

140 FERC ¶ 61,224
FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

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

Midwest Independent Transmission
System Operator, Inc.

Docket No. ER12-1664-000

ORDER ON COMPLIANCE FILING

(Issued September 20, 2012)

1. On April 30, 2012, the Midwest Independent Transmission System Operator, Inc. (MISO) filed proposed revisions to its Open Access Transmission, Energy and Operating Reserve Markets Tariff (Tariff) to establish a revised compensation methodology for the provision of regulation service, in compliance with Order No. 755.¹ MISO asserts that its proposal provides a comprehensive solution by addressing procurement and compensation of frequency regulation service in MISO's day-ahead and real-time energy and operating reserve markets. Also on April 30, 2012, MISO filed a request for an extension of the October 27, 2012 implementation date to December 17, 2012.

2. In this order, we find that MISO's proposal is generally compliant with Order No. 755, and we conditionally accept it, subject to certain conditions outlined below, to become effective on December 17, 2012, as requested. We also require MISO to make an additional compliance filing within 30 days of the date of this order and an informational report within 14 months of the effective date of the proposed Tariff revisions, as discussed herein.

I. Background

A. Frequency Regulation Service

3. Frequency regulation is an ancillary service, as required by the Commission's Orders No. 888 and 890, under the Commission's *pro forma* open access transmission

¹ *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, FERC Stats. & Regs. ¶ 31,324 (2011), *reh'g denied*, Order No. 755-A, 138 FERC ¶ 61,123 (2012).

tariff (*pro forma* OATT).² It is relied upon by system operators to control both actual and anticipated frequency deviations. A frequency deviation is caused when the supply of dispatched generation and demand response, as measured in Hertz, fails to equal the amount of electricity actually consumed (i.e., load, plus losses), at a given moment. When such a deviation exceeds an acceptable range, the system can be impaired, with major deviations causing generation and transmission equipment to disconnect from the grid.

B. Order No. 755

4. In Order No. 755, the Commission found that the resources relied upon by regional transmission operators (RTO) and independent system operators (ISO) to provide frequency regulation service differ in both their ramping ability, which is their ability to increase or decrease their provision of frequency regulation service, and the accuracy with which these resources can respond to the system operator's dispatch signal.³ Order No. 755 further found that current compensation policies fail to acknowledge these operational differences. Specifically, Order No. 755 found that existing RTO/ISO compensation methods result in rates that are unjust, unreasonable, and unduly discriminatory or preferential, given that resources are compensated at the same level even when providing different amounts of frequency regulation service.⁴ Order No. 755 further found that paying a uniform clearing price that includes opportunity costs would send efficient price signals reflecting the true cost of providing frequency regulation service.⁵

² See *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities and Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Order No. 888, FERC Stats. & Regs. ¶ 31,036 at 31,705 (1996), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048 (1997), *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in part and rev'd in part sub nom. Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002). *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, at P 135, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009), *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009).

³ Order No. 755, FERC Stats. & Regs. ¶ 31,324 at P 1.

⁴ *Id.* P 64.

⁵ *Id.* P 99.

5. To accomplish this objective, Order No. 755 required each RTO/ISO to use market-based mechanisms to select and compensate frequency regulation resources based on a two-part payment methodology. First, Order No. 755 required that a capacity payment be made to a resource to keep its capacity in reserve in the event that it is needed to provide real-time frequency regulation service.⁶ Second, Order No. 755 required that performance payments be made, which reflect the amount of work each resource performs in real-time in response to the system operator's dispatch signal.⁷ Order No. 755, however, gave each RTO and ISO discretion in identifying the manner by which it would implement Order No. 755's required two-part payment methodology.⁸ Order No. 755 also acknowledged that the market rule revisions required by Order No. 755 contemplate fundamental changes to the way RTOs and ISOs procure and compensate frequency regulation services and that these rule changes may render existing RTO and ISO market power mitigation provisions insufficient to address market power concerns.⁹ Accordingly, Order No. 755 required each RTO/ISO to submit revised market power mitigation provisions, as appropriate to their redesigned frequency regulation markets, or explain how their current mitigation methods are sufficient to address market power concerns.

C. MISO's Existing Compensation of Regulating Reserves

6. Currently, MISO only compensates regulating reserve resources for the capacity they provide. MISO co-optimizes energy and operating reserves commitment and dispatch in its day-ahead and real-time markets.¹⁰ The price paid to regulating reserve resources, as determined in the Security Constrained Economic Dispatch process, is known as the Regulating Reserve Market Clearing Price (MCP).¹¹ Resources providing regulating reserve service are required to follow dispatch instructions. If the regulating reserve resources do not follow their average five-minute Automatic Generation Control

⁶ *Id.* P 198.

⁷ *Id.* P 199.

⁸ *Id.* P 185.

⁹ *Id.* P 136.

¹⁰ Co-optimization refers to the process for clearing all energy and operating reserve products simultaneously.

¹¹ Once its Extended Locational Marginal Price (LMP) process is implemented, MISO will develop prices for settlement using the Extended LMP algorithm. *See Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,067 (2012) (Extended LMP Order).

