

**MARKET POWER STUDY
FOR THE
MIDWEST ISO'S PROPOSED
ANCILLARY SERVICES MARKETS**

MIDWEST ISO INDEPENDENT MARKET MONITOR
POTOMAC ECONOMICS, LTD.

David B. Patton, Ph.D.

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I. INTRODUCTION AND SUMMARY

On February 15, 2007, Midwest ISO filed revisions and amendments to its Transmission and Energy Markets Tariff (“TEMT” or “Tariff”) to implement a Day-Ahead, Real-Time Ancillary Services Market (“ASM”) for operating reserves. On June 22, 2007, the Federal Energy Regulatory Commission (“FERC” or “Commission”) issued an Order addressing Midwest ISO’s February 15, 2007 filing.¹ In its Order, the FERC identified several tasks for Midwest ISO in preparation for the ASM launch and necessary for Tariff approval. One of the tasks is for Midwest ISO to perform a Market Power Analysis.

The Market Power Analysis seeks to determine if any market participants could have market power in providing ASM products. Consistent with Commission precedent in *Ocean Vista*², the Midwest ISO must perform a market power analysis in order to determine whether sellers lack, or have adequately mitigated, market power with regard to each proposed ancillary service market. The Market Power Analysis must include:

1. Definitions of the ancillary services products to be sold at market-based rates;
2. Estimates of both total demand for the market (i.e., quantities required) and total supply available for each ancillary service;
3. Calculation of market shares for each seller within each product market;
4. Calculation of Hirschman-Herfindahl Indices (HHIs) for each product market; and
5. Analysis of barriers to entry and potential competitors.

The Market Power Analysis should address market monitoring, and to the extent that the Analysis finds that market power issues arise, the study should propose mitigation to address the potential for market power. In Order No. 697,³ the FERC revised certain of its rules governing market-based rates for wholesale sales of electric energy, capacity and ancillary services, but

¹ *Midwest Independent Transmission System Operator, Inc.*, 119 FERC ¶ 61,311 (2007).

² *Ocean Vista Power Generation, L.L.C.*, 82 FERC ¶ 61,114 (1998) (*Ocean Vista*).

³ *Market-Based Rates For Wholesale Sales Of Electric Energy, Capacity And Ancillary Services By Public Utilities*, 119 FERC ¶ 61,295 (2007) (“Order No. 697”). The rule becomes effective September 18, 2007.

said it would continue its existing approach regarding market-based pricing for ancillary services in RTOs and ISOs.⁴

Our market power analysis suggests the Midwest ISO region does not face region-wide market power concerns for the proposed ancillary services markets. However, the definition of sub-areas within the Midwest ISO with separate reserve requirements raises substantial market power concerns, which are addressed by the monitoring and mitigation measures presented herein. Details of the analysis are presented below. Given the results of this study that indicate potential market power in the proposed markets, we present a proposal for monitoring and administering conduct-and-impact based market power mitigation in Section III. Monitoring and conduct-and-impact mitigation is designed to limit the exercise of market power without limiting competitive market behavior. The proposed approach to market power mitigation to be applied in the ancillary services markets would be consistent with the Midwest ISO's Commission approved energy market mitigation.

A. Proposed Ancillary Services Markets

The proposed Midwest ISO Ancillary Services Markets will provide for the efficient acquisition and pricing of Regulating and Contingency Reserves, building upon the existing two-part financial settlement Energy Market design. The simultaneous co-optimization approach seeks to minimize overall production costs in the Midwest ISO markets through the coordinated market-based procurement of both Energy and Operating Reserves. Variations on this approach are being used by existing ISOs/RTOs that provide Ancillary Services through market-based mechanisms.

The Midwest ISO proposes scarcity demand curves for regulation and contingency reserves to be invoked when either regulation or operating reserves are deficient. The demand curves can be invoked on either a market-wide or zonal basis, depending on the nature of the deficiency. When resources are insufficient to satisfy requirements for both energy and ancillary services, the

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Order No. 697, at P 1069. While Order No. 697 specifically defers to *Ocean Vista* with respect to ancillary services market, *Ocean Vista* relies upon the Commission's policies on market power analysis. Order No. 697 modifies elements of the Commission's policies concerning market power analysis and therefore remains relevant to market power analyses addressing ancillary services markets.

market design allows the costs of the shortage to be fully reflected in both energy and ancillary services prices. The implementation of these markets promises to deliver substantial benefits in both the short-term and long-term. In the short-term, these co-optimized markets will improve the commitment and dispatch of resources for satisfying the region's energy and ancillary service requirements. In the long-term, the more efficient price signals produced from these markets should result in improved investment, maintenance and retirement decisions. Additionally, the more efficient pricing that results from co-optimization along with the effects of scarcity demand curves will, under most circumstances, improve incentives for market participants to submit offers that accurately reflect marginal costs.

Co-optimized ancillary services markets inherently tend to diminish market power concerns and reduce the need for mitigation measures. The simultaneous co-optimization approach evaluates trade-offs between scheduling a resource to produce energy and scheduling it to provide ancillary services, and selects the least cost security constrained assignment of resources to provide energy and reserves. A resource owner that submits a relatively high offer price for reserves can be dispatched for energy instead, allowing the market to back another energy provider down to provide reserves in its place. This simultaneous evaluation increases substitutability between different uses for a resource. This increased substitutability inherently reduces market power. Nonetheless, suppliers can become pivotal suppliers of contingency reserves or regulation in local areas and, therefore, may have market power.

B. Requirements of the Market Power Analysis

Under the existing FERC policy a supplier of ancillary services may make sales at market-based rates only if the supplier has been authorized to make such sales by the Commission. As noted above, the Commission's policy for the analysis of market power issues in ancillary services markets operated by an RTO is set out in *Ocean Vista*.⁵ The first step in a market power analysis is identification of the relevant market, which requires definition of the product and the geographic market wherein the product is traded. Once the market definition is established, it is possible to identify gross facts of supply and demand in the market, and assess whether market

⁵ See *Ocean Vista* and Order No. 697, cited above.

conditions are such that one or more suppliers could predictably and profitably raise prices, i.e. exercise market power.

1. Definition of Relevant Product Markets

Defining a product for the purposes of market power analysis requires description of the applicant's product – here the operating reserves to be provided in the ancillary services markets – and consideration of available substitutes for a good. As FERC explains in *Ocean Vista*:

A relevant product market would include the applicant's product, together with other products that – from the buyer's perspective – are good substitutes. Products are generally regarded as good substitutes if each substitute is shown to be comparable in terms of price, quality and availability. We have concluded, as an initial matter, that each ancillary service is a separate product.⁶

The Midwest ISO, as system operator, requires a variety of operating reserves to maintain real time system reliability. As proposed by the Midwest ISO, the RTO will operate markets to obtain regulating reserves, spinning reserves and supplemental reserve products, defined as follows⁷:

- *Regulating Reserves*. Regulating Reserves allow the system operator to physically balance supply and demand on a real time basis with qualified Generation and Demand Response Resources.
- *Spinning Reserve*. Reserved capacity held on qualified Generation Resources or Demand Response Resources that are synchronized to the grid and able to quickly increase their generation output (or reduce load) in response to system needs.
- *Supplemental Reserve*. Reserved capacity provided by Generation Resources not necessarily synchronized to the grid, but which can be quickly ramped up to offer capacity, or by demand-responsive load that can be curtailed or interrupted within this same time frame.

Spinning reserves and supplemental reserves are comparable in many respects and are considered together under the more general category of “Contingency Reserve” in the Midwest ISO tariff. Further, the locational requirements that may be defined for certain areas in the Midwest ISO will not distinguish between spinning and supplemental reserves. One important

⁶ *Ocean Vista* at 61,407.

⁷ As noted above these products will be announced in both Day-Ahead and Real-Time on a basis that is simultaneously co-optimized with the energy markets.

factor in determining whether spinning reserve should be defined as a separate product is the extent to which substitution is possible between spinning reserves and other classes of contingency reserves. Such substitution would prevent a large supplier of spinning reserve from withholding it to raise prices. In this context, substitution occurs by committing peaking resources that can start within the hour so the market will reduce dispatch of online resources to provide additional spinning reserves. To evaluate this, Figure 1 shows number of hours over the past 18 months (the left Y-axis) in which the quantity of available peaking resources that can start in less than one hour was in the range shown on the X-axis. The figure also shows the cumulative frequency with which the available resources are equal to or less than each level.

Figure 1: Available Peaking Resources
January 2006-July 2007

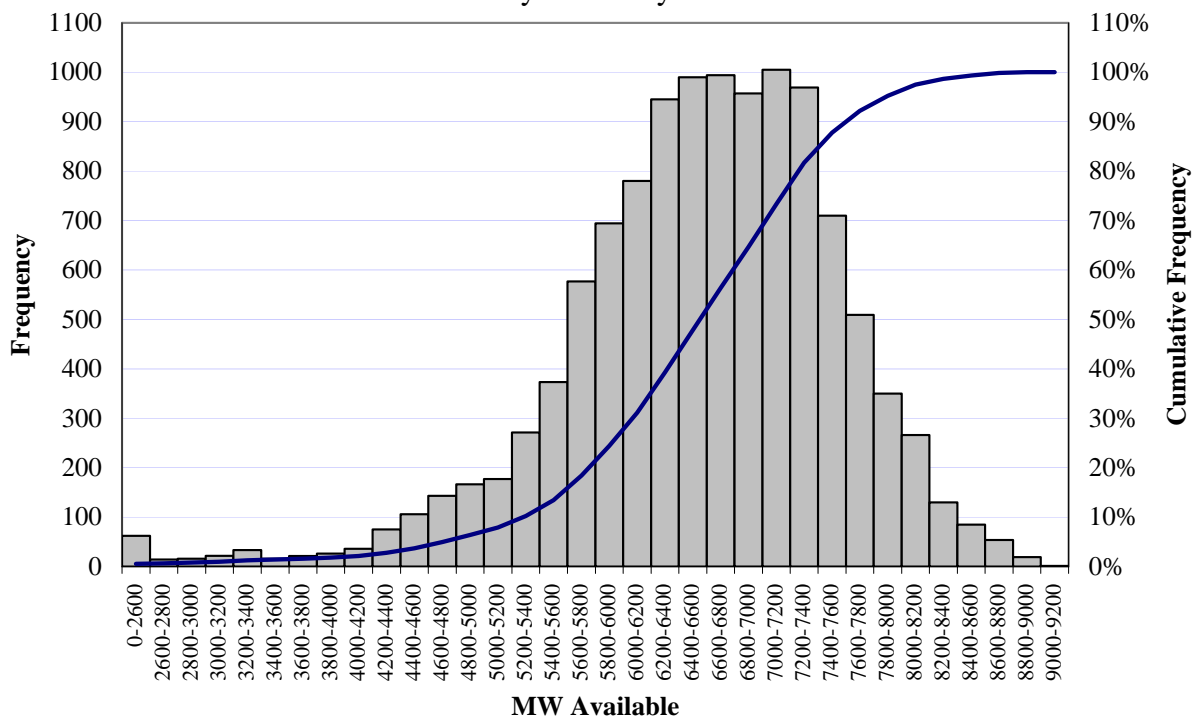


Figure 1 shows that there is generally substantially quantities of peaking resources that can be started to avoid a spinning reserve shortage. In fact, 95 percent of the hours have available resources greater than 4000 MW. Hence, one can conclude that it is extremely unlikely that a supplier could create a shortage of spinning reserves without a shortage of contingency reserves.

