

**SHORT-TERM AND LONG-TERM REFORMS  
TO PJM-MISO TRANSMISSION SEAMS RULES:**

**Fixing M2M Settlements and Providing a Path Forward For  
Building Valuable Transmission Upgrades**

**Proposed by Northern Indiana Public Service Company  
As Part of the Joint and Common Market Effort Between  
PJM and MISO**

**July 30, 2012**

## **SHORT-TERM AND LONG-TERM REFORMS TO PJM-MISO TRANSMISSION SEAMS RULES:**

### **Fixing M2M Settlements and Providing a Path Forward For Building Valuable Transmission Upgrades**

This briefing paper presents a method of evaluating and comparing short-term and long-term transmission solutions for addressing persistent problems associated with the transmission seam between the Midwest Independent Transmission System Operator, Inc. (“MISO”) and PJM Interconnection, LLC (“PJM”). Northern Indiana Public Service Company (“NIPSCO”) sits directly between PJM’s most western footprint (PJM West *i.e.*, Exelon’s Commonwealth Edison territory) and the rest of PJM (PJM East). Thus, NIPSCO and its customers, as well as other MISO participants, are significantly impacted by flows between PJM West and PJM East and how those flows are accounted for in the dispatch models of PJM and MISO. While this issue has been addressed in the past through operating procedures, market-to-market (“M2M”) redispatch to reallocate firm transmission capacity, and limited transmission improvements, these actions have not proved sufficient to resolve the significant reliability and market impacts of the use of the transmission system beyond any capabilities for which it was originally designed. Thus, NIPSCO welcomes this opportunity to re-engage all stakeholders in the two regions in a comprehensive effort to eliminate long-standing seams problems.

As discussed further herein, deficiencies exist in the current Joint Operating Agreement (“JOA”)<sup>1</sup> regime that, coupled with an inter-regional transmission planning process that has been recognized as insufficient to address the specifics of the NIPSCO seam, lead to significant inefficiencies for both regions and a situation where cost-effective transmission upgrades have no realistic path to ever being planned and put into service. NIPSCO’s proposal puts forth specific targeted reforms to close the gap and realize the benefits between the current “M2M” redispatch and settlements process (short-term) and the interregional transmission planning process (long-term) that provides a more efficient path forward to solve the persistent transmission issues between regions. NIPSCO’s targeted proposal would provide significant benefits to market participants in both regions and should be a priority for the joint and common market process moving forward. As the JOA itself states:

The Parties agree that the objectives of this Agreement can be fulfilled efficiently and economically only if the Parties, from time to time, review and as appropriate revise the requirements stated herein in response to such changes, including deleting, adding, or revising requirements and protocols. Each party will negotiate in good faith in response to such revisions the other Party may propose from time to time.<sup>2</sup>

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<sup>1</sup> Joint Operating Agreement Between The Midwest Independent Transmission System Operator, Inc. And PJM Interconnection, L.L.C.

<sup>2</sup> JOA, § 3.1.

Specifically, NIPSCO recommends the following action items in this joint and common market forum:

- MISO and PJM should formulate an agreed upon process for gathering and reporting to stakeholders M2M settlements, market flows, and firm flow entitlements per flow gate.<sup>3</sup>
- The inter-regional transmission planning, as well as each RTO's within region planning process, should take into account the M2M settlement information in the cost benefit analysis for Market Efficiency transmission upgrades.
- The interregional planning process criteria should be amended to include a methodology whereby a proposed project can be deemed as satisfying the inter-regional criteria for approval if the project can be shown to be more cost effective than the ongoing use of M2M settlements alone over an agreed-upon time period.
- The RTO's should outline the joint stakeholder process that will result in the inter-regional compliance filing, inclusive of the above issue, to be submitted by the FERC deadline of March 2013.
- This joint and common market forum should establish a Transmission Issues Committee or Task Force, and NIPSCO would volunteer to help lead such effort.

These issues were previewed by NIPSCO's presentation (through Tim Dehring) at the July 16, 2012 Joint and Common Market meeting. The intent in this paper is to elaborate on some of the points made in that presentation and provide specific action items for MISO, PJM, and stakeholders to consider.

