UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Coordination Across the Midcontinent Independent System Operator, Inc./PJM Interconnection, L.L.C. Seam	)	Docket No. AD14-3-000

REPLY TO RESPONSES TO REQUEST FOR INFORMATION OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to the notices issued on February 24 and May 19, 2015, and the Commission's Open Meeting convened January 22, 2015, Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM ("Market Monitor"), submits this reply to the responses to the Commission's order issued February 24, 2015, requesting further information on interface pricing and other seams issues affecting PJM Interconnection, L.L.C. ("PJM") and the Midcontinent Independent System Operator, Inc. ("MISO").[1]

MISO and PJM request a technical conference on seams issues.[2] The Market Monitor believes that a more productive approach would be to convene a two-day conference of technical experts from MISO, PJM, ISO-NE, and NYISO and their market monitors and FERC staff, designed to define and agree on a comprehensive solution. The Market Monitor suggests that the goal be to identify the best end state for a coordinated dispatch and

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1 *Coordination Across the Midcontinent Independent System Operator, Inc./PJM Interconnection, L.L.C. Seam*, 150 FERC ¶ 16,132.

2 *See* Responses of the Midcontinent Independent System Operator, Inc. and PJM Interconnection, L.L.C., Docket No. AD14-3 (May 11, 2015).

pricing model even if it cannot be achieved immediately. Agreement on the desired end state will facilitate the evaluation of shorter term transitional approaches.

The Market Monitor also responds to the MISO Independent Market Monitor responses ("MISO IMM").[3] The Market Monitor disagrees with the MISO IMM's definition of appropriate interface pricing and coordination and with the MISO IMM's proposals to modify interface pricing and coordination.

I. REPLY TO PJM/MISO RESPONSE ON INTERFACE PRICING

A. Plan to Resolve Objections

A new forum more conducive to creating a comprehensive solution is needed to move forward on seams issues. MISO and PJM note (at 6) that "further evaluations and discussions will continue through the Interface Pricing Small Group (IPSG) and Joint and Common Market (JCM) processes." The IPSG has not met since December 16, 2014. The JCM meetings are valuable for sharing information and status updates on the various issues, but these meetings are not appropriate for "further evaluations and discussions" that could result in a comprehensive solution.

The Market Monitor recommends that the Commission require a two day meeting of the technical experts and decision makers from MISO, PJM, ISO-NE, and NYISO and their market monitors to discuss the best solutions for a coordinated dispatch and pricing model and a transition plan to implement them, with the explicit goal of creating a consensus plan to meet that objective. FERC technical staff should also attend. It is essential that all the RTOs/ISOs be represented at this meeting and included in any agreement on the issues because the seams issues under discussion are common to all the interfaces between organized markets in the eastern interconnection and the solution needs to be

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[3] *See* Response of the Midcontinent ISO's Independent Market Monitor to the Commission's Request for Additional Information, Docket No. AD14-3 (May 11, 2015).

comprehensive and broadly supported. It is also essential that the best end state for a coordinated dispatch and pricing model be identified even if it cannot be achieved immediately. Agreement on the desired end state will facilitate the evaluation of shorter term transitional approaches. If a solution is not reached at the first two day meeting, additional meetings should be scheduled with a FERC staff facilitator if required. These issues are not intractable. Identifying the best solution should not be difficult. The most difficult problem is to define a practical path to the best solution once that solution has been identified.

B. Proposed Timeline

MISO describes (at 6) its tentative plan "to complete stakeholder informative sessions and submit Tariff revisions to FERC by the third quarter of 2015." MISO and PJM jointly request a technical conference with Commission staff in the late summer or early fall of 2015.

The Market Monitor recommends postponing any technical conference until the proposed meeting of the technical experts occurs. That meeting should occur as soon as it possible to schedule it. A technical conference would be more productive after RTOs and market monitors have an opportunity to develop a consensus and clarify any issues where there is continued disagreement. The Market Monitor is concerned that a unilateral tariff filing from MISO to address these issues will not be productive. A unilateral MISO approach could result in inefficient deployment of resources when software must be rewritten and/or market rules must be changed.

C. The Process Used to Study Issue

The current approach employed by MISO and PJM to resolving the interface pricing issues is too narrow in scope. In order to ensure that short term changes contribute to a long term solution, the long term solution must be identified. A better process for doing that could be developed in the meetings of experts and the subsequent technical conference. Long term solutions have not yet been actively discussed in the JCM process. The Market

Monitor recommends that the long term solution reflect the locational marginal pricing that would result from a single LMP dispatch over the entire multi-RTO/ISO area. One such alternative method is to implement a coordinated dispatch and pricing model similar to the one developed and simulated by Zhou, Litvinov, and Zheng at ISO-New England.[4] This paper is also on the agenda for the FERC technical conference on software designs/improvements scheduled for June 22–24, 2015.[5] The proposed approach would achieve market outcomes similar to that which would have resulted from a full joint dispatch system but with minimal exchange of information between RTOs. In coordination efforts with the NYISO, ISO-New England has explored and proposed similar options.