Therefore, given the substantial level of online resources committed each day that can provide spinning reserves and the quantity of peaking resources available to start to create additional

spinning reserves, we do not define spinning reserves as a relevant product separate from supplemental reserves. Hence, the relevant product markets defined for purposes of the market power analyses in this report are contingency reserves and regulating reserves.

2. Geographic Market Definition

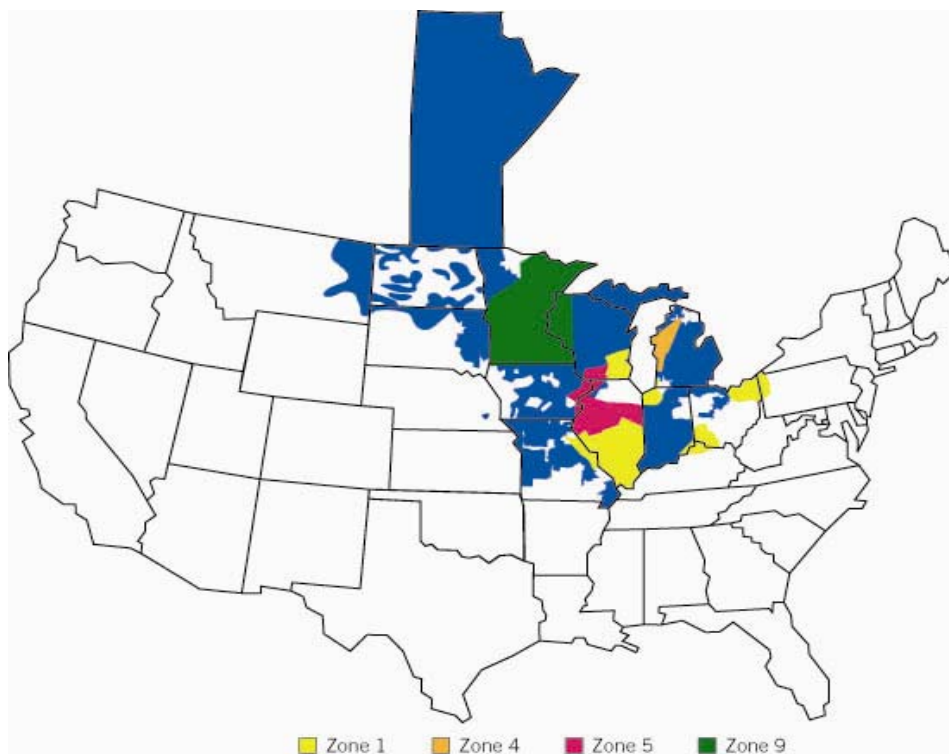
Relevant FERC orders state that a description of the relevant geographic market should reflect all potential suppliers of the product from whom buyers could purchase to avoid a price increase by the applicant. For an RTO, with an electricity market integrated into transmission system operations, the relevant geographic market is generally defined by the bounds of the region under a single, security-constrained commitment and dispatch market, except when delivery is limited by binding transmission network constraints. When transmission constraints are binding, a supplier within the constrained geographic area faces competition from fewer suppliers. FERC reiterated its commitment to this approach in Order No. 697. In that order, FERC said it would continue to use the RTO region as the default relevant geographic market, except in cases in which the Commission has made a specific finding that there is a submarket within an RTO. In these latter cases, submarkets must be examined separately in the market power analysis.

FERC has not issued specific findings with respect to submarkets for ancillary services in the Midwest ISO, and therefore the RTO region serves as the default relevant market area for the market power analysis. Additionally, however, the Midwest ISO's proposed ancillary services market design calls for the Midwest ISO to establish local ancillary service requirements for sub-areas within the Midwest ISO. When these areas are binding, they operate very similar to transmission constraints in that suppliers outside of the area cannot provide reserves to satisfy the requirement. In these cases, the local areas must be defined as additional relevant geographic markets. This is complicated by the fact that these areas can be established, eliminated, or redefined by the Midwest ISO, generally on a quarterly basis.⁸ Therefore, there is not single, static list of geographic markets that can be defined for this study.

⁸ The Midwest ISO proposes to modify the reserve zones quarterly and to establish locational requirements for these zones two days prior to the operating day. The reserve zones also maybe adjusted for reliability. See Direct Testimony of Roy L. Jones.

However, the local reserve requirements are generally only justified in areas that can be isolated by binding transmission constraints (otherwise reserves could be activated in other areas when a contingency occurs in the local area). Therefore, known constrained areas in the current energy markets have been defined as relevant geographic markets. Two of these areas are areas that have been defined as Narrow Constrained Areas (“NCA”) for purposes of market power mitigation in the energy market. The other area is one that is periodically constrained and the congestion into this area could be the basis for the definition of a reserve zone in the future.

The Midwest ISO also conducted a preliminary analysis of potential local ancillary services areas and identified four additional potentially constrained areas (which are referred to in the preliminary study as “clusters”) that also have been evaluated as separate relevant geographic markets. The four clusters are shown in the following map (although they are referred to as “zones” in the legend to the map). The blue areas in the map are the portions of the Midwest ISO region that are not contained in any of the four clusters.



The four clusters shown in the map encompass the following areas:

- Cluster #1 – The Midwest ISO Central Region and First Energy, but excluding points in southern Illinois and southern Indiana;
- Cluster #4 – Northwestern Michigan excluding the Upper Peninsula;
- Cluster #5 – Northwestern Illinois and Southwestern Wisconsin; and,
- Cluster #9 – Minnesota and Western WUMS.

We define each of these areas as relevant markets for our market power analysis. Hence, we define the following eight relevant geographic markets for the purposes of this market study:

- All of MISO;
- Three known existing congested areas: WUMS NCA, Minnesota NCA, and Michigan; and
- The four areas identified in MISO’s initial locational reserve requirement study, identified as Cluster #1, Cluster #4, Cluster #5, and Cluster #9.

3. Supply and Demand for Operating Reserves

For the analysis below we have estimated Regulating Reserve and Contingency Reserve capability based upon an analysis of existing market data. The proposed Midwest ISO ASM rule changes define Regulation Qualified Resources as, “A Generation Resource or a Demand Response Resource-Type II that has met the requirements to be eligible to submit Regulating Reserve Offers into the Energy and Operating Reserve Markets.” These proposed rule changes also provide definitions for Spin Qualified Resources and Supplemental Qualified Resources. Because these definitions are not yet implemented, the Midwest ISO does not have formal count of resources to provide each of these categories of reserve, and we instead have assessed existing market data to determine likely resource availability. Estimates of reserves based upon current operating data provide the best available indication of potential resource availability.

The Midwest ISO will establish reserve zones as necessary to ensure that Regulating Reserves and Contingency Reserves are dispersed in a way that helps prevent adverse operating conditions from undermining grid reliability. Because transmission constraints may prevent Operating Reserves in one area from responding to contingencies in another area, the value of the reserves may vary by location. The proposed design will allow the market to reflect this locational value of resources.

4. Measures of Market Power

Market Share Analysis: Market share analysis offers the simplest, most basic characterization of potential market power. The wholesale market share screen measures whether a seller has a dominant position in the market based on the number of megawatts of uncommitted capacity owned or controlled by the seller as compared to the uncommitted capacity of the entire relevant market. FERC employs an initial threshold of 20 percent. The market share screen will be satisfied if no seller has more than 20 percent of the uncommitted capacity in the relevant market.⁹

However, the 20 percent threshold does not constitute a bright line test. FERC has said, “While the Commission generally concludes that market power is not a concern when the results are below the threshold, it does not necessarily follow that market power is a concern when the thresholds are exceeded, depending on other relevant factors.”¹⁰ In particular, in cases in which supply far exceeds demand, even a supplier with a 20 percent market share would be unable to exercise market power.

Herfindahl-Hirschman Index: An alternative analysis of market structure adopted by the Commission evaluates the market’s concentration using the Herfindahl-Hirschman Index (“HHI”). The HHI is a standard measure of market concentration calculated by summing the square of each supplier’s market share. The antitrust agencies generally characterize markets with HHIs of greater than 1,800 as highly concentrated.¹¹ Concentration statistics can indicate the likelihood of coordinated interaction in a market. All else being equal, the higher the HHI, the more likely it is that firms would be able to extract excess profits from the market.

The market share assessment and HHI statistics provide only generic indicators of market concentration in electric power markets, not definitive measures of market power.¹² The

⁹ Order No. 697 at P 89-91.

¹⁰ *Atlantic City Electric Company*, 86 ¶ FERC 61,248 at 61,903 (1999).

¹¹ The DOJ and FTC evaluate the *change* in HHI as part of standard merger analysis. However, this is only a preliminary analysis that would typically be followed by a more rigorous simulation of the likely price effects of the merger.

¹² For example, see Severin Borenstein, James B. Bushnell, and Christopher R. Knittel, “Market Power in

usefulness of these statistics is limited by the fact that they reflect only the supply-side, and ignore demand-side factors affecting competition. Also, these statistics are relatively static in orientation, which limits their value for characterizing the constantly changing balance of resources and load affecting market power in electric markets. Since electricity cannot be stored economically in large scale, production must match demand on a real-time basis. When demand rises, an increasing quantity of generation is utilized to satisfy the demand, leaving fewer alternative resources that can respond by increasing output and displace any supplier seeking to withhold resources. Hence, markets with higher resource margins tend to be more competitive, but both the market share and HHI statistics neglect this aspect of the market. Pivotal supplier analysis, discussed next, remedies this problem.