## **I. THE ISSUE**

NIPSCO's service territory lies between the territories served by ComEd and AEP's Indiana & Michigan Power Company ("AEP"). The interconnections of NIPSCO's transmission network with the transmission networks of ComEd and AEP are at the "seams" of the Midwest ISO and PJM. NIPSCO's transmission system consists of lower voltage 138 kV and 345 kV lines to serve its customers, including large industrial customers, within its territory. The largest concentration of NIPSCO load is contained within this zone between ComEd and AEP (NW Indiana). Due to the nature of this load (including large industrial load) NIPSCO built a robust transmission system to not only fully deliver its generation to its load, but also to be able to import large quantities of power into its footprint to support this load when its generation was not available. ComEd and AEP are also directly connected, over NIPSCO's service area, by 345 kV lines and one substantial 765 kV line. NIPSCO's robust transmission network between ComEd and PJM along with the direct 345kV and 765kV connections between ComEd and AEP

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<sup>3</sup> This item puts a finer point on the already existing obligation for MISO and PJM to "exchange detailed Market-to-Market related data to foster enhanced transparency and data access for verification." See "Potential PJM/MISO Seams Initiatives" presentation, July 16, 2012, at slide 13.

produces a low impedance path between PJM West and PJM East allowing for large transfers between these two zones, limited at this time by certain elements on the NIPSCO system.

Simply stated the existing transmission system while being robust to serve NIPSCO's customers needs was not designed to support large interregional flows caused by the dispatch regimes of two interconnected RTOs. The result poses both reliability and economic impacts. Because NIPSCO is probably the most impacted member of both RTOs on the seam, we have a unique view of how the current JOA rules are either inadequate or broken. In a sense NIPSCO and its customers are punished in both the reliability and economic realms for being located on this seam.

Reliability impacts for NIPSCO at this time include challenging equipment maintenance schedules in some areas of the NIPSCO footprint. This circumstance arises because large through flows on the NIPSCO system do not allow for an N-2 scenario that outages introduce. In some scenarios M2M redispatch of generation may be needed to provide the needed relief on some flowgates. In other cases the RTOs have to implement farther reaching steps as laid out in numerous Operational Guides, including opening certain lines pre-contingent to mitigate the over use of the NIPSCO system by PJM. Each time an element is opened pre-contingent for mitigation purposes, another layer of potential vulnerability is added to the starting point of N-2 (N-1 plus outage). Long term planning evaluates only up to N-2, anything above that is only planned in the operating timeframe. These farther reaching actions degrade the reliability of the NIPSCO system.

As to adverse economic impacts, there is a need to properly study the full impact of congestion costs both for MISO and PJM. Because of the bifurcated nature of the current planning process, the total congestion costs are not evaluated against the potential revenue requirement associated with a shared transmission upgrade. As MISO stated when it filed the cross border allocation methodology for economic projects in July 2009, "resolution of the NIPSCO operational performance issues required a unique solution." NIPSCO believes that "unique solutions" are not necessary, but are quite normal, if benefits are properly identified and evaluated when looking at long term solutions.

## **II. BACKGROUND**

The NIPSCO seam has resulted in a series of adverse reliability and market events that have resulted in a long history of FERC complaints and other filings. To-date, the solutions which have involved operating procedures, modification of dispatch protocols, and limited transmission upgrades have proven ineffective in creating sufficient transfer capacity to mitigate the significant congestion. A summary of this history is included at Appendix A.

Despite this lengthy history, the problems persist as noted in the 2011 MISO State of the Market Report, "[t]he value of real-time congestion totaled \$1.24 billion, a 20 percent increase from 2010. The largest regional rise in congestion occurred in the Central region (up 44 percent), where market-to-market ("M2M") constraints bound more frequently than in prior years. Congestion persisted in a west-to-east pattern, partly as a result of continued growth in

wind output in the West.”<sup>4</sup> Net payments by PJM to MISO more than doubled to \$6.5 million per month during 2011, in part because of the increase in congestion on MISO’s M2M constraints.<sup>5</sup> Moreover, the “net” payments understate the perceived benefits to reduced congestion as each RTO is incurring congestion costs. Not surprisingly, the need to form appropriate metrics for the M2M process remains a high priority item for the MISO stakeholders.<sup>6</sup>