D. Any Efforts to Develop Joint Network Model to Study Issue

The MISO/PJM response states (at 9) that there have been no efforts undertaken to develop a joint network model and that developing a joint model to study the issue would require significant resources. The Market Monitor recommends that resources be assigned to create a complete joint network model. The development of a joint model would be valuable in evaluating and implementing long-term solutions as well. The resources used to develop this model would not be wasted and the model would be a useful tool for ongoing analysis.

II. REPLY TO MISO IMM RESPONSE ON INTERFACE PRICING

A. Over payment or Over charge for Coordinated Flowgate Constraint

The MISO IMM states (at 5) that since "MISO and PJM independently calculate interface prices that include the cost of congestion on the same coordinated flowgate, the

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[4] See for example: Zhao et. al., "A marginal equivalent decomposition method and its application to multi-area optimal power flow problems," *IEEE Transactions on Power Systems*, vol. 29, no. 1, pp. 53-61, Jan. 2014.

[5] *See* Notice of Technical Conference: Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software, AD10-12-006 (Feb. 26, 2015).

total settlement will over-pay or over-charge the market participant for the congestion effects of the transaction." The MISO IMM added (at 7) that there has been "a wide agreement that interface pricing should be coordinated to rectify this over-payment of congestion costs on the coordinated flowgates."

The Market Monitor does not agree that there has been wide agreement.

MISO IMM's contention that the congestion component of LMP of the monitoring RTO's interface price accounts for all congestion associated with the coordinated flowgate in the combined PJM and MISO markets and any additional congestion included in the interface prices of the non-monitoring RTO is an overpayment is based entirely on the MISO IMM's assertion that the non-monitoring RTO's interface is equivalent to the non-monitoring RTO's load-weighted reference bus.

The MISO IMM did not demonstrate analytically how or why the correct definition of the non-monitoring RTO's interface, which is a collection of the non-monitoring RTO's generation nodes, is equivalent to the non-monitoring RTO's load-weighted reference bus.[6]

The MISO IMM fails to note that the asserted overpayment results from the MISO IMM's proposed definition of interface prices as the load weighted reference bus of each RTO. The issue is resolved by the PJM alternative of using buses close to the border to calculate the interface price.

MISO agrees. MISO performed an analysis of the common interface proposal made by PJM, and found "that this approach addresses the basic congestion price overlap causing the MISO-PJM Congestion Overlap Issue, but has several issues that would require

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[6] MISO IMM presentation at PJM/MISO Joint and Common Market Initiative Meeting, Audubon, PA, February 19, 2015, "Item 04 – Efficient Interface Pricing for PJM and MISO" at http://www.pjm.com/committees-and-groups/stakeholder-meetings/stakeholder-groups/pjm-miso-joint-common.aspx

Potomac Economics, *Analytical Appendix to 2012 State of the Market Report for the MISO Electricity Markets*, "Overpayment and Overcharging of Congestion in Interface Pricing," pp. 136-141

significant effort to resolve (if the issues can be addressed at all)."[7] The issues MISO cites with the PJM common interface proposal are: it is inconsistent with current M2M coordination with market flow requiring M2M coordination use a new flow measure called constraint commercial flow; it has an unintended impact on non-M2M constraints; and it creates price incentive volatility leading to inefficient system operation.

Contrary to the MISO assertion, these issues can be and are being addressed straightforwardly.

MISO states that the PJM approach is inconsistent with current M2M coordination and requires use of a new flow measure called constraint commercial flow. As discussed in the joint MISO/PJM response (at 23), PJM made a M2M Market Flow Proposal to align commercial flows with the M2M settlement process.[8] Implementing this proposal would address MISO's first concern.

MISO (at 19) argued that the shift factors under the PJM alternative would be significantly different than the shift factors under the current MISO definition of the interface and that this difference would create an unintended impact on non-M2M constraints. It is expected that the shift factors from PJM's proposed definition of the interface would differ from the shift factors under MISO's proposed definition of the interface. This is just another way of saying that the definitions are different. This result does not create any issues. If the PJM proposed definition is adopted, it means that the associated shift factors are the correct shift factors and the difference is intended.