Pivotal Supplier Analysis: A more reliable means to evaluate the competitiveness of electricity markets and recognize the dynamic nature of market power in these markets is to identify when one or more suppliers are “pivotal”. A supplier is pivotal when the output of some of its resources is needed to meet demand in the market. A pivotal supplier has the ability to unilaterally raise the spot market prices to arbitrarily high levels by offering its energy and/or operating reserves at a very high price level. The market may be subject to substantial market power abuse when one or more suppliers are pivotal and the suppliers have the incentive to take advantage of their position to raise prices.¹³

Pivotal supplier analysis can be assessed by calculating a Residual Supply Index (RSI), which represents the ratio of the total available supply resources, net of the largest supplier, to the total demand. An RSI greater than one indicates that sufficient resources are available such that the largest supplier is not pivotal; an RSI less than one indicates that the resources of the largest supplier are necessary to meet load, i.e., the largest supplier is pivotal. The pivotal supplier analysis is presented below in the form of RSI duration curves, which show how often the largest supplier was pivotal over the period analyzed.

Electricity Markets: Beyond Concentration Measures,” *Energy Journal* 20(4), 1999, pp. 65-88.

¹³ Strictly speaking, a pivotal supplier analysis is not required under the *Ocean Vista* requirements. The analysis is presented here to give a more complete view of the potential for market power in the proposed ancillary services markets.

In the case of co-optimized ancillary services, the pivotal supplier analysis recognizes that the supplier can withhold energy and/or reserves. When the supplier withholds energy, it can cause the market to dispatch competitors' resources for energy that would otherwise be available to provide ancillary services.

Given that the market design co-optimizes procurement of energy and operating reserves, the identification of pivotal suppliers for contingency reserves must consider the interaction between the energy and operating reserve markets. For example, a large unit supplying energy and not capacity in a particular hour may nonetheless be pivotal in the operating reserve market. When a resource providing energy reduces output, the market will replace that output from other available resources, including in some circumstances, drawing down reserves in order to meet current load. If replacement operating reserves are not available, a reserve shortage may result. In cases in which a supplier providing energy can cause an operating reserve shortage, that supplier is pivotal for the operating reserve market.

5. Barriers to Entry and Potential Competitors

In determining whether to grant market-based rate authority, the Commission also generally considers whether a supplier has the ability to erect barriers to entry through control over transmission systems, essential building sites, natural gas pipelines or local gas distribution system, or other resources or inputs that could be used to restrict market entry by competing suppliers. Per the Midwest ISO Transmission Owners Agreement filed with the Commission, transmission owners in the Midwest ISO region have granted the RTO operational control over transmission facilities in the region. The Midwest ISO operates the transmission grid under the open access Transmission and Energy Market Tariff filed with the Commission. Therefore market participants are unable to restrict access to transmission facilities by competing suppliers.

The proposed ancillary services markets should facilitate increased competition in the provision of operating reserves. Relative to existing practices, the proposed markets will allow for a more open and transparent approach to supplying operating reserves needed on the Midwest ISO system to maintain reliability. Transparent price signals should encourage provision of operating reserves by existing resources and promote long-term investment in reserves-capable resources in areas with prices high enough to support such investment. In addition, by promulgating

regionally-consistent standards for reserves from Demand Response Resources, the proposed markets will tend to reduce barriers to entry and encourage participation of a broader range of resources, including both qualifying supply and demand.

The Midwest ISO's ASM proposal outlines two types of demand resources eligible to participate in the energy and ancillary services markets—Demand Response Resources Type I and Type II. Type I resources will supply a specific quantity of energy or contingency reserves through physical load interruption, and their offers are to include desired hourly compensation for operating in an interrupted state. Type II resources will supply a range of energy or operating reserves through behind-the-meter generation and/or controllable load, and are to be dispatched in a manner comparable to generation resources. Both types of Demand Response Resources can supply Contingency Reserves, while Type II resources will also be able to offer Regulating Reserves.

II. ANCILLARY SERVICES MARKET ANALYSIS

A. Regulating Reserve

1. Market Definition

Regulating Reserve is necessary to continuously balance total supplier output with total demand of all loads (including losses) within the Midwest ISO Balancing Authority Area, and to maintain the actual Interconnection frequency within acceptable limits based on Applicable Reliability Standards. The Midwest ISO will procure Regulating Reserve on behalf of the Load Serving Entities as provided for in Module C of the Midwest ISO Tariff. A Market Participant may self schedule from their Regulation Qualified Resources in the Energy and Operating Reserve Markets. The provision of Regulating Reserves constitutes a separate ancillary service market for the purposes of the market power analysis as there are no substitutes for Regulating Reserves in the Midwest ISO region.

Regulating Reserve Deployment is accomplished by using automatic control equipment to raise or lower the output of on-line Resources as necessary to follow the moment-by-moment changes in demand and frequency. Only Regulation Qualified Resources will be permitted to supply Regulating Reserve in the Day-Ahead and Real-Time Markets. Regulation Qualified Resources must be:

- Registered in the Energy and Operating Reserve Markets;
- Online and physically located within the Midwest ISO Balancing Authority Area or Pseudo-tied into the Midwest ISO Balancing Authority Area (with the exception of External Asynchronous Resources);
- Capable of supplying Regulation for a minimum continuous duration of sixty (60) minutes; and
- Capable of receiving and responding to automatic control signals, and must provide telemetered output data to the Midwest ISO.

The quantity of Regulating Reserves that can be supplied by particular Regulation Qualified Resource is equal to the its ability to ramp up or down in five minutes (i.e., ramp rate times five). With respect to the geographic market, we define eight relevant geographic markets for the reasons described in the prior section.

The eight geographic markets are:

1. All of MISO;
2. WUMS NCA;
3. Minnesota NCA;
4. Michigan;
5. Cluster #1 – The Midwest ISO Central Region and First Energy, but excluding points in southern Illinois and southern Indiana;
6. Cluster #4 – Northwestern Michigan excluding the Upper Peninsula;
7. Cluster #5 – Northwestern Illinois and Southwestern Wisconsin; and,
8. Cluster #9 – Northwestern Midwest ISO.

2. Supply and Demand for Regulating Reserve

Regulating Reserve can only be supplied by Regulation Qualified Resources that are online and otherwise available to provide regulation. We conducted an hourly analysis of the supply of Regulating Reserves for the 18 month period from January 2006 to July 2007. To conservatively estimate the supply of Regulating Reserves available from each resource, we took the lower of its offered ramp rate times 5, its unloaded capacity, and the maximum amount of regulation it was scheduled to provide during this time period. Hence, units capable of supplying Regulation Reserves, but that were not scheduled to do so by the current balancing authorities are excluded.

Nonetheless, based upon this analysis of hourly operating data, on average in each hour 1,160 MW of generating capacity was available to provide regulating reserve services on the Midwest ISO system. It is important to note that when the ASM markets are implemented, additional Regulating Reserves can be made available by ramping down a regulation-capable unit and ramping up another unit. This quantity is also conservative because it does not include projected online Type II Demand Response Resources that could provide Regulating Reserves or External Asynchronous Resources.

Requirements for Regulating Reserves to be procured through the markets will be set by the Midwest ISO to comply with applicable reliability requirements. Based on our analysis of operating data, on average the Midwest ISO region maintained Regulating Reserves in amounts equal to about one percent of load. Ninety percent of the time load in the Midwest ISO footprint

fell between 50 GW and 90 GW, and therefore the requirement for regulating reserve has ranged between 500 MW and 900 MW ninety percent of the time.

3. Market Share Analysis – Regulating Reserve

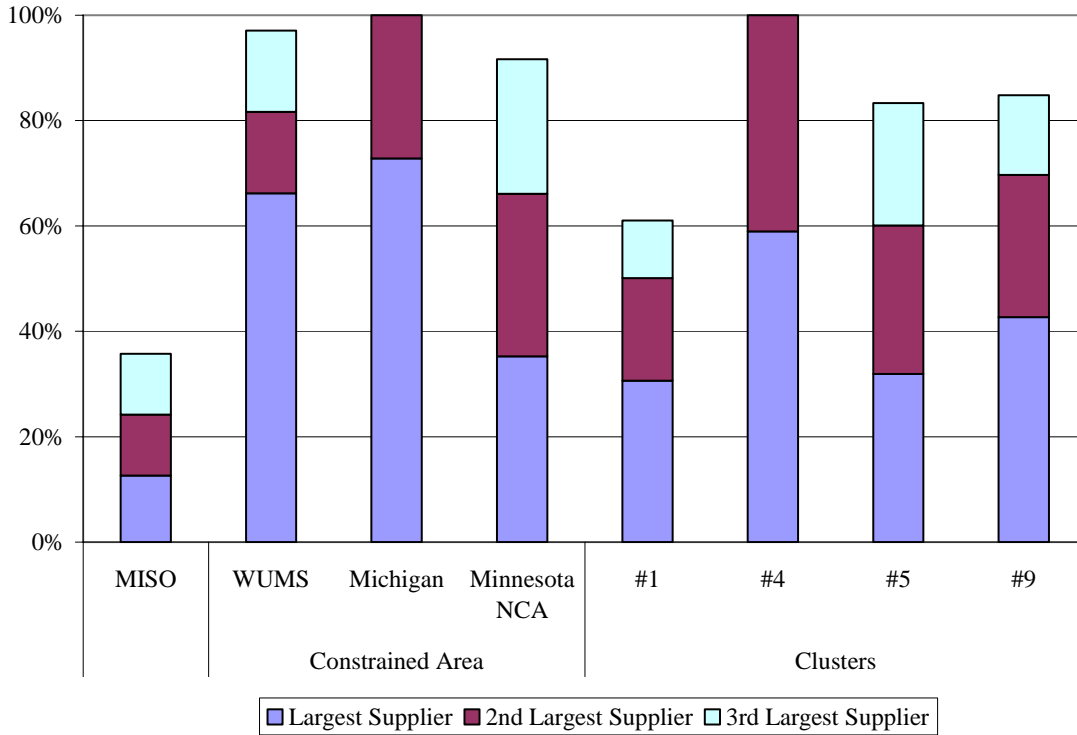
This subsection includes our analysis of the market shares for Regulating Reserves in the eight relevant geographic markets. These market shares are the basis for the calculation of the market concentration statistics presented in the following subsection.