(AGC) set points for four consecutive five-minute intervals, Excessive/Deficient Energy Deployment Charges may be assessed.¹²

D. MISO's Compliance Proposal

7. MISO asserts that its compliance proposal provides a comprehensive solution by addressing procurement and compensation of regulation service in both the day-ahead and real-time markets. As discussed below, MISO proposes two-part regulation offers, consisting of a Regulating Capacity Offer and a Regulating Mileage Offer, in the day-ahead and real-time markets. MISO also proposes that compensation for regulation service consist of two components: one for the capacity reserved to be able to provide the service, and one for the mileage, or amount of movement a resource makes in response to regulation deployment instructions. As discussed below, MISO also proposes two additional provisions to ensure that the performance payment accurately reflects the actual work done in real-time by the resource in response to MISO's dispatch signal.

8. MISO proposes a two-part payment for regulating reserve compensation through the use of two-part offers for capacity and mileage. Resources submit Regulating Capacity Offers (\$/MW/h) and Regulating Mileage Offers (\$/MW) in the day-ahead market. MISO uses the two parts of the regulating reserve offer to calculate the total expected cost of regulation service from that resource (the combination of capacity and mileage offer costs).

9. To calculate the total expected regulating resource cost from a resource that is used in the selection of resources, MISO proposes a new term, Regulating Total Cost (in \$/MW/h), which is the hourly cost of regulation from a resource¹³ as a function of the resource's two regulating reserve offer components. MISO uses the Regulating Total Cost to select the most cost-effective regulating reserve resources in the day-ahead market. A resource's Regulating Total Cost is calculated as follows:

$$\text{Regulating Total Cost} = \text{Regulating Capacity Offer} + (12 * \text{Regulating Mileage Offer})$$

10. Under MISO's proposal, a resource's Regulating Mileage Offer is multiplied by twelve in the Regulating Total Cost calculation to reflect MISO's assumption that each resource will be asked to move "one full deployment" of its capacity in each of the

¹² See, e.g., Filing at 8.

¹³ MISO asserts that the use of the Regulating Total Cost concept allows it to select resources considering both the capacity and mileage components, in its effort to minimize the total cost of the needed regulating reserves.

twelve five-minute dispatch intervals in an hour.¹⁴ In other words, under MISO's proposal, a resource's assumed mileage in each hour is equal to 12 times the amount of the resource's cleared regulation capacity. The Regulating Total Cost calculated is an approximation for the hourly cost per MW of offered capacity for a resource for each hour during its commitment period.

11. MISO states that it will then use the Regulating Total Cost in the day-ahead co-optimization process to select the most cost-effective set of resources, and the Regulating Total Cost of the marginal unit will set the Regulating Reserve MCP.¹⁵ Each resource cleared in the day-ahead market will receive a payment equal to its cleared amount of regulation capacity times the Regulating Reserve MCP.

12. If MISO dispatches a resource for more miles than was assumed when clearing the day-ahead market (i.e., the one full deployment), MISO proposes to pay for additional mileage at the Regulating Mileage MCP.¹⁶ In that case, MISO proposes that additional regulating reserve mileage costs will be allocated *pro rata* to market participants based on their load ratio share and excluding export schedules. Also, if, in real-time, MISO deploys a resource less than the one full deployment it has pre-paid for, MISO proposes to charge that resource for the unprovided regulating reserve at that resource's Regulating Mileage Offer.¹⁷

13. MISO also notes that the Regulating Reserve MCP includes all cross-product opportunity costs as a result of the co-optimization of MISO's energy and operating reserve markets. MISO explains that the payment of the Regulating Mileage MCP will ensure that cross-product opportunity costs will only be included in the regulation capacity payment.¹⁸ With respect to inter-temporal opportunity costs, MISO states that

¹⁴ MISO asserts that it bases this assumption on historical data that show, on average, each MW of cleared capacity is asked to move an equal number of miles in each five-minute dispatch interval. Gardner Test. at 17-18.

¹⁵ The Regulating Reserve MCP includes all cross-product opportunity costs that MISO calculates through the co-optimization process.

¹⁶ Regulating Mileage MCP is the highest Regulating Mileage Offer from all resources that are economically cleared for regulation capacity.

¹⁷ Resources can submit capacity and mileage offers in both the day-ahead and real-time energy markets. The real-time energy and operating reserve market is used primarily to account for changes in the quantity of regulation demands or changes in the amount of regulation a resource can provide.

¹⁸ Filing at 10.

they may be included in resources' offers.¹⁹ MISO notes that, in order to provide adequate protection from market manipulation, its Independent Market Monitor has the ability to review resources' offers.

II. Request for Extension of Implementation Date

14. Under Order No. 755, MISO is required to implement its compliance tariff changes within 180 days of the date of its compliance filing.²⁰ MISO requests an extension of the implementation date, from October 27, 2012 to December 17, 2012, to implement the changes proposed in the instant compliance filing. MISO asserts that the additional 49 days will allow it to prepare the necessary software and make modeling changes reflecting (1) new regulation service offer data; (2) revisions to the treatment of regulating reserves in MISO's co-optimized energy and operating reserve market clearing engines; (3) new measurement of regulation performance accuracy; and (4) new settlement rules. MISO also notes that this extension of time will align its regulating reserve implementation schedule with its planned December 2012 market model update.

III. Notice of Filing and Responsive Pleadings

15. Notice of MISO's filing was published in the *Federal Register*, 77 Fed. Reg. 27,046 (2012), with comments due on or before May 21, 2012.