MISO (at 20) argued that changing the interface definition would increase the volatility of interface prices between PJM and MISO. To support this claim, MISO

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7 MISO presentation at PJM/MISO Joint and Common Market Initiative Meeting, Carmel IN, May 27, 2015, "Item 04 MISO Interface Pricing Approach Whitepaper" at http://www.pjm.com/committees-and-groups/stakeholder-meetings/stakeholder-groups/pjm-miso-joint-common.aspx

8 See "PJM M2M Market Flow Proposal" October 2014.

compared the difference in the congestion components of the PJM and MISO interface prices associated with one constraint under the two approaches. The comparison is not adequate to support the assertion. The relevant comparison is between the complete interface prices under the two approaches rather than just the congestion component and includes a representative time period and a representative set of constraints. Even if price volatility were to increase under the PJM proposal and that volatility is an accurate reflection of supply and demand, that increase would be appropriate.

B. Process participants have used to study this issue

MISO IMM stated (at 7) that "the study of this issue has involved the development of alternative interface definitions, evaluating whether they are theoretically sound, and studying the effects of the definitions." The Market Monitor believes that market coordination is a complex process. Modeling and rigorous analysis are needed to define and address this issue. The Market Monitor has developed a bus model which was used to study the impact of interface definitions, scheduled transactions and market-to-market process on prices, incentives and the convergence of shadow prices on coordinated flow gates. The model results and approach were shared with PJM on multiple occasions beginning in October 2014, and were shared with the MISO, the MISO IMM and PJM in March 2015, and more recently with the full JCM.[9]

C. Efforts to develop a joint network model to study the issue

MISO IMM stated (at 8) that they "have taken the lead in using actual data to examine the benefits and unintended consequences of the two solutions advanced by MISO and PJM." The MISO IMM has used a single example based on one historical hour to

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[9] PJM IMM presentation at PJM/MISO Joint and Common Market Initiative Meeting, Carmel IN, May 27, 2015, "Item 04 Modeling Interface between PJM and MISO" at http://www.pjm.com/committees-and-groups/stakeholder-meetings/stakeholder-groups/pjm-miso-joint-common.aspx

support their argument.[10] The MISO IMM has not shown comprehensively how the interface prices are affected under alternative interface definitions.

Even a comprehensive analysis of historical price data would not be sufficient for an analysis of the interface pricing issues. Real time prices in a given five-minute interval reflect one distinct realization of various constantly changing parameters such as load, generators' ramp constraints, transmission outages, generator outages and operator actions. It is important to control for all the influencing factors in order to assess the impact of interface definitions on prices and incentives. It is for this reason that the Market Monitor developed the scaled two-RTO dispatch model, which allows for isolating the impact of interface definitions on prices and incentives.

D. The MISO Preferred Remedy

The MISO IMM stated (at 8) that the "source of the power for an export will be every marginal unit in the exporting RTO's area, which are generally distributed throughout its footprint" and therefore the interface pricing calculated using this definition is efficient. This is the basis of MISO's current approach which includes PJM generation across the entire PJM footprint as their interface definition. However, if there are binding transmission constraints in the PJM system, which is most of the time, it is incorrect to assume that the generators located on the far side of PJM constraints have same impact on interface prices as generators located near the PJM-MISO border.

The MISO IMM stated (at 9) that their "proposal also is straightforward, ensures efficient pricing and, since the time of its development and presentation to stakeholders, has encountered little credible criticism."

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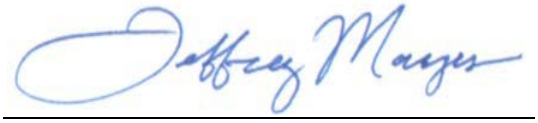
[10] MISO IMM presentation at PJM/MISO Joint and Common Market Initiative Meeting, Audubon, PA, February 19, 2015, "Item 04 – Efficient Interface Pricing for PJM and MISO" at http://www.pjm.com/committees-and-groups/stakeholder-meetings/stakeholder-groups/pjm-miso-joint-common.aspx

The Market Monitor does not agree with this characterization of the discussions. The MISO IMM proposal has encountered consistent criticism from parties including the Market Monitor and PJM.[11]

III. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to this response as the Commission considers the issues raised in this proceeding.

Respectfully submitted,



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[11] PJM presentation at PJM/MISO Joint and Common Market Initiative Meeting, Carmel IN, May 27, 2015, "Item 04 Interface Pricing Issue – PJM Position Paper Draft – February 17, 2015" at http://www.pjm.com/committees-and-groups/stakeholder-meetings/stakeholder-groups/pjm-miso-joint-common.aspx

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 15th day of June, 2015.

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