The following assumptions concerning Regulating Reserve capability were employed in the market share analysis and in calculation of HHI values discussed in this subsection:

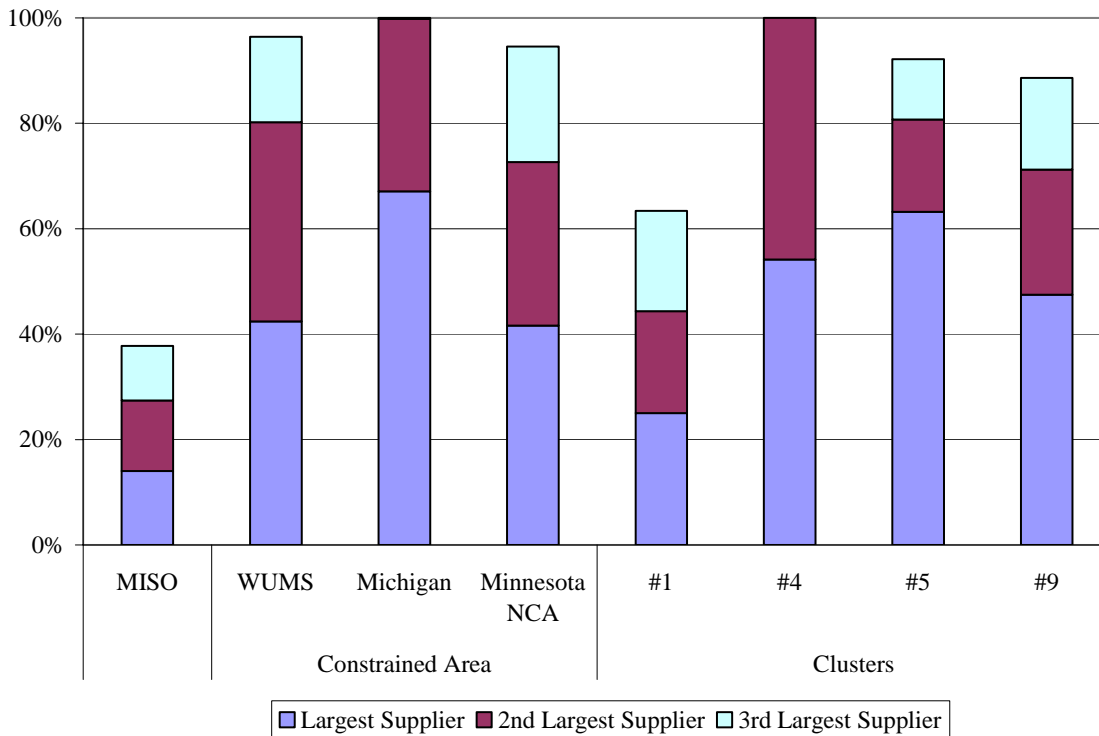
- Units that are owned by affiliated entities were aggregated for the purposes of the analysis. The capacity of jointly-owned units is attributed to the entity that offers the unit into the market.
- To identify the amount of regulation that a supplier could have sold from a resource in a given hour, the regulating capability is equal to the minimum of either five minutes of ramping capability or current unloaded capacity plus reserve range.
- The maximum possible regulating capability for each unit is limited to the maximum level of regulation output observed since implementation of the energy market in the Midwest ISO. This assumption is conservative because units that have not previously provided regulation may do so once the operating reserve market is implemented.
- Nuclear units and intermittent units are assumed to not be able to provide regulation service; all other units that have provided regulation service and were online and available for dispatch during an hour were included in the detailed market share analysis.

Figure 2 contains two charts and shows average hourly market shares for the summer of 2006 and for winter 2006/2007.

Figure 2: Hourly Mean Regulating Reserve Market Shares by Region
 Three Largest Suppliers, Summer 2006



Three Largest Suppliers, Winter 2006/2007



The broadest geographic market is the market corresponding to all of the Midwest ISO region. The results for this market are shown in the left-most bar in the chart termed “ALL MISO.” For this geographic market, the largest supplier held 12.6 percent of the Regulating Reserve capability during summer 2006 and the second largest supplier held 11.6 percent of capability. During the winter 2006/2007, the largest supplier averaged 14.0 percent of Regulating Reserve capability and the second largest supplier held 13.4 percent. These values are all well below the 20 percent the Commission has used to indicate potential market power issues in market-based pricing cases.

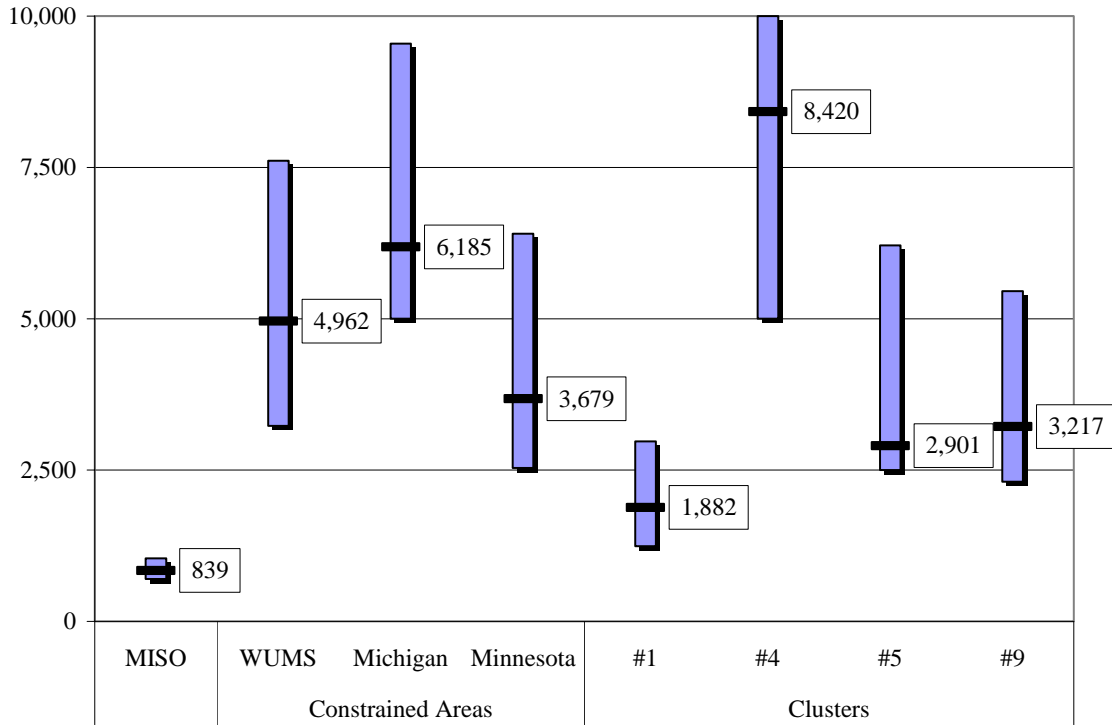
When smaller market areas are considered, market share values are naturally higher. Within WUMS for example, the largest supplier holds more than two-thirds of the Regulating Reserve capability during summer 2006. With just two suppliers within Michigan, the largest supplier during summer 2006 in Michigan had an average market share of 72 percent. Like the constrained areas, the locational clusters analyzed exhibit higher market shares than the overall Midwest ISO region. In all four of the Clusters examined, the largest supplier has a market share ranging from 24 percent to more than 60 percent. Again, these values are all above the 20 percent standard generally relied upon as a market share screen.

Based on these results, we do not find a lack of market power for Regulating Reserves in the local areas. Under FERC policy, market shares below 20 percent gain the presumption of a lack of market power, while market shares above 20 percent indicate the need for further analysis. Absent locational requirements, the region-wide market shares do not suggest significant market power concerns. However, for smaller sub-regions within the Midwest ISO, market shares for the largest supplier of Regulating Reserve capability exceed 20 percent in every case.

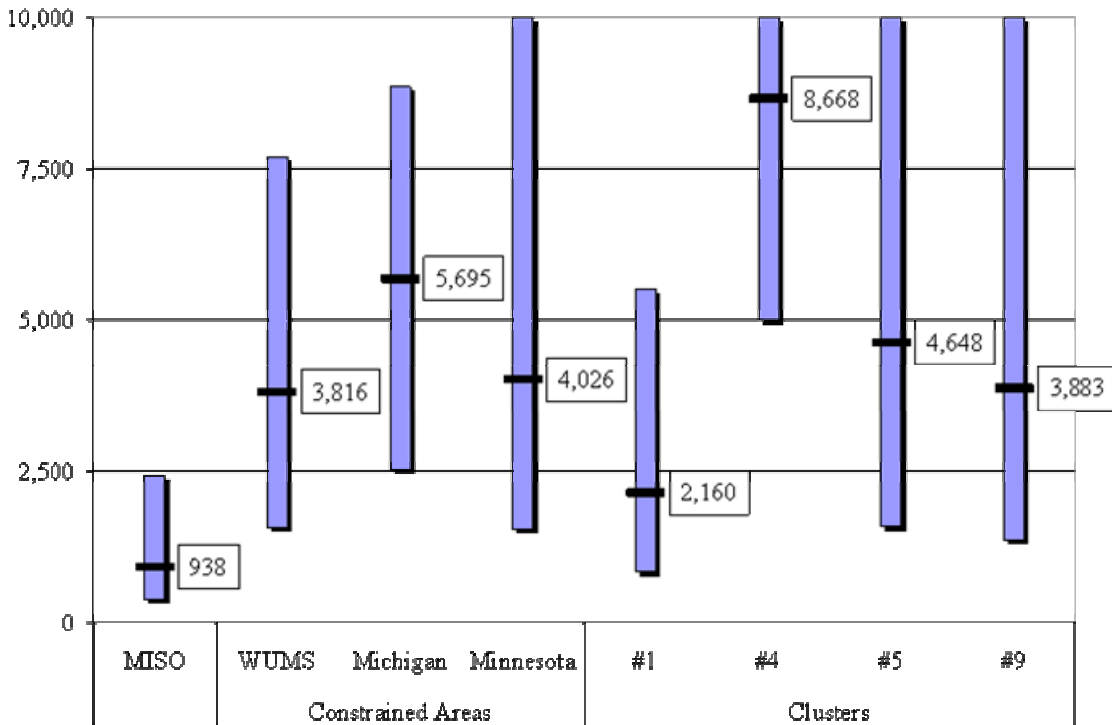
4. Market Concentration Analysis – Regulating Reserve

Using the same assumptions for measuring Regulating Reserve capability detailed above, we calculated hourly HHI values for the Midwest ISO and for regional areas. The results of these calculations are shown in the figure below. The figure reports mean, minimum, and maximum hourly HHI by geographic region. The mean value is labeled in the Figure 3.

Figure 3: Regulating Reserve HHI Values by Region
Summer 2006



Winter 2006/2007



The results for the broadest geographic market, the entire Midwest ISO region, is shown by the left-most bar in the charts. For this geographic market, the mean hourly HHI for Regulating Reserve capability is 839 in the Summer 2006 and 938 in Winter 2006/2007. The range in hourly HHI values is very low for this market as well. Both the range and the mean are generally well below the 1,800 threshold that indicates a highly concentrated market.