16. Timely motions to intervene were filed by the Detroit Edison Company; ENBALA Power Networks (USA), Inc.; Ameren Services Company on behalf of Ameren Illinois Company, Union Electric Company, Ameren Energy Marketing Company, Ameren Energy Generating Company, and AmerenEnergy Resources Generating Company; Consumers Energy Company; Michigan South Central Power Agency; the NRG Companies;²¹ Beacon Power LLC (Beacon Power); Electricity Storage Association (ESA); Missouri Joint Municipal Electric Utility Commission; WPPI Energy, Madison Gas & Electric Company and Great Lakes Utilities; Michigan Public Power Agency; MidAmerican Energy Company (MidAmerican); Xcel Energy Services, Inc. on behalf of Northern States Power Company, a Minnesota corporation, and Northern States Power

¹⁹ Order No. 755 deferred to the RTOs and ISOs to propose which party is responsible for calculating inter-temporal costs, whether the RTO/ISO or market participants. Order No. 755, FERC Stats. & Regs. ¶ 31,324 at P 103.

²⁰ *Id.* P 201.

²¹ For purposes of this filing, the NRG Companies are NRG Power Marketing LLC, Bayou Cove Peaking Power LLC, Big Cajun I Peaking Power LLC, Louisiana Generating LLC, NRG Sterlington Power LLC, and Cottonwood Energy Company LP.

Company, a Wisconsin corporation; American Municipal Power, Inc.; and Wisconsin Electric Power Company.

17. Comments were filed by Beacon Power, ESA and MidAmerican. On June 4, 2012, MISO filed an answer to the comments.

A. Comments

18. Beacon Power and ESA strongly support the compliance filing because it provides for a two-part payment, including both capacity and performance. They assert that the mileage payments will equitably compensate each regulation resource for the regulation service the resource actually provides, and as such, MISO's Tariff will send efficient price signals that will encourage storage technologies. Further, Beacon Power and ESA state that they support the proposal to set the Regulating Mileage MCP at the highest Regulating Mileage Offer from all resources that are economically cleared for regulation capacity.²²

19. Although Beacon Power and ESA do not adamantly oppose MISO's request for an extension of the effective date of the proposed Tariff revisions to December 17, 2012, they assert that the Commission should ensure that these provisions become effective no later than that date. Beacon Power and ESA assert that until such time that MISO implements its Order No. 755 compliant tariff provisions, the marketplace will remain discriminatory; in fact, they assert that a delay in implementation actually prejudices investment decisions in new technologies, which is a direct financial harm to Beacon Power and ESA member companies. According to Beacon Power and ESA, because the current mechanism for compensating frequency regulation providers in MISO is discriminatory, there has been little development of energy storage resources in the MISO market.²³

20. In its comments, MidAmerican states that it does not oppose MISO's compliance filing; however, it argues that in Module A and section 40.3.3.b of the Tariff, MISO has proposed redundant and potentially inconsistent definitions of several new terms.²⁴

B. MISO's Answer

21. MISO answers Beacon Power's and ESA's assertions regarding its request for an extension, explaining that it needs the additional time to prepare necessary software and

²² Beacon Power Comments at 6; ESA Comments at 6.

²³ Beacon Power Comments at 8; ESA Comments at 8.

²⁴ MidAmerican Comments at 3.

modeling upgrades, and then to test these upgrades, to avoid any potentially negative effects on reliability that might result from truncating its modeling, testing, and review procedures.²⁵ In response to the MidAmerican's comments, MISO explains that it is willing to eliminate the redundant definitions found in section 40.3.3.b of the Tariff.²⁶

IV. Procedural Matters

22. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2012), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

23. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2012), prohibits an answer to a protest unless otherwise ordered by the decisional authority. We will accept MISO's answer because it has provided information that assisted us in our decision-making process.

24. We will grant MISO's request for extension until December 17, 2012 of the implementation of its proposed Tariff provisions. We recognize the various factors involved with MISO's request (i.e., attempting to synchronize several other market changes) and find MISO's request reasonable.

V. Discussion

25. As discussed below, we will accept MISO's compliance filing, subject to conditions and the submission of an additional compliance filing within 30 days of the date of this order and an informational report within 14 months of the effective date of the proposed Tariff revisions, to become effective, as requested, on December 17, 2012. We find that MISO's proposal generally satisfies the requirements of Order No. 755 and is a reasonable approach to compensating resources that provide frequency regulation service. However, as discussed in more detail below, we will require MISO to provide additional details and to revise certain aspects of its proposed Tariff language.

A. Capacity Payment

1. Order No. 755

26. Order No. 755 required that RTOs and ISOs provide for the payment of a uniform clearing price for capacity to all cleared frequency regulation resources that include the marginal resource's opportunity costs.²⁷ Order No. 755 also required that this uniform

²⁵ MISO Answer at 3.

²⁶ *Id.* at 3-4.

²⁷ Order No. 755, FERC Stats. & Regs. ¶ 31,324 at P 99.

clearing price be market-based, as derived from market participants' bids for the provision of frequency regulation capacity.

