

145 FERC ¶ 61,128
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Jon Wellinghoff, Chairman;
Philip D. Moeller, John R. Norris,
Cheryl A. LaFleur, and Tony Clark.

Midcontinent Independent System Operator, Inc.

Docket Nos. ER13-2295-000
ER13-2295-001

ORDER CONDITIONALLY ACCEPTING TARIFF REVISIONS

(Issued November 15, 2013)

1. On August 30, 2013, pursuant to section 205 of the Federal Power Act,¹ the Midcontinent Independent System Operator, Inc. (MISO) filed proposed revisions to its Open Access Transmission, Energy and Operating Reserve Markets Tariff (Tariff).² MISO proposes to add Transmission Constraint Demand Curves (TCDCs) to price transmission constraints that cannot be managed under the Security Constrained Economic Dispatch³ (SCED) process. In this order, the Commission conditionally accepts MISO's proposed Tariff revisions, effective November 1, 2013, as requested. The Commission also directs MISO to submit a compliance filing within 30 days of the date of this order.

I. Background

2. MISO states that it currently manages transmission constraints on its system primarily using the SCED algorithm. MISO explains that when the SCED algorithm determines that the projected flow on a transmission path will reach the flow constraint limit, the constraint binds, and the SCED algorithm sets a shadow price for the

¹ 16 U.S.C. § 824d (2012).

² This filing was amended by MISO on September 17, 2013 in order to correct the requested effective date on MISO's proposed Tariff language.

³ MISO defines Security Constrained Economic Dispatch as “[a]n algorithm capable of clearing, dispatching, and pricing Energy and Operating Reserve in a simultaneously co-optimized basis that minimizes Production Costs and Operating Reserve Costs while enforcing multiple security constraints.” See MISO, FERC Electric Tariff, Module A, § 1.598 (0.0.0).

constraint.⁴ MISO states that the shadow prices of binding constraints are used in calculating the congestion components of locational marginal prices.⁵ MISO asserts that, as the SCED algorithm exhausts redispatch options to keep the projected flow on a constraint within its binding limit, the shadow price on the constraint will increase.⁶ According to MISO, the SCED algorithm will continue to search for redispatch options to keep the projected flow on a constraint within its binding limit, up to a maximum shadow price known as the “marginal value limit” (MVL).⁷ MISO explains that, at times, the SCED algorithm is unable to redispatch resources to manage a constraint within its binding limit at a cost below the MVL.⁸

3. MISO explains that it has historically used two approaches to price transmission constraints that have exceeded their binding limit. Until February 2012, MISO used a constraint relaxation algorithm, which would attempt to relax the constraint limit to the flow that was feasible with available resources, and price the transmission constraint based on the redispatch costs of available resources.⁹ However, in using the constraint relaxation algorithm, MISO notes that the shadow price would often underrepresent the severity of the level by which the constraint was exceeded, and the algorithm would occasionally even produce a shadow price of zero on a relaxed constraint, which would indicate no congestion on the constraint.¹⁰

⁴ MISO August 30 Filing, Transmittal Letter at 2.

⁵ *Id.* MISO states that the shadow price reflects the incremental cost of redispatching resources to relieve a constraint. In addition, MISO states that the congestion component of a locational marginal price equals the sum of the product of the shadow prices of the constraints and the associated power transfer shift factors.

⁶ *Id.*

⁷ *Id.* MISO states that the MVL is the maximum amount that the market is willing to spend to manage the constraint.

⁸ *Id.*, Testimony of Joseph Gardner at 3. Mr. Gardner’s testimony explains that, in most cases, the SCED algorithm is successful in managing a constraint within its binding limit.

⁹ *Id.*, Transmittal Letter at 2.

¹⁰ *Id.* As an example, MISO explains that this can occur when there are no marginal resources available.

4. In February 2012, at the recommendation of its independent market monitor (IMM), MISO explains that it began using MVLs to set the shadow prices for transmission constraints that exceeded their binding limits. MISO states that it currently applies default MVLs based on the type and voltage level of the affected transmission elements, and has established two voltage groups.¹¹ In the first group, MISO states that the default MVL is \$3,000/MWh for Interconnection Reliability Operating Limit (IROL) constraints, \$2,000/MWh for System Operating Limit (SOL) constraints greater than or equal to 161 kV, \$1,000/MWh for SOL constraints between 100 kV and 161 kV, and \$500/MWh for SOL constraints less than 100 kV.¹² MISO states that some constraints less than or equal to 138 kV have been determined to be significantly impacted by regional flows, and these constraints are placed in a second group with a default MVL of \$2,000/MWh.