### III. THE SOLUTION

#### A. The Opportunity

As discussed earlier, given the highly interconnected nature of the PJM – MISO seam, the regions were required to formulate the JOA. The JOA deals with a number of issues, but pertinent to this discussion, the JOA establishes a Market to Market redispatch and settlements system (commonly referred to as “M2M”). In general, NIPSCO supports this process and sees it as an effective means of reallocating scarce firm transmission capacity on a flowgate in a state of overload, if the most limiting contingency were to occur. NIPSCO likens this process to a spot market for hourly firm transmission capacity where one RTO sells firm capacity that it is currently using to the other RTO because the other RTO values this incremental capacity more. As explained in more detail below, the M2M event volumes may become (or may have already become) so substantial, that it may be more cost effective for this short-term solution to give way to the true long-term solution, which is a transmission upgrade(s) that would accommodate the marginal transactions causing M2M redispatch with increasing the total transmission capacity rather than reallocating existing capacity. This will ultimately alleviate the need for a M2M settlements regime for the targeted flowgates.

In order to make this determination, the RTO’s need to share information on M2M settlement payments per flowgate, add it to their benefits calculation, and compare this to the cost of a transmission upgrade that would address the same overloaded flowgate issue on a permanent basis. In some cases mitigating the M2M payments for one RTO may justify on its own the building of a Cross Border project. The mitigation of M2M payments would be compared to the revenue requirement for the long term project in this case. The currently-approved inter-regional transmission planning process and cost allocation methodologies must be updated to recognize the profound benefits of a facility located in one RTO that presents significant congestion relief for the other RTO.

The following example using actual data is noted below to illustrate how this change would apply. In 2011, flowgates in the NIPSCO system contained in the zone between Chicago and South Bend (excluding flowgates in southern NIPSCO footprint), PJM paid MISO roughly \$34 million for MISO to redispatch its generation to reallocate a portion of its firm transmission capacity. Comparing these levels of M2M payments to an equal level of revenue requirement

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<sup>4</sup> See, 2011 State of the Market Report at ii.

<sup>5</sup> *Id.* at 46.

<sup>6</sup> See, MISO Seam Management Working Group Task Tracking List dated June 6, 2012.

for a transmission project that would relieve these constraints, roughly a \$200 million project could be built just on the level of benefits provided only to PJM. NIPSCO has evaluated some projects on a preliminary basis that would address the flowgates causing the \$34 million in M2M redispatch and has submitted these projects to MISO and PJM to be evaluated. The preliminary cost estimates for most of these projects range from \$100 million to \$300 million, where each project offers a differing level of incremental transfer capability across the NIPSCO system.

NIPSCO is hopeful that this reinvigorated attention to critical seams issues will focus on the immediate benefits that can be accrued for the joint and common market process. Further, stakeholders should avoid a dynamic where stakeholders point to the Order No. 1000 interregional compliance filing process as a “home” for this issue only to have the Order No. 1000 interregional compliance filing process point back to this process. This type of “administrative keep-away” will only lead to more formal complaints and a proliferation of proceedings. Indeed, the issues associated with the NIPSCO seam were to be addressed in the cross-border protocol for economic projects. However, MISO, PJM and the stakeholders recognized the specific circumstances of this problem could not be addressed by that generic policy. Accordingly, NIPSCO is strongly in favor of an approach where this joint and common market process addresses the specific issues raised herein, and then the results of the effort within this process are fed into the Order No. 1000 inter-regional compliance filing process (once that process is formalized). Further, success on this type of long-standing issue will demonstrate to FERC that the joint and common market and Order No. 1000 compliance processes can work without the need for intervention on the part of the Commission.

## **B. The M2M Settlement Process**

Under the current approach, firm transmission is allocated between RTO’s based on a historical usage calculation pursuant to the JOA (Firm Flow Entitlement or “FFE”). The M2M process will be initiated whenever “an M2M flowgate is constrained and therefore binding in its dispatch.”<sup>7</sup> The JOA also generally calls for “controlling to the most limiting flowgate” as providing the most favorable operational and financial outcome.<sup>8</sup> When the M2M constraint is in the NIPSCO system, it oftentimes leads to NIPSCO generation being called upon to relieve the constrained flowgate, and reallocate the firm transmission that NIPSCO was utilizing to PJM for their use. M2M settlements then flow from PJM to MISO (but not to NIPSCO specifically) as compensation for having freed up this firm transmission capacity and relieving the constraint. The M2M settlement process charges for the incremental amount of transmission capacity used by one of the RTO’s over that RTO’s allotment of FFE. Financial exposure is limited only to that amount of usage above the FFE allocated to the RTO only during M2M re-dispatch situations. All other times, when M2M is not initiated, there is no charge for the use of transmission capacity on any flowgate deemed to be a M2M flowgate.