27. Order No. 755 further required RTOs and ISOs to calculate each resource's cross-product opportunity costs (i.e., the foregone opportunity to participate in the energy or ancillary services markets), and to then add this cost to each resource's frequency regulation capacity offer.²⁸ In addition, Order No. 755 directed each RTO and ISO to allow a resource to include its inter-temporal opportunity costs, to the extent the resource has such costs, in its offer (i.e., the foregone value when a resource must operate at a given time, and therefore must either forego a profit from selling energy at a later time or incur costs due to consuming at a later time), provided such costs are verifiable.²⁹ However, in Order No. 755, the Commission declined to specify the circumstances under which certain resources, including energy storage resources, at the time that they charge, should be treated as eligible to receive a capacity payment during the time that they charge.³⁰

2. MISO's Proposal

28. As noted above, MISO proposes that regulation shall be compensated in the MISO market through the use of Regulating Capacity Offers (in \$/MW/h) and Regulating Mileage Offers (in \$/MW). MISO explains that it must evaluate the Regulating Mileage Offers in addition to the Regulating Capacity Offers when clearing regulating reserve. MISO notes that otherwise, participants may be given an incentive to submit very high Regulating Mileage Offers and very low Regulating Capacity Offers in order to attempt to game MISO's market clearing process. Under the proposal, these two components will be summed into a Regulating Total Cost (in \$/MW/h), which will account for the mileage cost of deploying cleared regulating reserve once during each five-minute real-time dispatch interval.

3. Commission Determination

29. We find that MISO's compliance proposal satisfies Order No. 755's requirement that all cleared frequency regulation resources be paid a uniform clearing price that includes the marginal resource's opportunity costs. Order No. 755 gives discretion to

²⁸ *Id.* P 102.

²⁹ *Id.*

³⁰ *Id.* P 100. The Commission recognized that methods for handling the charging state of energy storage resources varied among RTOs and ISOs, based on regional differences. Accordingly, the Commission permitted each RTO and ISO to address this issue, in its compliance filing, based on the given needs of its region. *Id.*

each RTO and ISO regarding the design of an RTO/ISO regulation market.³¹ As proposed by MISO, the Regulating Reserve MCP will be based on the offers to provide frequency regulation and thus will be market-based, as contemplated by Order No. 755. To select the most efficient resources, MISO will consider both capacity bids and mileage bids simultaneously. We find that MISO's proposal represents a reasonable method of selecting the most efficient resources providing frequency regulation.

B. Payment for Performance

1. Order No. 755

30. Order No. 755 required that the second part of the two-part payment to be provided to frequency regulation resources be a performance payment that reflects the quantity of frequency regulation provided by a resource when the resource is accurately following the dispatch signal. Specifically, Order No. 755 required that the cleared performance price be: (i) market-based;³² (ii) paid uniformly to all resources cleared during the same settlement period;³³ (iii) measured based on the absolute (rather than the net) amount of energy injected or withdrawn from the system, as provided by the resource in response to the system operator's dispatch signal;³⁴ and (iv) calculated relative to the resource's accuracy in following the dispatch signal.³⁵ Order No. 755 also required that the performance payment reflect the amount of work each resource performs in real time.³⁶

2. MISO's Proposal

31. As noted above, MISO proposes a two-part payment for regulating reserve compensation through the use of two-part offers for capacity and mileage. Resources submit Regulating Capacity Offers (\$/MW/h) and Regulating Mileage Offers (\$/MW) in the day-ahead market, and MISO uses the two parts of the regulating reserve offer to calculate the total expected cost of regulation service from that resource (the combination of capacity and mileage offer costs).

³¹ *Id.* P 75.

³² *Id.* P 128.

³³ *Id.* P 131.

³⁴ *Id.* P 133.

³⁵ *Id.* P 151.

³⁶ *Id.* P 199.

32. As noted above, if MISO dispatches a resource for more miles than was assumed when clearing the day-ahead market (i.e., the one full deployment), MISO proposes to pay for additional mileage at the Regulating Mileage MCP. In that case, MISO proposes that additional regulating reserve mileage costs will be allocated to market participants on a *pro rata* basis. Also, if, in real-time, MISO deploys a resource less than the one full deployment it has pre-paid for, MISO proposes to charge that resource for the unprovided regulating reserve at that resource's Regulating Mileage Offer. MISO also allows resources to self-schedule for regulation; however, Regulating Mileage Offers from self-scheduled regulating resources will not be allowed to set the Regulating Mileage MCP.

3. Commission Determination

33. We find that MISO's payment for performance proposal (i.e., mileage) is generally consistent with the requirements of Order No. 755. Specifically, MISO attempts to remedy undue discrimination in the regulation market by adding a performance payment that pays resources based on the actual amount of regulation up and down that MISO dispatches a resource to provide. Thus, this proposal appropriately compensates those resources that provide more value to the grid by their fast, accurate responses to MISO's control signals.

34. However, with respect to undeployed regulating reserve mileage, we note that MISO's proposal to charge a resource its Regulating Mileage Offer for undeployed regulating reserve mileage could result in resources that provide the same quantity of regulation service being compensated differently, depending on their respective Regulating Mileage Offers.³⁷ This would violate one of the principles of Order No. 755, which is that resources should not be paid at the same level for providing different amounts of service, or paid different levels for providing the same amount of service.³⁸ This result would also violate the principle of Order No. 755 that resources should be

³⁷ For example, if two resources clear in the day-ahead market for 10 MW each of capacity, and thus 10 MW of prepaid mileage per dispatch interval for a total of 120 MW of prepaid mileage for the hour, at a regulating reserve market clearing price of \$60/MW/h, both resources will be paid \$600 for that hour when the market clears. However, if they are both only deployed in real-time for 5 MW of mileage in an interval, and their Regulation Mileage Offers are \$1 and \$3 per MW, respectively, then one resource will be charged back \$5, and the other \$15, making their net total payments for the hour \$595 and \$585 (assuming the other intervals of the hour are deployed exactly at the prepaid amount), respectively, for providing the same amount of service.