5. MISO notes that its current default MVL system is problematic because the high prices of the default MVLs are causing adverse economic consequences. MISO states that even small or temporary projected exceedances of the binding limit, such as those due to insufficient ramp capability over a five-minute dispatch period, trigger the use of the high MVL. As a result, MISO states that it has experienced significant price spikes regardless of the level of the impact on reliability.¹³

II. Description of Filing

6. In order to address its MVL-related price volatility issue, on August 30, 2013, MISO submitted proposed Schedule 28A to its Tariff.¹⁴ MISO states that the filing is supported by its Market Subcommittee and unopposed by its Reliability Subcommittee.¹⁵ The filing proposes Tariff language that would implement TCDCs in the SCED to price

¹¹ *Id.* at 2-3.

¹² The North American Electric Reliability Corporation (NERC) defines IROL as “[a] System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Bulk Electric System.” NERC defines SOL as “[t]he value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.” *See* NERC Glossary of Terms Used in Reliability Standards at 26, 48.

¹³ MISO August 30 Filing, Transmittal Letter at 3.

¹⁴ MISO, FERC Electric Tariff, SCHEDULE 28A, Demand Curves for Transmission Constraints (1.0.0).

¹⁵ MISO August 30 Filing, Transmittal Letter at 7.

transmission constraints when projected flows exceed their binding limits. MISO explains that the TCDCs would be utilized in both the Day-Ahead and Real-Time Markets and applied to all MISO market transactions that are not managed by a market-to-market congestion management protocol between MISO and an adjacent RTO or ISO.¹⁶ MISO proposes to implement two groups of TCDCs that price transmission constraints based on type (i.e., IROL or non-IROL), transmission voltage, and percent exceedance of the binding limit on the line.¹⁷

7. MISO states that most constraints will be subject to the Group 1 TCDC, which represents constraints that are less frequently bound. Group 1 would establish two steps of MVLs as shadow prices for constraints that fall within one of several voltage classes as well as constraints during IROL and Transmission Line Loading Relief (TLR) events. Under MISO's proposal, the MVLs for constraint exceedances greater than or equal to 102 percent of the binding limit on the line are the same MVLs that are currently applied to each transmission voltage class, with the exception of IROL constraints. MISO's proposed Group 1 TCDC also includes new, lower MVLs that apply to exceedances between 100 percent and 102 percent of the binding limit. MISO reasons that this approach will allow it to more appropriately price smaller transmission limit exceedances that do not have a significant impact on reliability. MISO also states that the higher MVL for IROL constraints reflects the potential severity of an IROL exceedance on reliable operations. The proposed Group 1 MVLs are shown in Table 1 below:

Table 1: Proposed Group 1 MVLs by Binding Constraint Exceedance and Voltage or IROL Classification

Binding Constraint Exceedance	V ≤ 100 kV	V > 100 kV and V < 161 kV	V ≥ 161 kV	IROL
≥ 102%	\$500/MWh	\$1,000/MWh	\$2,000/MWh	\$4,000/MWh
> 100% and < 102%	\$400/MWh	\$700/MWh	\$1,000/MWh	\$3,000/MWh

¹⁶ *Id.*, Testimony of Joseph Gardner at 5-7.

¹⁷ *Id.*, Transmittal Letter at 4-6.

8. MISO also proposes a separate Group 1 TCDC for internal and external constraints associated with a TLR event.¹⁸ MISO states that, due to the nature of transmission constraints associated with TLR events, the constraint exceedance is defined as the MW amount above the binding limit. For exceedances of 10 MW or greater, the proposed MVL is \$2,000/MWh, and for exceedances between 0 and 10 MW the proposed MVL is \$1,000/MWh.¹⁹

9. MISO explains that some constraints, particularly those that tend to be significantly impacted by regional flows, may require a higher MVL to manage reliability. As a result, MISO proposes a Group 2 TCDC that may be applied to “constraints that persistently cannot be managed using Group 1 TCDCs.”²⁰ The proposed Group 2 TCDC contains higher MVLs for the same voltage and exceedance levels (as compared to the Group 1 TCDC), as shown in Table 2 below:

Table 2: Proposed Group 2 MVLs by Binding Constraint Exceedance and Voltage

Binding Constraint Exceedance	V ≤ 100 kV	V > 100 kV and V < 161 kV	V ≥ 161 kV
≥ 102%	\$1,000/MWh	\$2,000/MWh	\$3,000/MWh
> 100% and < 102%	\$700/MWh	\$1,000/MWh	\$2,000/MWh

¹⁸ MISO follows the TLR procedures outlined in the NERC reliability standards IRO-006-5 – Reliability Coordination – Transmission Loading Relief and IRO-006-EAST-1 – Transmission Loading Relief Procedure for the Eastern Interconnection. These standards require coordinated action in interconnection-wide congestion management procedures across interconnection boundaries and also require Reliability Coordinators in the Eastern Interconnection to take actions related to TLR events that are intended to prevent or mitigate SOL and IROL violations.

¹⁹ MISO August 30 Filing, Transmittal Letter at 5. In its answer to the IMM’s comments filed October 10, 2013, MISO states that its current practice when receiving a relief obligation on a constraint during a TLR is to apply its default internal MVL of \$2,000/MWh. MISO Answer at 10.

²⁰ MISO August 30 Filing, Transmittal Letter at 6.

10. MISO's proposed Tariff language provides some criteria to be used in determining when a constraint should be moved from a Group 1 TCDC to a Group 2 TCDC.²¹ MISO includes Tariff language stating that it will remove the constraint from Group 2 when it deems that a constraint no longer satisfies the Group 2 criteria. MISO's proposed Tariff language states that "changes to the set of constraints managed by Group 2 TCDCs shall be publicly posted" by MISO.²²

11. MISO also proposes Tariff language that gives it the authority to implement a temporary override of the Group 1 TCDC or Group 2 TCDC applicable to a constraint when "the flow over a constraint is greater than or is expected to be greater than the constraint's binding limit for more than two intervals or raises an elevated reliability concern."²³ MISO proposes that, during an override, the shadow price associated with a constraint would be determined by MISO. MISO's proposed Tariff language states that MISO will return a constraint to its applicable TCDC as soon as it "determines that the system conditions and congestion management needs no longer require the adjustment" and that "overridden binding constraints will be publicly posted" by MISO.²⁴ MISO provides no further detail about the information that will be included in these public postings.

III. Notice of Filing and Responsive Pleadings

12. Notice of MISO's August 30, 2013 filing was published in the *Federal Register*, 78 Fed. Reg. 55,247 (2013), with interventions or protests due September 20, 2013. Timely motions to intervene were filed by DTE Electric Company, Ameren Services Company, MidAmerican Energy Company, Consumers Energy Company, American Municipal Power, Inc., and Wisconsin Electric Power Company. MISO's IMM filed a timely motion to intervene and comments. On October 11, 2013, MISO filed an answer to the IMM's comments. Notice of MISO's September 17, 2013 amendment was

²¹ MISO, FERC Electric Tariff, SCHEDULE 28A, § 3.2 (1.0.0). These criteria include: the constraint is frequently violated for more than two consecutive intervals because it cannot routinely be managed under the Group 1 TCDC, the constraint is not subject to operating guides or other actions to manage flows that are available to other constraints in the same voltage class, and the operators believe the reliability consequences of allowing the flow to exceed the limit on the constraint are more severe than for other constraints in the voltage class.

²² *Id.*

²³ *Id.* § 3.3.

²⁴ *Id.*

published in the *Federal Register*, 78 Fed. Reg. 58,532 (2013), with comments due September 24, 2013. No comments were received.

A. IMM Comments

13. MISO's IMM generally supports the TCDC proposal because it should improve the market's performance by allowing MISO to distinguish between small and large constraint violations. However, the IMM disagrees with MISO's proposed MVLs for the Group 1 TCDC associated with external constraints during TLR events and recommends that the Commission order MISO to establish lower values.²⁵ The IMM argues that the MVLs proposed by MISO to manage an external constraint are many times higher than the cost that would be incurred by the monitoring RTO/ISO (i.e., the RTO/ISO in which the constraint is occurring) to manage the constraint. The IMM illustrates its argument by showing that MISO's average monthly shadow price to manage the most costly external constraint in 2011 and 2012 was always higher than the average monthly shadow price applied to the same constraint by the Southwest Power Pool (SPP), the monitoring RTO for the constraint. The IMM states that in many cases, a constraint was not even binding in SPP when MISO was incurring substantial redispatch costs. The IMM argues that it is inefficient for MISO to incur redispatch costs associated with shadow prices for external constraints at levels that are multiples of the costs incurred by SPP. The IMM states that the value of external constraints is fundamentally different than the value of internal constraints, i.e., an internal constraint is valued according to the reliability cost of its violation, while an external constraint is generally defined by the costs incurred by the monitoring RTO to manage it. The IMM recommends that the Commission order MISO to establish a fixed \$500/MWh MVL applicable to external constraints during TLR events and direct MISO to develop a proposal that would reduce market inefficiencies.