For the smaller geographic markets, the HHI values are much higher. The averages for the three constrained areas range from almost 3,700 to almost 6,200. In most hours, the HHI values produced in these constrained areas exceeded 2,500 for Regulating Reserves. Likewise, the HHI values for the clusters indicate that these areas are also highly concentrated. Cluster #1, the largest of the four clusters studied, exhibits a mean HHI of 1,882 in Summer 2006 and 2160 in Winter 2006/2007. In many hours, the hourly HHI values exceeded 2,500. The other three clusters have average HHI values ranging from 2,900 to more than 8,700 with hourly HHI values generally exceeding 2,500. These results suggest that the market for Regulating Reserves is likely to be highly concentrated when local requirements are defined for specific areas.

As with market share, these results raise potential market power concerns for Regulating Reserves in relevant geographic markets that are smaller than the entire Midwest ISO region. Although the market share and HHI results at the local level are relatively high, these statistics may not provide accurate inferences regarding potential market power as discussed earlier. To further evaluate the potential market power, we perform a pivotal supplier analysis.

5. Pivotal Supplier Analysis – Regulating Reserve

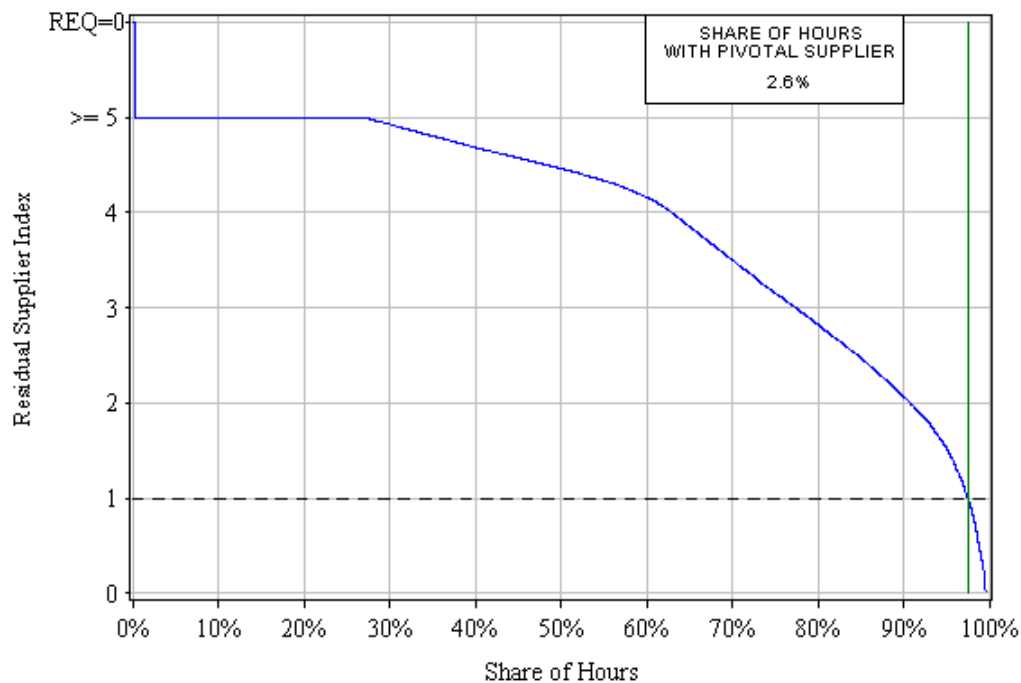
For the Pivotal Supplier Analysis, we analyzed hourly data from April 1, 2005, i.e. the commencement of the Midwest ISO Energy Markets, through June 30, 2007. In each hour a residual supplier index value was calculated using the formula described in the prior section. Total Regulating Reserve capability and the capability of the largest supplier were computed in each hour and for each geographic region, using the assumptions detailed in the prior section.

Our analysis accounts for the potential interactions between operating reserve and energy markets that result from the fact that energy and regulation are produced from the same resources and procurement of the resources is co-optimized in the proposed ASM markets. For example, a

supplier providing energy could withhold energy from the market, leading the system to dispatch as energy resources currently held as regulation capability. The test for pivotal supplier not only considers operating reserves available in an hour but also the possibility that actions taken in energy markets could create shortages in the regulation market.

Assumptions regarding Regulating Reserve capability were the same as those used in the market share analysis. For the Midwest ISO market-wide calculation, the Regulating Reserve requirement in each hour was set at 1 percent of load. One percent of load represents the average amount of regulation procured over the historic time period studied. For the regions and defined zone clusters analyzed, the Regulating Reserve requirement in each hour was set at one-quarter of 1 percent of load times the ratio of the region's (or cluster's) Regulating Reserve capability to the total market reserve capability; if the regional or cluster requirement was less than 10 MW, the requirement was set to 0.¹⁴ These regional requirement assumptions are preliminary and may not precisely reflect the actual Regulating Reserve requirements. Figure 4 shows the residual supply index for the entire Midwest ISO market from Spring 2005 through Winter 2006/2007.

Figure 4: Regulating Reserves RSI Duration Curves – Midwest ISO Region
Spring 2005 - Winter 2006/2007



¹⁴

These assumptions are consistent with the Midwest ISO's proposed market design. See Section 39.2.1A.e.

Figure 4 shows that in only 2.6 percent of hours was a supplier pivotal for the entire Midwest ISO market (i.e. about 230 hours per year). The hours with pivotal suppliers most frequently occurred during the winter months. A pivotal supplier can only use its position to exercise market power when that condition is sufficiently predictable so that the supplier has the opportunity to alter its Regulating Reserve offers and affect the market price. Additionally, a pivotal supplier will have the incentive to raise prices only when it has sufficient capability in the market that can benefit from the resulting higher prices. Based on the results of this analysis, we find that the regulation market for the Midwest ISO region is workably competitive and not subject to a substantial threat of market power abuse. Table 1 shows the frequency with which a supplier is pivotal for the provision of Regulating Reserves in each of the eight geographic markets.

Table 1: Frequency of Pivotal Supplier - Regulating Reserve
Regional Results, Spring 2005-Winter 2006/07

| | <u>Zone</u> | <u>Frequency of Pivotal Supplier</u> ¹⁵ |
|-------------------|-------------|--|
| Constrained Areas | MISO | 2.6 |
| | WUMS | 91.5 |
| | Michigan | 97.4 |
| | Minnesota | 87.5 |
| Clusters | #1 | 65.0 |
| | #4 | 23.8 |
| | #5 | 14.3 |
| | #9 | 96.7 |

The market share and market concentration results described in earlier sections indicate potential competitive concerns in the smaller market areas. This pivotal supplier analysis confirms the potential for market power abuse in the Regulating Reserve market. Table 1 shows that the frequency with which a supplier is pivotal in the local areas ranges from 14.3 percent in Cluster #5 to more than 97 percent in Michigan. These values are relatively high in a number of the local areas because the import limits into these areas are relatively binding. As noted earlier, this analysis assumes the supplier can withhold energy or reserves. When the supplier withholds energy, the energy must be replaced by imports or internal generation. When the import

¹⁵ The remaining 76% and 86% of hours for clusters 4 and 5, respectively, did not have a pivotal supplier due to the calculation methodology resulting in local regulating requirements of 0 MW.

constraints are binding, the market would dispatch internal resources that may be needed to satisfy the Regulating Reserve requirements. These results are conservative because we assume that the supplier will withhold only the energy above the minimum generation level on its online resources (i.e., that the supplier will not take online generators offline). Even employing conservative assumptions, a supplier is frequently pivotal in each of the 7 geographic markets that are smaller than the entire Midwest ISO region. Specific thresholds for this type analysis have not been established in FERC's market power policies, but these values in conjunction with the relatively high market concentration and high market shares indicate substantial market power concerns that warrant monitoring and mitigation measures.

6. Barriers to Entry and Potential Competitors – Regulating Reserves

The Midwest ISO procurement of Regulating Reserves via the proposed Ancillary Services Markets will tend to reduce any barriers to entry and encourage competition in the supply of Regulating Reserves. There are no unreasonable barriers to entry that would compromise the competitiveness of the Regulating Reserve market.

B. Contingency Reserves

Contingency reserves consist of unloaded resource capacity that is set aside to offset an abnormal supply deficiency event, such as the loss of a large generator or a transmission line carrying significant flow. Contingency reserves include both Spinning Reserve, resources synchronized to the system, and Supplemental Reserve, which need not be synchronized to the system.

1. Market Definition

Spinning Reserve is required to immediately offset deficiencies in Energy supply that result from a resource contingency or other abnormal event. Spinning Reserve must be immediately available and must be fully deployable within the Contingency Reserve Deployment Period, which is ten minutes in the proposed ASM rules. Spinning Reserve can be supplied in the Day-Ahead and Real-Time Energy and Ancillary Services Markets by any Spin Qualified Resource. In both Day-Ahead and Real-Time markets, Spinning Reserve is defined as a specified percentage of the total Midwest ISO Contingency Reserve requirement that must be immediately available to respond to an abnormal supply deficiency event.

Supplemental Reserve is also used to offset deficiencies in Energy supply that result from a Resource contingency or other abnormal event. Like Spinning Reserves, Supplemental Reserves must be fully deployable within the ten-minute Contingency Reserve Deployment Period. Supplemental Reserves may be provided by Resources that are Supplemental Qualified Resources and are available to supply Supplemental Reserve.

A Spin Qualified Resource is defined as “A Generation Resource, an External Asynchronous Resource or Demand Response Resource-Type II that has met the requirements to be eligible to submit Spinning Reserve Offers into the Energy and Operating Reserve Markets.”¹⁶

Supplemental Qualified Resources include all Spin Qualified Resources, as well as “a Demand Response Resource-Type I or, a Generation Resource, Demand Response Resource Type-II, or an External Asynchronous Resource that is not a Spin Qualified Resource that has met the requirements to be eligible to submit Supplemental Reserve Offers into the Energy and Operating Reserve Markets.”¹⁷

Spinning reserves and supplemental reserves are comparable in many respects and are considered together under the more general category of “Contingency Reserve” in the Midwest ISO tariff. Further, for the reasons described above, the locational requirements that may be defined for certain areas in the Midwest ISO region will not distinguish between spinning and supplemental reserves. Given the number of online resources committed each day that can provide spinning reserves and the number of quick-start resources available to start so other resources may be ramped down to provide spinning reserves. Therefore, we do not define spinning reserves as a relevant product separate from supplemental reserves. Hence, the relevant product markets defined for purposes of the market power analyses in this report are contingency reserves and regulating reserves.

With respect to the geographic market, we define eight relevant geographic markets for the reasons described in the prior section.

¹⁶ Midwest TEMT, Third Revised Sheet No. 125A at 1.291h.

¹⁷ Midwest ISO TEMT, Third Revised Sheet No. 126 at 1.295a.