³⁸ *Id.* P 64. Specifically, the Commission found that it was unjust and unreasonable for resources to be compensated at the same level even when providing different amounts of frequency regulation service.

paid according to the actual service they provide.³⁹ Further, while MISO notes that using the Regulating Mileage MCP could cause issues with uplift,⁴⁰ it does not explain these issues sufficiently or address why it is appropriate to manage a potential uplift issue by failing to implement a specific requirement of Order No. 755. Accordingly, we will require MISO to submit, in the compliance filing ordered below, Tariff revisions to use the Regulating Mileage MCP to charge resources back for any increment of undeployed regulating reserve mileage.

35. We are requiring MISO to charge back a resource for undeployed regulating reserve mileage according to the Regulating Mileage MCP rather than its Regulating Mileage Offer for several reasons. Under MISO's proposal, instances of paying resources differently for the same service would be an ever-present feature of the market design whenever MISO deploys a resource less in real-time than it anticipated day-ahead. In contrast, using the Regulating Mileage MCP will generate a market-based payment that will be paid uniformly to all resources cleared during the same settlement period, consistent with Order No. 755's requirements. Charging back the Regulating Mileage MCP, rather than charging the resource back its own mileage offer, when it has undeployed regulating reserve mileage should not give resources incentives to offer something other than their true respective costs for capacity and mileage. While charging back the Regulating Mileage MCP to the resource for undeployed regulating reserve mileage may result in uplift payments that were not necessary under MISO's proposal, we believe that use of the Regulating Mileage MCP is more consistent with the requirements of Order No. 755. Further, we note that, per our discussion below, uplift concerns may be lessened as MISO gains experience and revisits its day-ahead deployment assumptions. As it relates to our concerns regarding MISO's uniform deployment assumption, we will require MISO to file, 14 months after implementation of these rules, an informational filing describing the extent to which its deployment assumption reflects actual deployment, and what effect this has had on the need to credit and charge back market participants for their actual provision of regulation service in response to real-time dispatch.

³⁹ *Id.*

⁴⁰ *See, e.g.,* Gardner Test. at 24 (“[t]he examples in Appendix III show that deriving the Regulating Mileage MCP from the co-optimization will introduce uplift when a Regulating Mileage Target, as a result of AGC deployment, is different from the Regulating Mileage considered in the cooptimization. The different treatment for Additional Regulating Mileage and Undeployed Regulating Mileage appropriately addresses the uplift issue.”). While MISO does provide an appendix attached to Gardner's testimony to provide some additional detail, we find that MISO does not provide an explanation of its proposed departure from the requirements of Order No. 755.

36. Also, consistent with the allocation of other costs associated with the procurement of regulating reserves, we will require MISO to include in its compliance filing Tariff revisions to allocate the uplift costs necessitated by charging back the Regulating Mileage MCP to resources for undeployed regulating reserve mileage pursuant to existing Schedule 3 of the Tariff (i.e., based on actual energy withdrawals).⁴¹

C. Uniform Deployment Assumption

1. MISO's Proposal

37. As noted above, to calculate the total expected regulating reserve resource cost from a resource that is used in the selection of resources, MISO proposes a new term, Regulating Total Cost, which is the hourly cost of regulation from a resource⁴² as a function of the resource's two regulating reserve offer components. MISO uses the Regulating Total Cost to select the most cost-effective regulating reserve resources in the day-ahead market. A resource's Regulating Total Cost is calculated as follows:

$$\text{Regulating Total Cost} = \text{Regulating Capacity Offer} + (12 * \text{Regulating Mileage Offer})$$

38. Under MISO's proposal, a resource's Regulating Mileage Offer is multiplied by twelve in the Regulating Total Cost calculation to reflect MISO's assumption that each resource will be asked to move "one full deployment" of its capacity in each of the twelve five-minute dispatch intervals in an hour.⁴³ In other words, under MISO's proposal, a resource's assumed mileage in each hour is equal to twelve times the amount of the resource's cleared regulation capacity. The Regulating Total Cost calculated is an approximation for the hourly total cost for a resource for each hour during its commitment period. MISO assumes a 1:1 ratio of regulating reserve capacity to regulating reserve mileage.

⁴¹ See MISO, FERC Electric Tariff, Fourth Revised Vol. No. 1, First Revised Sheet No. 1796.

⁴² As mentioned earlier, the use of the Regulating Total Cost concept allows it to select resources considering both the capacity and mileage components, in its effort to minimize the total cost of the needed regulation reserves.

⁴³ MISO asserts that it bases this assumption on historical data that show, on average, each MW of cleared capacity is asked to move an equal number of miles in each 5-minute dispatch interval. Gardner Test. at 17-18.

2. Commission Determination

39. With respect to MISO's proposal to apply a full deployment per dispatch interval (i.e., a 1:1 ratio between regulating reserve mileage and regulating reserve), MISO explains in its filing that it sampled historical AGC deployments to derive the 1:1 ratio. MISO states, however, that there also were a number of dispatch intervals in which the 1:1 ratio did not hold. We also note that, given MISO's practice of dispatching faster-ramping resources first, a uniform deployment assumption might not accurately reflect the movement asked of different types of resources.⁴⁴ While MISO has committed to revisiting the assumption that all resources will move one full deployment after two years of market experience, we are concerned that two years may be too long. Accordingly, we will require MISO to submit, in the informational report directed below, additional information regarding the effect the 1:1 ratio has had on the efficient clearing and equitable settlement of the frequency regulation market based on one year of experience with the proposal. MISO should file the informational report within 14 months of the effective date of the proposed Tariff revisions.⁴⁵

D. Accuracy

1. Order No. 755

40. Order No. 755 required that the RTO/ISO measure the accuracy of provision of regulation service of a resource in relation to the system operator's dispatch signal.⁴⁶ Under Order No. 755, RTOs/ISOs are required to link the measurement of a resource's accuracy in meeting the system operator's AGC dispatch signal, and to reflect the resource's performance accuracy in the resource's compensation procedures.