At the point in time when M2M is implemented, the M2M flowgate in question has been over allocated (above 100% of the facility’s emergency rating), relating into an overload on this flowgate if the most limiting contingency were to occur. When M2M re-dispatch is employed,

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<sup>7</sup> JOA, Attachment 3, § 8.1.3.

<sup>8</sup> *Id.* at § 8.1.4.

one party has to relinquish a portion of their firm transmission capacity to reduce the loading back down to 100 percent of the facility in question. In areas where this occurs frequently, a long-term solution should be sought.

### **C. Cross-Border Transmission Planning Criteria.**

While current methodologies justifying cross-border transmission upgrades have prevented any projects from being approved, NIPSCO submits that it would be altogether appropriate to add an additional criterion that projects could be evaluated against. This criterion would calculate the transmission revenue requirement associated with the upgrade and evaluate that cost against the volume of market to market settlements associated with the flowgates that would be relieved by the transmission addition. In other words, the RTO's would be required to evaluate the ongoing effectiveness of the *short-term* tools (M2M settlements) against the cost-effectiveness of a *long-term* fix to the problem (a cross-border transmission addition that would unload the lines in question). In reality, a long term project that relieves a congested flowgate and eliminates the need for M2M redispatch offers an easily-measured and long-lasting benefit to the RTO that was paying for the M2M settlements. If the aforementioned business case was satisfied, the transmission project should be included in approved MTEP and RTEP plans. The costs of such an upgrade should be allocated per the benefits evaluated. FFE entitlements for settlements purposes for both existing capacity and new capacity should be aligned with those who have funded the assets.

### **D. Recommended Reforms That Should Be Addressed In the Joint And Common Market Forum**

In terms of specific recommendations to be taken up through the joint and common market forum, in order to address the foregoing long-standing problems, NIPSCO recommends the following action items:

- MISO and PJM should formulate an agreed upon process for gathering and reporting to stakeholders M2M settlements per flow gate. Historic information has already been requested, but the RTO's should put in place a settled process to make such information available and fed into the transmission planning processes within each RTO, and available to interested stakeholders. This item would appear to be a "low hanging fruit" item that can be easily accomplished.<sup>9</sup>
- Each region's transmission planning process and the PJM-MISO interregional process should take into account this information in the various planning processes. If the RTO's believe that this reform would ultimately be taken up in the Order No. 1000 inter-regional compliance filing process, NIPSCO submits that there is no reason why the parties cannot use the joint and common market

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<sup>9</sup> Indeed, under Section 4.1.4, significant flowgate data should already be shared by the RTO's. Thus, the JOA would likely not require any amendment. Rather, the RTO's need to work out a protocol *pursuant to the existing JOA* whereby such information would be made readily available on an ongoing basis. This information would allow for more efficient transmission planning.

forum to work out mutually acceptable language on this point that can then be fed into the Order No. 1000 compliance process. Again, this appears to be a “low hanging fruit” item.

- The interregional planning process criteria should be amended promptly to include M2M settlements in the benefits calculation for proposed Market Efficiency cross-border projects. Separately, a new avenue for project approval and cost allocation should be considered when a proposed project can be deemed as satisfying the inter-regional criteria for approval if the project can be shown to be more cost effective than the ongoing use of M2M settlements alone.<sup>10</sup> Further, the process for assigning FFE should be amended to align FFE assignments for settlement purposes with those who fund the assets both existing and new.
- The Order No. 1000 inter-regional planning process should be initiated immediately, given the existing deadline established by FERC. This joint and common market forum can address the issues discussed above, but the Order No. 1000 process should take up inter-regional issues comprehensively, including inter-regional cost allocation. As part of the deliverables from the RTO’s at the next reporting date, the RTO’s should outline the joint stakeholder process that will result in the inter-regional compliance filing to be submitted in March 2013.