The eight geographic markets are:

1. All of MISO;
2. WUMS NCA;
3. Minnesota NCA;
4. Michigan;
5. Cluster #1 – The Midwest ISO Central Region and First Energy, but excluding points in southern Illinois and southern Indiana;
6. Cluster #4 – Northwestern Michigan excluding the Upper Peninsula;
7. Cluster #5 – Northwestern Illinois and Southwestern Wisconsin; and,
8. Cluster #9 – Northwestern Midwest ISO.

2. Supply and Demand for Contingency Reserves

We conducted an hourly analysis of the supply of Contingency Reserves for the 18 month period from January 2006 to July 2007. An analysis of hourly data shows that on average the Midwest ISO maintains 3,397 MW of contingency reserves available, and a maximum of 7,786 MW of contingency reserves has been held on the system since implementation of the Midwest ISO energy markets.

The Midwest ISO Contingency Reserve requirement is established with reference to the single largest system contingency. This is typically 1,500 MW capacity of the transmission interface with Manitoba Hydro. Locational requirements for local areas are calculated by subtracting the projected available import capability into the area from the largest contingency in the area. For example, if the largest contingency in an area is 800 MW and the Midwest ISO projects available import capability of 500 MW, then it must hold 300 MW of reserves on internal resources within the zone. If the contingency occurs, the Midwest ISO could then respond by deploying the local reserves and increasing the imports into the area.

3. Market Share Analysis – Contingency Reserves

This subsection includes our analysis of the market shares for Contingency Reserves in the eight relevant geographic markets. These market shares are the basis for the calculation of the market concentration statistics presented in the following subsection.

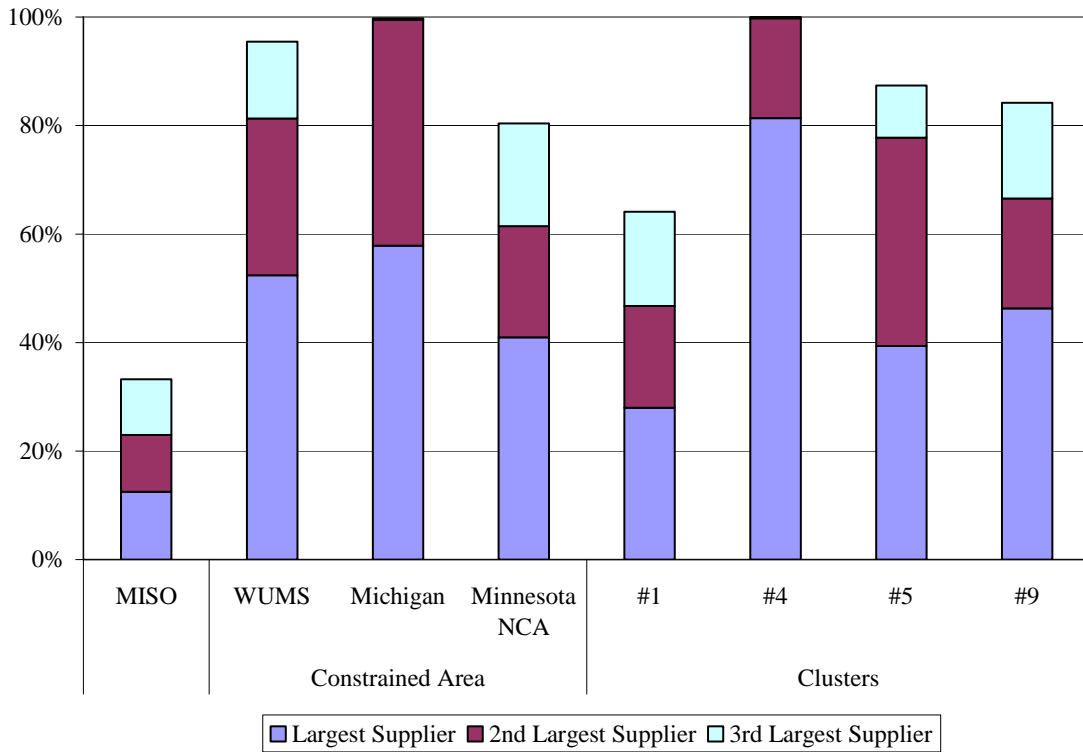
The following assumptions concerning Contingency Reserve capability were employed in the market share analysis and in calculation of HHI values discussed in the next subsection:

- Units that are owned by affiliated entities were aggregated for the purposes of the analysis. The capacity of jointly-owned units is attributed to the entity that offers the unit into the market.
- Units that were online during an hour were assumed to have reserve capability equal to the minimum of 10 minutes of offered ramp and available unloaded capacity (i.e., the amount of energy the unit could produce up to its Emergency Maximum).
- Offline units can provide reserve capability if they have a combined cold startup and notification time of no more than 15 minutes, are offered in an economic state or must-run state in the RT dispatch model, and are either a CT or Diesel unit.
- Reserves are set equal to the lesser of 10-minutes of ramp and default capacity.

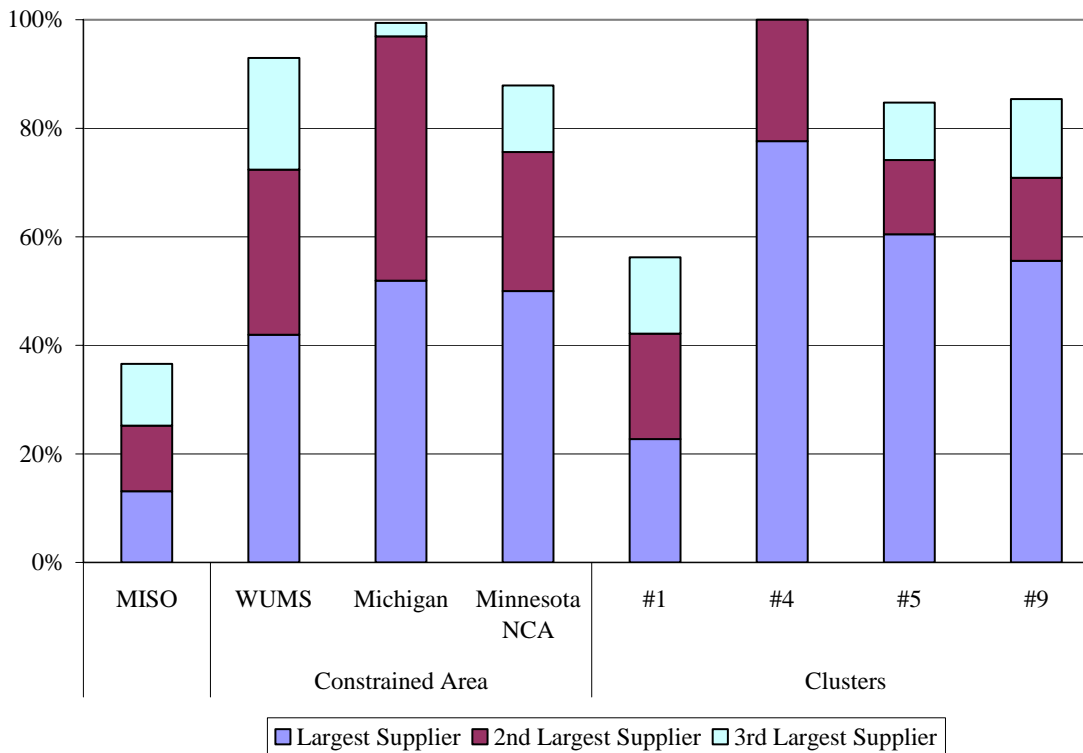
Figure 5 shows Summer 2006 and Winter 2006/2007 average market share values for Contingency Reserves by geographic area. The Contingency Reserve results are similar to those produced by the Regulating Reserve analysis. The broadest geographic market is the market corresponding to all of the Midwest ISO region. The results for this market are shown in the left-most bar in the chart termed “ALL MISO.” For this geographic market, the largest supplier held 12.5 percent of the Contingency Reserves capability during summer 2006 and 13.1 percent in the Winter of 2006/2007. These values are all well below the 20 percent the Commission has used to indicate potential market power issues in market-based pricing cases.

When smaller market areas are considered, market share values are naturally higher. Within the constrained areas, for example, the largest supplier holds more than 40 percent of the Contingency Reserve capability during summer 2006 and Winter 2006/2007. Like the constrained areas, the locational clusters analyzed exhibit higher market shares than the overall Midwest ISO region. In all four of the Clusters examined, the largest supplier has a market share ranging from 24 percent to more than 80 percent. Again, these values are all above the 20 percent standard generally relied upon as a market share screen.

**Figure 5: Hourly Mean Contingency Reserves Market Shares by Region
Three Largest Suppliers, Summer 2006**



Three Largest Suppliers, Winter 2006-2007



Based on these results, we do not find a lack of market power for Contingency Reserves in the local areas. Under FERC policy, market shares below 20 percent gain the presumption of a lack of market power, while market shares above 20 percent indicate the need for further analysis. Absent locational requirements, the region-wide market shares do not suggest significant market power concerns. However, for smaller sub regions within the Midwest ISO, market shares for the largest supplier of Contingency Reserve capability exceed 20 percent in every case.

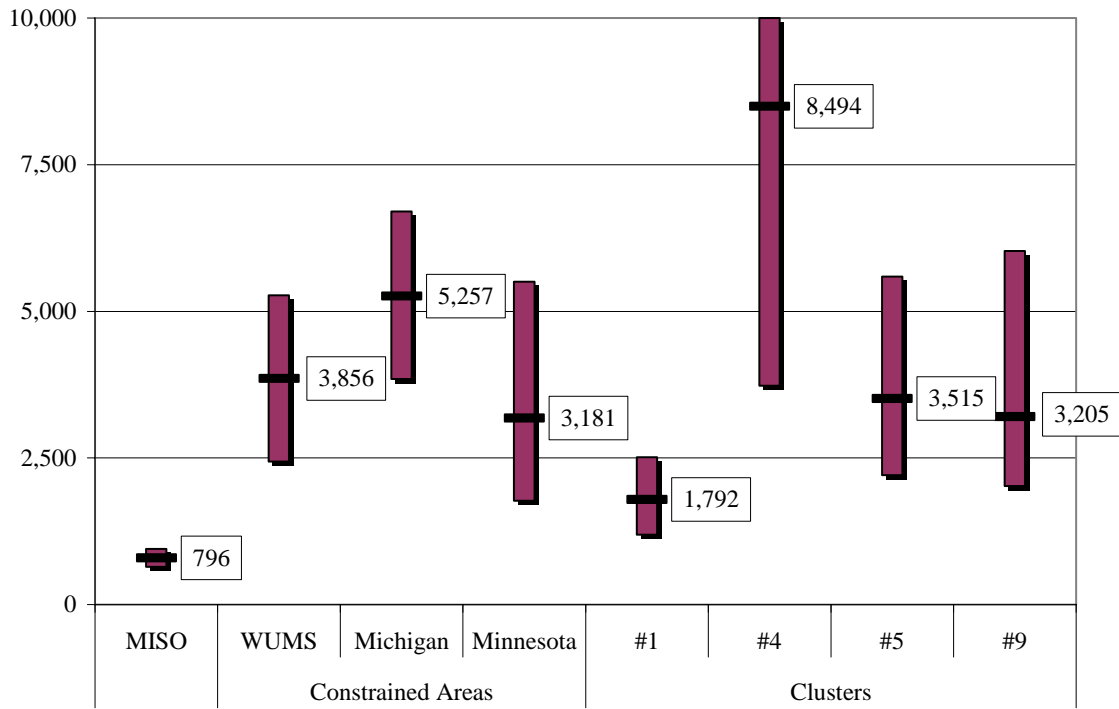
4. Market Concentration Analysis – Contingency Reserve

Using assumptions about Contingency Reserve capability as described above, we calculated hourly HHI values for the Midwest ISO and for regional areas. The results of these calculations are shown in Figure 6. The figure reports mean, minimum, and maximum hourly HHI by geographic region. The mean value is labeled in the figure and is used in further assessment.