2. MISO's Proposal

41. MISO states that it proposes to measure the actual outputs of resources in comparison to AGC instructions. MISO explains that the performance accuracy test approach will: (1) calculate the Actual Resource Response showing how well a resource

⁴⁴ Because MISO dispatches faster resources first, it should expect to see faster-ramping resources dispatched to provide more service in real-time than relatively slower-ramping resources. When a resource is dispatched more in real-time than was expected day-ahead, that resource will be compensated at the market clearing price for mileage, ensuring that it is not denied appropriate compensation.

⁴⁵ The Commission does not intend to issue a public notice, accept comments, or issue an order on the informational report.

⁴⁶ Order No. 755, FERC Stats. & Regs. ¶ 31,324 at P 151.

responds to AGC stepped set points within each five minute dispatch interval; (2) calculate the Desired Resource Response assuming that a resource starts from its actual output at the beginning of each five-minute dispatch interval and ramps toward its AGC stepped set points within that five-minute dispatch interval; and (3) compare the Actual Resource Response against the Desired Resource Response on a granular, five-minute dispatch interval basis.⁴⁷

42. MISO proposes to define acceptable accuracy as a resource's Actual Resource Response⁴⁸ being within a tolerance band of 70 percent or more of that resource's Desired Resource Response⁴⁹ following AGC instruction. MISO explains that it developed the tolerance band by examining the currently observed accuracy of generation in following Setpoint Instructions when providing Regulating Service to better understand these resources' performance characteristics. The study results showed that the proper accuracy threshold needed to be developed to account for measurement noise as well as delays caused by non-linear responses and/or ICCP latency.⁵⁰ If a resource's response falls outside the 70-percent tolerance band, MISO proposes that the resource only be paid for its percentage of deployed regulation mileage relative to the desired mileage in the five-minute dispatch interval. If a resource fails four consecutive five-minute dispatch intervals in an hour and Excessive/Deficient Energy Deployment Charges have not been assessed, MISO proposes that the resources receive no regulation capacity payment.

3. Commission Determination

43. We find that MISO's proposed accuracy provisions satisfy the requirements of Order No. 755. MISO's proposed Tariff revisions include means of (1) measuring the accuracy of a resource's response and (2) compensating those resources according to the accuracy of their responses. We find that these provisions should improve overall frequency regulation market performance by encouraging all resources to improve the speed and accuracy of their response. However, while MISO has noted that the 70

⁴⁷ Filing at 7.

⁴⁸ Actual Resource Response is the amount of actual movement in response to Setpoint Instructions. *Id.* at 14.

⁴⁹ Desired Resource Response is the movement, in MW, that a resource is capable of providing during a dispatch interval, based on the resource's applicable ramp rate. *Id.* at 34.

⁵⁰ Gardner Test at 27. ICCP is the Inter-Control Communications Protocol to provide data exchange over wide area networks between utility control centers, utilities, power pools, regional control centers, and Non-Utility Generators.

percent tolerance band was developed to account for inaccuracies in metering due to measurement noise, non-linear responses, and ICCP latency, we understand that some of the 70 percent tolerance band also incorporates resources not properly following AGC instruction. Accordingly, we direct MISO to include in its informational filing an analysis of the percentages attributable to each of the factors listed above that impact the tolerance band. As part of this analysis, we direct MISO to address why the tolerance band should continue to include the factor that reflects resources' inability to accurately follow Setpoint Instructions.

E. Market Power and Mitigation

1. Order No. 755

44. Order No. 755 found that the changes it required may render existing RTO and ISO market power mitigation rules insufficient to address market power concerns.⁵¹ Accordingly, Order No. 755 required each RTO and ISO to submit revised market power mitigation provisions, as appropriate, to conform with the Commission's required rule changes, or explain how its current market power mitigation methods will continue to be sufficient to address market power concerns.⁵²

2. MISO's Proposal

45. MISO asserts that the current conduct and impact test mitigation methods found in Module D of its Tariff for evaluation of the potential exercise of market power are adequate to monitor regulation service and that additional Tariff provisions related to mitigation are unnecessary. MISO explains that its Independent Market Monitor will continue to monitor activity in the markets, including but not limited to regulation service activity. In general, MISO argues that the Independent Market Monitor's existing Tariff procedures are adequate to evaluate whether a market participant is engaging in potentially prohibited conduct and/or if such conduct has an impermissible impact on prices in the MISO region. MISO states that the Regulating Total Cost Reference Levels for each market participant will be calculated by and used by the Independent Market Monitor to perform the conduct test for potential mitigation. MISO further states that the Independent Market Monitor will monitor the Regulating Mileage Offers and Regulating Reserve MCPs.

46. In addition to utilizing its existing market mitigation provisions, MISO proposes additional regulating reserve offer rules. Specifically, MISO proposes certain offer restrictions whereby (1) all Regulating Mileage Offers must be non-negative and (2)

⁵¹ Order No. 755, FERC Stats. & Regs. ¶ 31,324 at P 136.