14. The IMM notes that there are other issues outside the scope of this proceeding that will affect the reasonableness of MISO's proposed MVLs for external constraints during TLR events. First, the IMM states that when an external flowgate binds, MISO receives a relief obligation that is based solely on the forward-direction market flows²⁶ and does not account for reverse flows over the constraint that may, on a net basis, relieve the congestion on the external flowgate. The IMM argues that this exaggerates MISO's perceived effect on the external constraints and contributes to MISO receiving inflated relief requirements. Second, the IMM notes that Entergy will be integrated into MISO in

²⁵ External constraints are those that occur outside of MISO's area at flowgates that are not managed by a market-to-market congestion management protocol or a joint operating agreement. MISO may receive a relief obligation during a TLR that requires MISO to manage the external constraint.

²⁶ Forward-direction market flows are those that increase the flow over the constraint.

December, adding roughly 40 GW of capacity that will likely significantly increase the forward-only flows on which relief obligations are based. The IMM argues that this has the potential to greatly increase the relief obligations and, in turn, the inefficient redispatch costs that MISO must incur to manage external constraints.

B. MISO's Answer

15. In its answer, MISO replies that the goal of the TCDC proposal is to reduce the economic inefficiencies that occur when a single, higher MVL is used for small exceedances that have no detrimental impact on reliability. However, MISO argues that the MVL must be of sufficient magnitude to influence market behavior to relieve congestion, because the MVL is only applied when the SCED cannot manage a transmission constraint within its binding limit. MISO states that its proposed MVLs for external constraints during TLR events reflect the footprint's fleet costs and establish a price signal that is sufficiently high to influence higher cost generators within MISO to relieve the congestion across the constraint. MISO also argues that the increase in exceedances by reducing the TLR MVL to \$500/MWh, as suggested by the IMM, would be too great. For facilities rated between 161 and 500 kV, MISO projects that the application of its proposed \$1,000/MWh MVL would cause an additional 1.7 percent of exceedances. If MISO were to adopt the \$500/MWh MVL for these facilities during TLR events, MISO projects an increase in exceedances of 8.7 percent.

16. Additionally, MISO states that it is appropriate that an external constraint be priced on the same basis as an internal constraint because a similar action is desired within MISO regardless of whether the constraint is internal or external. MISO explains that it has used the same MVLs for external TLR events that were established for internal constraints on facilities rated greater than or equal to 161 kV, which are the comparable class of facilities. MISO adds that it manages multiple seams with other RTOs, yet the IMM only references SPP's lower shadow prices for external constraints and fails to offer evidence that its recommended MVL of \$500/MWh would allow MISO to reliably and economically respond to TLR events.

17. Lastly, MISO notes that the inefficiencies presented by the IMM would be reduced upon the implementation of a market-to-market process between MISO and SPP, which is expected to be in operation in March 2015. MISO argues that it is better to start conservatively with the proposed two-step TLR MVL and states that, after the TCDC is implemented and can be evaluated based on operational data, MISO will continue working with the IMM and its stakeholders to determine whether further improvements to the TCDC (and the TLR MVLs in particular) are warranted.

IV. Discussion

A. Procedural Matters

18. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2013), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

19. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 213(a)(2) (2013), prohibits an answer to a protest unless otherwise ordered by the decisional authority. We will accept MISO's answer because it provided information that assisted us in our decision-making process.