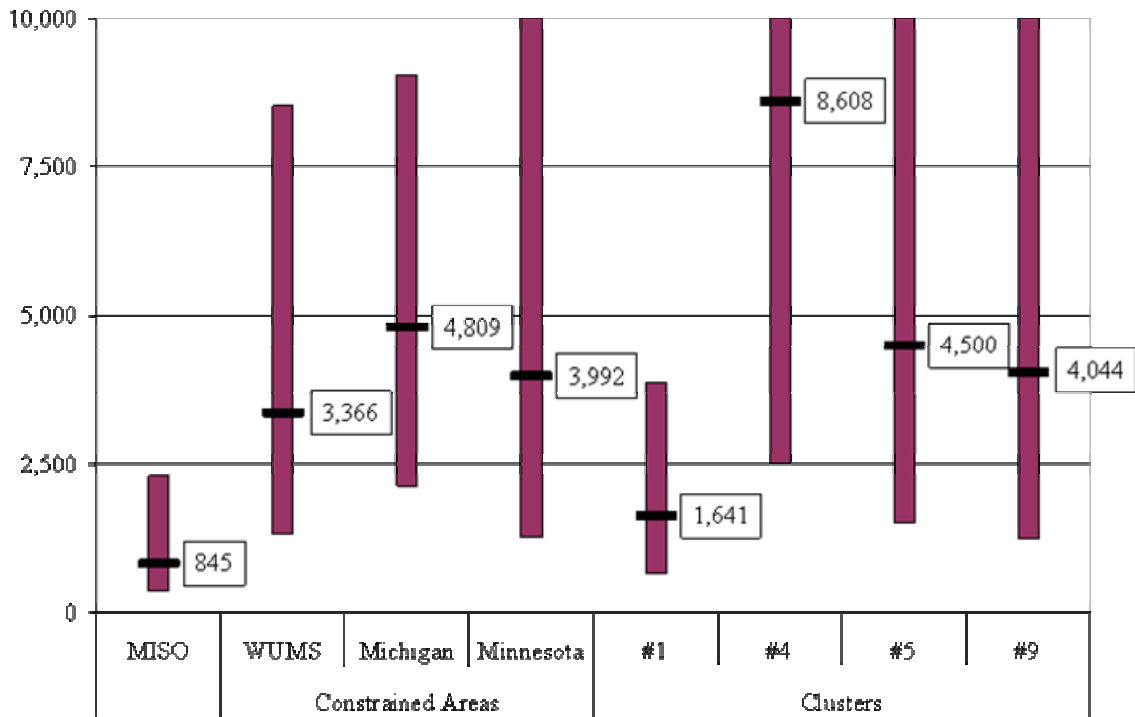
The results for the broadest geographic market, the entire Midwest ISO region, is shown by the left-most bar in the charts. For this geographic market, the mean hourly HHI for Contingency Reserve capability is less than 850. The range in hourly HHI values is very low for this market as well. Both the range and the mean are generally well below the 1,800 threshold that would indicate a highly concentrated market.

For the smaller geographic markets, the HHI values much higher. The averages for the three constrained areas range from almost 3,200 to more than 5,200. In almost all hours, the HHI values produced in these areas exceeded 2,500 for Contingency Reserves. Likewise, the HHI values for the clusters indicated that these areas are also highly concentrated. Cluster #1, the largest of the four clusters studied, exhibits a mean HHI of just under 1,800 and hourly HHI values extending up to more than 4,000. The other three clusters have average HHI values ranging from 3,200 to almost 8,600 with hourly HHI values generally exceeding 2,500. These results suggest the market for Contingency Reserve is likely to be highly concentrated when local requirements are defined for specific areas.

Figure 6: Contingency Reserves HHI Values by Region
Summer 2006



Winter 2006/2007



As with the market share results, these results raise potential market power concerns for Contingency Reserves in relevant geographic markets that are smaller than the entire Midwest ISO region. However, although the market share and HHI results at the local level are relatively high, these statistics may not provide accurate inferences regarding potential market power in electric power markets. To further examine the potential for market power in the proposed Contingency Reserve markets, we perform a pivotal supplier analysis.

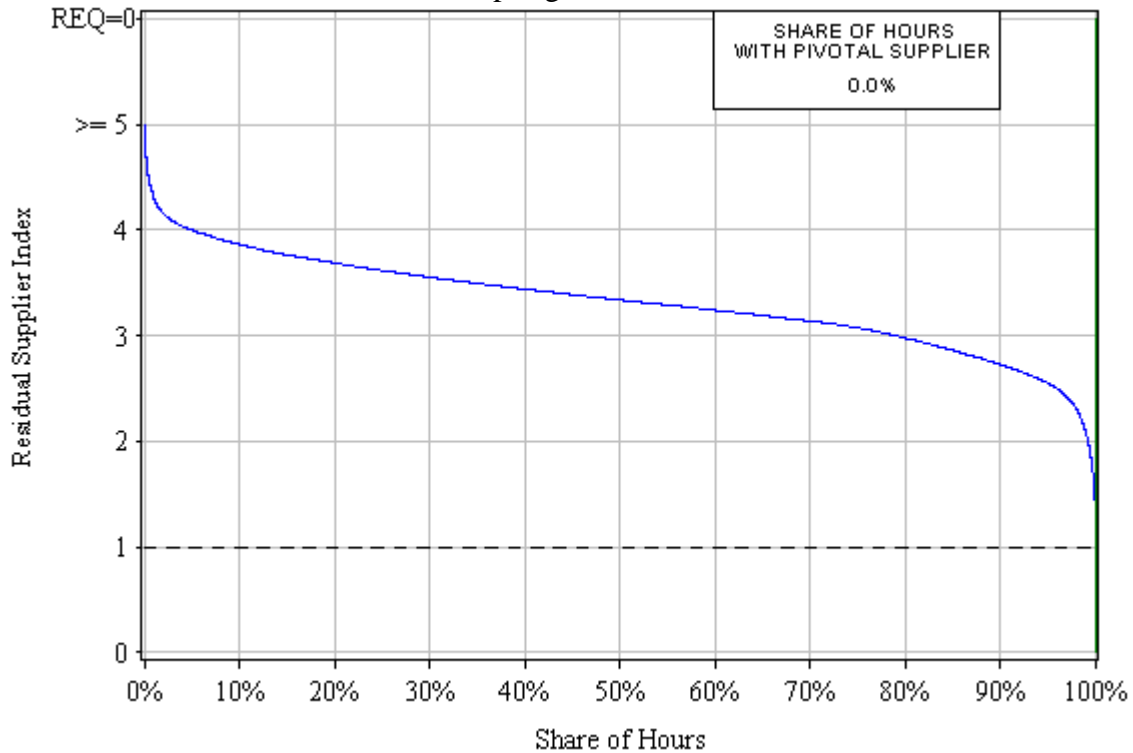
5. Pivotal Supplier Analysis – Contingency Reserves

For the Pivotal Supplier Analysis, we analyzed hourly data from April 1, 2005 through June 30, 2007. In each hour a Residual Supplier Index value was calculated using the formula described above. Total Contingency Reserve capability and the capability of the largest supplier were computed in each hour and for each geographic region, using the assumptions detailed in the market share analysis section above.

Our analysis accounts for the potential interactions between contingency reserve and energy markets that result given that energy and operating reserves are produced from the same resources and procurement of the resources is co-optimized in the proposed ASM markets. For example, a supplier providing energy could withhold energy from the market, leading the system to dispatch as energy resources currently held as operating reserves. The test for pivotal supplier not only considers operating reserves available in an hour but also the possibility that actions taken in energy markets could create operating reserve shortages.

The Midwest ISO market-wide Contingency Reserve requirement is determined by the largest single system contingency, generally defined by the Manitoba Hydro inter-tie capacity. Following this guideline for this analysis the system-wide requirement at 1,500 MW. At the Midwest ISO congested areas, we have estimated Contingency Reserve requirements by the lesser of the largest local contingency or 2 percent of load. For the analysis of the defined clusters, hourly requirements were calculated that vary with the import capability of the cluster relative to the largest contingency in the cluster.

Figure 7: Contingency Reserve RSI Duration Curves
Midwest ISO, Spring 2005-Winter 2006/07



At no time over the study period was a single supplier pivotal for the supply of Contingency Reserves at the level of the Midwest ISO region considered as a whole. Given these results, we conclude that the market can be expected to operate competitively when the transmission system is unconstrained. Table 2 shows the frequency with which a supplier is pivotal for the provision of Contingency Reserves in each of the eight geographic markets.

Table 2: Frequency of Pivotal Supplier - Contingency Reserve
Regional Results, Spring 2005-Winter 2006/07

| | <u>Zone</u> | <u>Frequency of Pivotal Supplier</u> |
|-------------------|-------------|--------------------------------------|
| | MISO | 0 |
| Constrained Areas | WUMS | 83.2 |
| | Michigan | 95.4 |
| | Minnesota | 93.9 |
| Clusters | #1 | 34.4 |
| | #4 | 100 |
| | #5 | 94.5 |
| | #9 | 96.1 |

Unlike the results for the full Midwest ISO market, in sub-regions the largest supplier is frequently pivotal for meeting the estimated Contingency Reserve requirement for the area. This confirms the market share and market concentration analyses that indicate potential competitive concerns in the sub-region areas. Table 2 shows that the frequency with which a supplier is pivotal in the sub-region ranges from 35 percent in Cluster #1 to 100 percent in Cluster #4. These values are relatively high in a number of the local areas because the import limits into these areas are relatively binding. As noted earlier, this analysis assumes the supplier can withhold energy or reserves. When the supplier withholds energy, the energy must be replaced by imports or internal generation. When the import constraints are binding, the market would dispatch internal resources that may be needed to satisfy the Contingency Reserve requirements. These results are conservative because we assume that the supplier will withhold only the energy above the minimum generation level on its online resources (i.e., that the supplier will not take online generators offline). Even employing conservative assumptions, a supplier is frequently pivotal in each of the 7 geographic markets that are smaller than the entire Midwest ISO region. Specific thresholds for this type analysis have not been established in FERC's market power policies, but these values in conjunction with the relatively high market concentration and high market shares indicate substantial market power concerns that warrant mitigation measures.