⁵² *Id.*

when the resource's Regulating Capacity Offer is negative, the Regulating Mileage Offer must be \$0/MW. Also, MISO proposes that the day-ahead and real-time Regulating Total Cost be between negative \$500 MW/h and positive \$500 MW/h. This is an offer cap on the combined offer calculated by MISO, not on one or the other component of the total offer.

3. Commission Determination

47. We find that MISO's proposed market power mitigation provisions satisfy the requirements of Order No. 755. MISO's proposed revisions include performance offers in the process to determine regulation MCPs to which total cost is compared when determining available supply. Also, increasing the amount of regulation offered can increase competition in the regulation market, thereby reducing the need to implement mitigation. Additionally, we note that the Independent Market Monitor will monitor the Regulating Mileage Offers and Regulating Mileage MCPs for market power concerns. Thus, we find that the current market power mitigation provisions in Module D of the Tariff for evaluation of the potential exercise of market power are adequate to monitor regulation service.

F. Additional Issues

48. In its comments, MidAmerican states that it does not oppose MISO's compliance filing; however, it argues that in Module A and section 40.3.3.b of the Tariff, MISO has proposed redundant and potentially inconsistent definitions of the following new terms, which should instead be consolidated in Module A: Additional Regulating Mileage, Instructed Energy Mileage, Instructed Regulating Mileage, Instructed Total Mileage, Regulating Mileage Target, and Undeployed Regulating Mileage.⁵³ In its answer, MISO explains that it is willing to eliminate the redundant definitions found in section 40.3.3.b of the Tariff.⁵⁴

49. In response to concerns raised by MidAmerican, we will require MISO to address, in the compliance filing ordered below, the overlap between the proposed definitions of Additional Regulating Mileage, Instructed Energy Mileage, Instructed Regulating Mileage, Instructed Total Mileage, Regulating Mileage Target, and Undeployed Regulating Mileage. We therefore direct MISO either to explain why these definitions are not overlapping or propose changes to these definitions that clarify and remove any overlaps.

⁵³ MidAmerican Comments at 3.

⁵⁴ MISO Answer at 3-4.

50. We note that the Tariff sections filed in this proceeding include portions of the Tariff revisions filed in the Extended LMP proceeding. Making Tariff revisions accepted in the Extended LMP Order effective on December 17, 2012 as part of this proceeding would be inappropriate, as the Tariff revisions accepted in the Extended LMP Order have not yet been made effective.⁵⁵ We therefore direct MISO to submit, in the compliance filing directed below, Tariff revisions to remove from the Tariff sections filed in this proceeding Tariff revisions proposed in the Extended LMP proceeding.

51. We are concerned that the proposed revisions to sections 39.2.5A (version 1.5.0) and 40.3.3 (version 2.3.0) will be superseded by revisions to sections 39.2.5A (version 2.0.0) and 40.3.3 (versions 2.4.0 and 2.5.0) accepted effective June 12, 2012 by the Commission in the MISO Order Nos. 719 and 745 compliance proceedings (e.g., so that the proposed revisions in version 1.5.0 of section 39.2.5A will not appear in the current version of the MISO Tariff effective December 17, 2012).⁵⁶ We are also concerned that the proposed revisions to section 40.2.6 (version 0.5.0) will be superseded by version 1.0.0 of section 40.2.6 accepted effective October 1, 2012 in the MISO resource adequacy proceeding.⁵⁷ We will require MISO to submit, in the compliance filing ordered below, revised sections 39.2.5A, 40.2.6, and 40.3.3 that appropriately reflect MISO's Order No. 755 compliance filing in the Tariff effective December 17, 2012.

52. We are concerned that (1) the proposed revisions to section 40.2.5 (version 5.0.0) do not reflect, and will supersede, revisions to section 40.2.5 (version 3.0.0) accepted by the Commission effective October 1, 2012 in the MISO resource adequacy proceeding;⁵⁸

⁵⁵ In the Extended LMP Order, the Commission directed MISO to make a compliance filing which includes the date when MISO proposes to implement the proposed new and revised Tariff provisions and left for further order issues regarding the effective date of the Extended LMP methodology. *See* Extended LMP Order, 140 FERC ¶ 61,067 at P 63.

⁵⁶ *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,059 (2012); *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,060 (2012). *See also* MISO, FERC Electric Tariff, 39.2.5A, Demand Response Resource - Type I Offer Rules in the Day-Ah, 2.0.0, 40.3.3, Real-Time Energy and Operating Reserve Market Settlement Cal, 2.4.0, 40.3.3, Real-Time Energy and Operating Reserve Market Settlement Cal, 2.5.0.

⁵⁷ *Midwest Indep. Transmission Sys. Operator, Inc.*, 139 FERC ¶ 61,199 (2012) (Resource Adequacy Order). *See also* MISO, FERC Electric Tariff, 40.2.6, DRR-Type I Offer Rules in RT EORM, 1.0.0.

⁵⁸ Resource Adequacy Order, 139 FERC ¶ 61,199. *See also* MISO, FERC Electric Tariff, 40.2.5, Generation Offer and DRR II Offer Rules in RT EORM, 3.0.0.