B. Commission Determination

20. We will conditionally accept MISO's Tariff revisions and make them effective November 1, 2013, as requested. We will direct MISO to submit a compliance filing within 30 days of the date of this order, as discussed below. We find MISO's proposal to be just and reasonable, as it increases transparency, allows MISO to more accurately manage varying degrees of congestion on its system, and prices transmission constraints according to their relative effect on reliability. In addition, we find that MISO's proposal achieves MISO's stated goals in designing the TCDCs. In his testimony provided with MISO's filing, Mr. Joseph Gardner states that MISO's goal in designing the TCDCs is to achieve the desired reduction in price spikes while avoiding a large increase in constraint exceedances or a significant adverse effect on reliability. The testimony explains that MISO tested the TCDCs using data from 2012, and that the proposed TCDCs had no detrimental impact on reliability while achieving on average more than a 10 percent reduction in shadow prices compared to the current MVLs.²⁷ In addition, MISO found that the proposal would add only a small number of new exceedances into the market (less than a 5 percent increase).²⁸ The testimony also estimates that 20 to 50 percent of exceedances will fall within the lower block of the TCDC curve, i.e., exceedances between 100 percent and 102 percent of the binding limit, which will dampen the price spikes MISO has recently experienced.²⁹

21. In accepting MISO's Tariff revisions, including the proposed MVLs for TLR events, we agree with MISO's approach of treating external TLR events as if they were internal constraints on facilities rated greater than or equal to 161 kV because they are the

²⁷ MISO August 30 Filing, Testimony of Joseph Gardner at 3.

²⁸ *Id.* at 8.

²⁹ *Id.* at 10.

comparable class of facilities. We further agree with MISO's argument that reducing its MVLs to \$500/MWh for TLR events would increase exceedances by 8.7 percent, which would violate MISO's stated criterion of creating less than or equal to 5 percent new exceedances when determining the MVL values to be used in the TCDC. We note that MISO's proposal to value the first 10 MW of a TLR event exceedance at \$1,000/MWh and any exceedance over 10 MW at \$2,000/MWh is in keeping with MISO's stated goal of addressing smaller exceedances more appropriately so as to reduce price spikes. Therefore, we do not agree with the IMM that MISO should alter its proposed MVLs for TLR events, which will apply to all TLR events that may occur across multiple seams between MISO and neighboring Transmission Providers in which there is not a market-based congestion management agreement in effect (and not just the seam between SPP and MISO). However, we encourage MISO to continue working with the IMM and its stakeholders to reduce any market inefficiencies that may exist within the MISO region or between MISO and neighboring Transmission Providers.

22. We find the IMM's comment regarding MISO's receipt of relief obligations based solely on forward-direction market flows to be beyond the scope of this proceeding. We also find the IMM's comment regarding the increase in forward-only flows that will result from the integration of Entergy into MISO to be beyond the scope of this proceeding. As stated above, we encourage MISO to continue working with the IMM and its stakeholders to resolve these issues.

23. Although we will accept MISO's Tariff revisions, we will direct MISO to submit a compliance filing with additional Tariff language to clarify the information that will be submitted in its public postings. Currently, the Tariff language states only that "changes to the set of constraints managed by Group 2 TCDCs shall be publicly posted" and that "overridden binding constraints will be publicly posted" by MISO.³⁰ We agree with MISO that the ability to apply Group 2 TCDCs to constraints that cannot be managed in Group 1, as well as the ability to temporarily override Group 1 or Group 2 TCDCs, will provide a useful tool to reliably manage congestion in real-time and comply with NERC reliability standards. However, the Commission and other entities must be able to monitor the situations in which this flexibility is exercised. Because MISO's proposal lacks details on the type of information that will be publicly posted, the MISO Tariff language must be revised to specify that MISO will publicly post all constraints managed by Group 2, explaining the reasons for applying the Group 2 TCDC and the duration of time before the constraints were removed from Group 2. With respect to temporary overrides, MISO's Tariff language must provide that MISO's public postings will: (1) explain the circumstances in which temporary override authority was exercised; (2) describe the length of time each temporary override was in place; and (3) state the MVL applied during the temporary override in place of the default TCDC MVL. The

³⁰ MISO, FERC Electric Tariff, SCHEDULE 28A, §§ 3.2, 3.3 (1.0.0).

Commission also directs MISO to retain these postings on its OASIS Notices Archives site, consistent with its current archival practices for OASIS postings.

The Commission orders:

(A) MISO's proposed Tariff revisions are conditionally accepted effective November 1, 2013, subject to a compliance filing, as discussed in the body of this order.

(B) MISO is hereby directed to submit a compliance filing, within 30 days of the date of this order, as discussed in the body of this order.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.