6. Barriers to Entry and Potential Competitors – Contingency Reserves

The Midwest ISO procurement of Contingency Reserves via the proposed Ancillary Services Markets will tend to reduce any barriers to entry and encourage competition in the supply of Contingency Reserves. There are no unreasonable barriers to entry that would compromise the competitiveness of the Contingency Reserve market.

III. PROPOSED ASM MARKET POWER MONITORING AND MITIGATION PLAN

In order to authorize market-based rates, the Commission must find that sellers lack market power or that any market power that may be present is adequately monitored and mitigated. The above analyses suggest that the Midwest ISO region as a whole should expect the operating reserves markets to function competitively when the transmission system is unconstrained. In addition, the co-optimized procurement of energy and operating reserves will increase the substitutability of these products in ways that will further reduce market power. However, the analyses clearly indicate that at times and in locations for which the transmission system is constrained, some market participants are likely to hold market power.

When the ASM markets are implemented, all areas will be closely monitored to identify any potential inefficiencies, market power abuses, or manipulation. Additionally, based on the findings of the market power analyses contained in this report, we propose market power mitigation measures be implemented to address the substantial market power concerns.

The market power monitoring and mitigation measures described below are specifically tailored to meet the needs of the Midwest ISO market. The proposed mitigation measures employ a two-part conduct-impact test to determine whether mitigation of offers is warranted. The first part of the two-part test screens the behavior of market participants to identify conduct that may warrant mitigation. The second part of the test evaluates whether the market impact of the behavior is significant enough to the market to justify mitigation. Mitigation should only be employed in a local area when the reserve constraint in the area is binding and both tests are satisfied.

The conduct test is important for differentiating between scarcity and market power for purposes of mitigation (i.e., if suppliers are not withholding physically or economically, any price increases are the result of scarcity rather than market power). The impact test is important because conduct that does not have a significant effect on market outcomes is not, by definition, an abuse of market power and should not be mitigated. Use of the Commission-approved Midwest ISO conduct-and-impact approach provides a tailored approach to market power monitoring mitigation that will ensure that market participant offers are only mitigated when the offer exceeds clearly established offer conduct thresholds and market price impact thresholds.

To mitigate economic withholding, the supplier's offer would be replaced by a default offer that reflects a competitive offer for the resource. For physical withholding, the Midwest ISO tariff contains sanctions that would apply. When physical withholding is identified, the conduct will be referred to the Commission and it will apply the section.

Conduct-and-impact based market power mitigation works together with shortage pricing rules to help ensure that prices appropriately reflect scarcity conditions. When the system is in a true scarcity condition, prices for operating reserves and regulation are set by reference to the demand curves for these products – not by the marginal supply offer. Because the impact test examines the effects of the supplier's offer on the market prices, and the supplier's offer will have no effect when the price is set by the shortage pricing rule, the proposed mitigation rules will not over mitigate prices in shortage conditions.

This approach to prospectively mitigating market power is consistent with the existing market power mitigation measures employed in the Midwest ISO Energy markets. In fact, because the markets are co-optimized, energy offers can affect the ancillary services prices and vice versa. It is very important that the mitigation measures reflect this interrelationship. We note that the proposed mitigation measures are dynamic in the same way that the mitigation for Broad Constrained Areas ("BCAs") is dynamic. Both BCAs and the local reserve zones can change over time, which is recognized appropriately in the mitigation framework. The application of the conduct-impact mitigation framework in the Midwest ISO, and in New York and New England over the past seven years, has proven to be very effective at addressing potential market power abuses without unnecessarily intervening in the market.

A. Market Monitoring Changes

The proposal includes relatively modest, but important, changes to the Midwest ISO Monitoring Plan. Because the Midwest ISO initiated its Energy Markets prior to the Ancillary Services Markets, the Monitoring Plan contained a number of specific references to Energy Markets that must be broadened to refer to both Energy and Ancillary Services Markets in order not to inadvertently limit the scope of the Monitoring Plan.

The proposed changes to the Monitoring Plan clarify operation of the Monitoring Plan without expanding the scope or responsibilities of the Independent Market Monitoring (IMM).

B. Conduct and Impact Mitigation

To address the apparent potential to exercise market power in the Ancillary Services Markets, the Midwest ISO and the IMM propose adding specific reference levels and thresholds for these markets to the existing market monitoring and mitigation measures contained in Module D of the Tariff.

1. Conduct Test

To identify economic withholding, the participant's offers will be compared to a competitive Reference Level. If the offer exceeds the competitive Reference Level by more than a threshold amount, the offer fails the conduct test. For Contingency Reserve and Regulating Reserve Offers, the economic withholding threshold will be a three hundred percent (300%) increase or a \$50 per MW/h increase, whichever is lower. However, for any such Offers below \$10 per MW/h shall be deemed not to constitute economic withholding. With regard to uneconomic production, energy offers from a Generation Resource priced at less than 50 percent of the applicable energy reference level on an output range scheduled for Contingency Reserves or Regulating Reserves when the energy offer is lower than the LMP.

These thresholds allow a supplier to modify its offers substantially without risk of mitigation. This is important because there are many factors that alter the marginal cost (i.e., the competitive offer price) of providing ancillary services. Hence, these thresholds help prevent mitigation from being applied inappropriately. If these thresholds allow for material and sustained price increases, the Midwest ISO may make a Section 205 filing with the Commission to lower the thresholds.

No change is proposed for physical withholding thresholds. Physical Withholding will affect both Energy Markets and Ancillary Services Markets, and the existing thresholds in the Midwest ISO Tariff are adequate to identify such conduct.

Market power mitigation measures employed for the ancillary services will rely on existing methods for setting Reference Levels. In order of preference, the methods are:

- (1) Offer-Based: The lower of the mean or the median of a unit's accepted Offers in competitive periods over the previous 90 days for similar hours.
- (2) MCP-Based: The mean of the MCP at the unit's location during the lowest-priced 25 percent of the hours that the unit was dispatched over the previous 90 days for similar hours, adjusted for changes in fuel prices.
- (3) Cost-based: A cost-based level determined based on information from the Market Participant submitting the Offer(s) at issue and intended to reflect a unit's marginal costs, including legitimate risks and opportunity costs, provided such consultation has occurred prior to the occurrence of the conduct being examined.

Regardless of the method used to calculate the Reference Level, the Reference Level will be adjusted daily for changes in fuel costs. This is important because changes in fuel costs have the largest effects on suppliers' marginal costs of supplying ancillary services.

A cost-based estimate, as provided for in Module D Section 64.1.4, will serve as a transition mechanism to calculate Reference Levels until there is sufficient historical market data.

Pursuant to Section 64.1.4.d, a Market Participant's Reference Levels will be made available to the Market Participant upon request. Market Participants may submit cost or other data to justify modifications of the Reference Levels.

2. Market Impact Test

The impact test threshold we are proposing for the Ancillary Services Markets is \$50 per MW-hour. This is lower than the \$100 per MWh threshold currently used in the Energy Markets. It is appropriate to utilize a lower threshold for the Ancillary Services markets because the typical prices in these markets are generally substantially less than energy prices. In fact, the \$50 threshold proposed for the operating reserves and regulation is likely to allow a larger increase in percentage terms than the potential \$100 per MWh increase in the energy market.

As set forth in Section 65.2.2.c, a Mitigation Measure imposed in accordance with the conduct thresholds and the impact thresholds will remain in effect for only those hours in which the conduct and impact tests are satisfied and mitigation is deemed warranted.

C. Effectiveness of the Conduct and Impact Mitigation Framework

The proposed conduct-and-impact mitigation framework is appropriate and effective for energy and ancillary services markets where the potential for market power varies significantly over time and location. Such mitigation imposed in accordance with the conduct test and impact test is applied in only those hours in which the conduct and impact tests are satisfied. Outside of the hours and locations for which mitigation is triggered, competition among suppliers will be sufficient to ensure just and reasonable prices for Regulating and Contingency Reserves.

The value of the conduct and impact framework is based on the fact that when these tests are not satisfied, one can conclude that the supplier does not have market power or is not attempting to exercise any market power that it may have. In this way, it virtually eliminates the potential for over-mitigation. The same cannot be said of simpler mitigation approaches, such as cost-based offer caps. By not employing the conduct and impact tests, cost-based offer caps can mitigate legitimate competitive conduct, which can distort participants' incentives and change their conduct in ways that result in substantial inefficiencies.

As noted above, the proposed mitigation measures are consistent with the existing market power mitigation measures employed in the Midwest ISO Energy markets. The mitigation measures reflect the interrelationship between the energy and ancillary services markets, which can cause energy offers to affect the ancillary services prices and vice versa. Like the energy mitigation in BCAs, the proposed mitigation for the local ASM markets is dynamic and allows for the fact that the Reserve Zones can change over time. The application of the conduct-impact mitigation framework in the Midwest ISO and other markets has been very effective at addressing potential market power abuses without unnecessarily intervening in the market.

Additionally, the proposed mitigation measures will not limit the ability of the Midwest ISO markets to set efficient prices during shortages. The Midwest ISO markets should naturally produce shortage prices when true shortage conditions arise without suppliers economically or

physically withholding resources. To suggest that Mitigation Measures will limit shortage pricing is to imply that suppliers must engage in economic withholding (i.e., raising their offer prices substantially from competitive levels) to achieve efficient shortage prices. This is not the case in the Midwest ISO markets. Efficient prices when the system is in shortage will be set by the economic value of reserves and regulation in the form of the demand curves. Mitigating supply offers under these conditions will not affect prices, making it impossible for offers to fail the impact test.

The conduct and impact thresholds play an important role in precluding mitigation from applying when a supplier is not exercising market power. However, the thresholds may be high enough that they allow low level exercises of market power. If this occurs on a sustained basis, it can result in significant costs to consumers. Therefore, if the IMM determines that the thresholds allow for material and sustained price increases, the Midwest ISO will make a Section 205 filing with the Commission to lower the thresholds.