemented on January 15, 2013. MISO and PJM processes are aligned upon implementation of these changes.

ER13-1052-000

FERC Order ER13-1052-000 approved MISO and PJM’s joint request to calculate Market Flows reflecting the impacts of a jointly-owned unit’s transaction tags on a unit-specific basis. Specifically, when a jointly owned unit participates in more than one market and the generator output from that unit is represented as interchange with a corresponding tag(s), its modeling in the Market Flow calculation will match the Firm Flow calculation and the generator output will be treated as a unit specific export in the Market Flow calculation of the owning RTO and will be treated as a load specific import tagged transaction in the neighboring RTO. For exports out of one RTO, the jointly owned unit output will be scaled down by an amount which is the lesser of the corresponding export tagged transaction(s) and the unit ownership of an other participating in the other market area. For imports into the other RTO, related to the jointly owned unit, the Control Zone load or bus load(s) will be scaled down by an amount which is the lesser of the corresponding import tagged transaction(s) and the unit ownership of an owner participating in the market area.

All of the corresponding software changes, associated with this order, were implemented on March 8, 2013.

ER13-1054-000

FERC Order ER13-1054-000 approved MISO and PJM’s joint request to include tagged imports in Market Flow calculations. The Market Flow calculations will use the Slice of System methodology to scale loads for tagged import transactions in the same manner to scale generation for tagged export transactions. 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 will be accounted for in the Market Flow by including a new term that proportionally offsets the MW output of all unit(s) in the market by the
amount of the total market export excluding unit specific tagged transactions. When the actual load of the market area exceeds the total generation of that area, the market area is importing energy. The imports of tagged transactions will be accounted for in the Market Flow by including a new term that proportionally offsets the MW load of all buses in the market by the amount of the total market import excluding load specific tagged transactions.

All of the corresponding software changes, associated with this order, were implemented on June 18, 2013. MISO and PJM processes are aligned upon implementation of these changes.
5. Summary

The primary determination of the JOA Baseline Review was that the parties to the Joint Operating Agreement were substantially in conformance with the JOA language. However, there were opportunities to take proactive steps in the areas of communication and documentation. To that end, MISO and PJM have worked over the past two years to facilitate better communication via the implementation of standing, weekly status calls; implementation of systematic data exchange; development of formal processes and procedures. Further, the two parties continue to work towards full implementation of the JOA Baseline Review recommendations with the enhanced data exchange project, which is currently under way.

The Baseline Review identified two primary areas in which the parties operated differently – Day Ahead flowgate limit determination and modeling procedures for certain types of equipment. The parties have worked diligently to align the Day Ahead processes such that they are now more closely aligned and in accordance with the JOA language. The parties continue to maintain modeling philosophy differences for non-standard equipment; however, those differences are well documented and understood by both RTO’s. MISO and PJM are pursuing a Joint and Common Market initiative that would address the modeling of the Michigan-Ontario PARs in both the market flow calculation and the historic allocation process.

The Baseline Review also identified an opportunity for better communication with respect to Outage Coordination. The parties have initiated new twice-monthly meetings to review longer-term outages in addition to weekly meetings to discuss more immediate outage issues. The parties are also currently working through the Joint and Common Market Initiative to improve communication specifically around timely identification of outage drive transmission constraints.

Going forward MISO and PJM should continue to work towards development of M2M process related documentations and implementation of the enhanced data exchange project. Additionally, the parties should continue to work towards a solution for implementing FFE sharing provisions in the Day Ahead market as well as enhancements to outage coordination data.