## **VI. CONCLUSION**

MISO and PJM should place a high priority on the reforms outlined above, and allow for the joint and common market initiative to include efforts aimed at completing the enumerated objectives listed above.

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<sup>10</sup> If the RTO’s believe that this type of change would be taken up in the interregional Order No. 1000 compliance process, NIPSCO submits that there is no reason why the parties could not work out acceptable language in this process and then feed the results into the Order No. 1000 compliance process.



## **Appendix A**

### **Procedural History**

In 2002, the Commission ordered the former members of the Alliance RTO to elect membership in either PJM or the Midwest ISO.<sup>11</sup> ComEd and AEP, among others, elected to join PJM. To protect reliability and to improve economic efficiency at the seam created by these elections, the Commission ordered PJM and the Midwest ISO to develop what became the JOA.<sup>12</sup> The initial JOA was executed in December of 2003, and was approved by the Commission in March of 2004.<sup>13</sup>

As MISO had not implemented an energy market at the time, the JOA provided for both market-to-nonmarket congestion management (“Phase 1”) and market-to-market congestion management (“Phase 2”). During Phase 1, the JOA provided for the least-cost congestion management on Reciprocal Coordinated Flowgates (“RCF”) pursuant to a Congestion Management Process (“CMP”).<sup>14</sup> In Phase 2, the Interregional Coordination Process (“ICP”) allows transmission constraints that are significantly impacted by generation dispatch changes in both markets to be jointly managed in the security-constrained economic dispatch models of both RTOs.<sup>15</sup> MISO’s instituted its Phase 2 market on April 1, 2005.

After the integration of ComEd in PJM in May of 2004 and AEP on October 1, 2004, west-to-east flows began to cause disruptions on NIPSCO’s system.<sup>16</sup> On May 2, 2005, NIPSCO filed a complaint against MISO and PJM concerning the RTO operations under the JOA.<sup>17</sup>

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<sup>11</sup> *Alliance Cos., et al.*, 99 FERC ¶ 61,105 (2002).

<sup>12</sup> *Alliance Cos., et al.*, 100 FERC ¶ 61,137 (2002).

<sup>13</sup> *Midwest Independent Transmission System Operator, Inc., and PJM Interconnection LLC*, 106 FERC ¶ 61,251 (2004). On August 5, 2004, the Commission issued an order accepting the compliance filing and providing further clarification on the mechanics of the JOA. *Midwest Independent Transmission System Operator, Inc. and PJM Interconnection, L.L.C.*, 108 FERC ¶ 61,143 (2004). Midwest ISO and PJM filed a second revised JOA, with the complete CMP included as Attachment 2, in September 2004. The Commission accepted the complete JOA, with an effective date of March 1, 2004, by letter order dated November 18, 2004 in Docket Nos. ER04-375-008 and ER04-375-009.

<sup>14</sup> The CMP provides the instruction set for modeling. The modeling results are used to determine how to allocate the existing capacity of certain flowgates on both RTO’s systems, and what data would be used to populate the data base of the NERC Interchange Distribution Calculator (“IDC”). The IDC is used to allocate Transmission Loading Relief (“TLR”) curtailments or other responses necessary to reduce congestion in real time.

<sup>15</sup> The ICP mechanism resolves congestion by allowing RTO #1 to pay the RTO #2 to redispatch their generation to free up a certain amount of firm transmission to allow for RTO #1’s transactions to flow across certain congested flowgates without violating the flowgates’ limits.

<sup>16</sup> As noted in MISO’s Complaint in Docket No. EL10-45 filed on March 8, 2010 at p 8-9, the Midwest ISO observed extreme flows on the NIPSCO system shortly after midnight when AEP became part of PJM, and immediately advised PJM of the circumstances. When ComEd could not back down its generation under PJM’s dispatch, MISO declared an emergency allowing ComEd generators to reduce their output. Shortly thereafter the two RTOs adopted remedial measures to avoid further emergencies. The solution developed by the RTOs provided for MISO to request “Safe Operating Mode” when heavy ComEd flows threaten the reliability of the MISO transmission system, to avoid the prospect of an Interconnection Reliability Operating Limit (“IROL”) violation, and the possibility of a cascading event. When Safe Operating Mode was called, ComEd reduced its generation output to remove its market flows from the system until congestion is reduced. Similar to a curtailment or other