(2) the proposed revisions to sections 40.2.15 (version 2.5.0) and 40.2.17 (version 4.5.0) do not reflect, and will supersede, revisions to sections 40.2.15 (version 1.5.0) and 40.2.17 (version 1.0.0) accepted by the Commission effective November 9, 2010 in the

MISO interface pricing proceeding;⁵⁹ and (3) the proposed revisions to section 40.3.3 (version 2.3.0) do not reflect, and will supersede, revisions to section 40.3.3 (version 1.5.0) accepted by the Commission effective September 1, 2012 in the MISO Voltage and Local Reliability (VLR) proceeding.⁶⁰ We will require MISO to submit, in the compliance filing ordered below, a revised section 40.2.5 that appropriately reflects Tariff revisions accepted in MISO's resource adequacy and interface pricing proceedings.

53. We note that the proposed revisions to sections 33.8.2, 40.2.5, and 40.3.3 include Tariff revisions pending before the Commission in the Dispatchable Intermittent Resources proceeding.⁶¹ Therefore, our conditional acceptance of sections 33.8.2, 40.2.5, and 40.3.3 is subject to the outcome of that proceeding.

54. We note that the proposed revisions to section 64.1.2 of the Tariff contain revisions conditionally accepted in the VLR proceeding.⁶² Therefore, our acceptance of section 64.1.2 is subject to the outcome of that proceeding, and we will require MISO to submit, in the compliance filing directed below, Tariff revisions to ensure that section 64.1.2 reflects Tariff revisions filed in that proceeding.

55. Finally, we require MISO to submit, in the compliance filing directed below, Tariff revisions to address the following concerns regarding the proposed Tariff revisions:

⁵⁹ *Midwest Indep. Transmission Sys. Operator, Inc.*, 134 FERC ¶ 61,010 (2011); *Midwest Indep. Transmission Sys. Operator, Inc.*, Docket No. ER11-2053-001 (Oct. 28, 2011) (delegated letter order). *See also* MISO, FERC Electric Tariff, 40.2.17, Calculation of Real-Time Ex Post LMPs and Ex Post MCPs, 1.0.0, 40.2.15, Real-Time Energy and Operating Reserve Market Process, 1.5.0.

⁶⁰ *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61,171 (2012) (VLR Order). *See also* MISO, FERC Electric Tariff, 40.3.3, Real-Time EORM Market Settlement Calculations, 1.5.0.

⁶¹ MISO March 30, 2011 Compliance Filing, Docket No. ER11-1991-002, 33.8.2, Manual Redispatch Compensation and Eligibility, 1.0.0, 40.2.5, Generation Offer and DRR II Offer Rules in RT EORM, 2.0.0, 40.3.3, Real-Time EORM Market Settlement Calculations, 2.0.0.

⁶² VLR Order, 140 FERC ¶ 61,171.

- 1) In several sections, MISO does not consistently capitalize terms to indicate that they are defined in the Tariff, including “Day-Ahead Schedule,”⁶³ “Export Schedule,”⁶⁴ and “Resource;”⁶⁵
- 2) In several sections,⁶⁶ MISO refers to “Regulating Reserve Deployment instructions” rather than “Regulation Deployment Instructions,” as defined in section 1.556 of the Tariff;⁶⁷
- 3) Section 1.549 refers to “[c]apacity held in a reserve” rather than “[c]apacity held in reserve;”⁶⁸
- 4) Sections 40.2.7.b.ii and 40.2.7A.b.i should provide, in part, that “[i]f the Regulating Capacity Offer is negative, then the Regulating Mileage Offer must be \$0/MW;”⁶⁹ and
- 5) Section 40.3.4.1 refers to “regulating minimum limit” and “regulating maximum limit,”⁷⁰ rather than “Hourly Regulation Minimum Limit” and “Hourly Regulation Maximum Limit,” as defined in sections 1.299 and 1.300 of the Tariff.⁷¹

⁶³ See, e.g., MISO, FERC Electric Tariff, 40.2.17, Calculation of Real-Time Ex Post LMPs and Ex Post MCPs, 4.5.0, at § 40.2.17.o.

⁶⁴ See, e.g., *id.* 40.3.4.1, Regulation Performance Accuracy Measurement Test Failure Cha, 0.0.0, § 40.3.4.1.c.

⁶⁵ See, e.g., *id.* 1.313a, Instructed Energy Mileage, 0.0.0.

⁶⁶ See, e.g., *id.* 1.313b, Instructed Regulating Mileage, 0.0.0.

⁶⁷ *Id.* 1.556, Regulation Deployment Instruction:, 0.0.0.

⁶⁸ *Id.* 1.549, Regulating Reserve:, 1.0.0.

⁶⁹ *Id.* 40.2.7, External Asynchronous Resource Offer Rules in the Real-Time, 2.0.0, 40.2.7A, Stored Energy Resource Offer Rules in the Real-Time Energy a, 1.0.0 at §§ 40.2.7.b.ii, 40.2.7A.b.i.

⁷⁰ *Id.* 40.3.4.1, Regulation Performance Accuracy Measurement Test Failure Cha, 0.0.0.

⁷¹ *Id.* 1.299, Hourly Regulation Maximum Limit:, 0.0.0, 1.300, Hourly Regulation Minimum Limit:, 0.0.0.

The Commission orders:

(A) MISO's proposed Tariff revisions are hereby accepted, subject to conditions, effective December 17, 2012, as discussed in the body to this order.

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

(C) MISO is hereby directed to make an informational report within 14 months of the effective date of the proposed Tariff revisions, as discussed in the body of this order.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.