In response to the complaint, the Commission ordered MISO and PJM to file certain informational reports.<sup>18</sup> After a series of status reports, MISO and PJM filed their Final Report on January 30, 2006. The Transmission Report stated that the source of Northern Indiana's problems is the increase of west-to-east power flows from ComEd to PJM-East; although this problem existed prior to ComEd joining PJM, the flows have increased after integrations of ComEd and AEP into PJM were finalized. The report stated that when redispatch of generation in the markets does not relieve the NIPSCO flowgates, the RTOs resort to additional measures, which include reconfiguring NIPSCO's transmission facilities by opening certain lines. The report stated further that such actions degrade the reliability of the NIPSCO system, putting native load at risk. The report developed a list of potential upgrades to the 138 kV system that should be implemented if certain "triggering" events occurred."

In an order issued on April 21, 2006, the Commission observed that all parties had supported constructing the upgrades after the triggering events, and that the only dispute was over apportionment of the construction costs. The Commission concluded that it was premature to decide the cost responsibility and dismissed the Complaint.<sup>19</sup>

Subsequently, MISO and PJM recognized that, "there has been a significant increase in congestion and operational performance issues on the NIPSCO system since August 2008, the congestion and operational issues are ongoing, and the efficiency of the PJM and MISO markets are expected to be materially improved by the elimination of such congestion and operational performance issues."<sup>20</sup> In other words, the triggering events occurred. MISO, PJM, NIPSCO and Edison Mission entered into a Transmission Upgrade Agreement that was approved in Docket No. ER09-1539. The parties recognized, however, that "while the Upgrades will increase transfer capability and reduce operational performance issues under many system conditions, the Upgrades do not guarantee the resolution of all parallel flow issues."<sup>21</sup>

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action using TLR procedures, Safe Operating Mode does not employ market based solutions, and there is no compensation from one RTO to the other when it is used.

<sup>17</sup> FERC Docket No. EL05-123-000.

<sup>18</sup> *Northern Indiana Public Service Company v. MISO and PJM*, 111 FERC ¶ 61,474 (2005) at P. 29.

<sup>19</sup> The Commission reasoned that the triggering events had not yet occurred, and that the RTOs planned to address in the near future, *i.e.*, in the report to be filed in June 2006, in Docket No. ER05-6, *et al.*, the costs of cross-border facilities constructed for economic or operational reasons that provide benefits to customers in the other RTO. The Commission also rejected the argument that the recommended upgrades would be so unique as to necessitate a special allocation process outside of the to-be-revised JOA. It stated that allocation of the costs must be determined according to generally applicable tariff provisions that apply to both RTOs for comparable facilities. It stated also that, if the RTOs find that these recommended upgrades require special cost allocation provisions, they should propose provisions that would apply to all comparable upgrades in their forthcoming June 2006 filing, in the Docket No. ER05-6, *et al.* proceedings. April Order at P 24.

<sup>20</sup> See Docket No. ER 09-1539, Transmission Upgrade Agreement, NIPSCO Rate Schedule FERC No. 30 at 2.

<sup>21</sup> *Id.* at 6.

On March 8, 2010 in Docket No. EL10-45-000, the MISO filed a complaint which alleged that PJM was in violation of PJM Rate Schedule 38 because PJM refused to comply with the requirement of the JOA to engage in market-to market redispatch. On April 12, 2010, MISO filed a second complaint alleging that during the time period 2005 to 2009, PJM underreported market flows under the JOA, causing net underpayment of market-to-market settlement costs.<sup>22</sup>

On April 12, 2010, in Docket No. EL10-60-000, PJM filed a complaint against MISO, contending that MISO had used substitute flowgates, in violation of the JOA. On June 29, 2010, the Commission issued an order establishing settlement judge and hearing procedures for three related complaints. All three matters were resolved by a settlement filed on January 4, 2011. In addition to establishing that neither MISO nor PJM will make any payments to the other with regard to the claims set out in the three complaints, the settlement provided, *inter alia*, for comprehensive biennial reviews of the market-to-market process, starting two years after issuance of the baseline review report.

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<sup>22</sup> PJM made an error that existed from April 2005 to June of 2009; the error was that PJM incorrectly excluded 34 generating units representing 6,100 MWs of capacity from the calculation of market flows under the JOA.