

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

Before Commissioners: Jon Wellinghoff, Acting Chairman;
Sudeen G. Kelly, Marc Spitzer,
and Philip D. Moeller.

PJM Interconnection, L.L.C.

Docket No. EL08-47-000

INITIAL ORDER ON MARKET POWER MITIGATION PROVISIONS AND
ESTABLISHING PROCEDURES

(Issued February 19, 2009)

1. In this order, we find that there is not sufficient evidence to meet the Federal Power Act section 206 burden to show that the three-pivotal-supplier test, which PJM uses in its market power mitigation process, is unjust and unreasonable as it relates to assessing the structural competitiveness of the PJM energy market.¹ However, we find that the application of the related price mitigation measures is unjust and unreasonable because the measures do not clearly define and fully account for the inclusion of unit-specific opportunity costs in mitigated offer prices. This order establishes a procedure to address this concern.

I. Background

2. On May 16, 2008, the Commission addressed a complaint by the Maryland Public Service Commission (Maryland PSC) against PJM regarding market rule provisions that exempted certain generation resources from energy offer price mitigation. The Maryland PSC had requested, among other things, that the Commission remove the interface and new construction mitigation exemptions because they were preferential and discriminatory and produced unjust and unreasonable energy prices.² The Commission

¹ 16 U.S.C. § 824e (2006).

² The exemptions applied to the West, Central, and East interfaces, located in the Mid-Atlantic Area Council (MAAC) control zone, and the AP South interface (between the former Allegheny Power System and PJM). The new construction exemption applied to generators that were built between April 1, 1999 and September 30, 2003, which were always exempt from unit-specific offer caps regardless of any transmission constraints.

granted Maryland PSC's complaint and eliminated the interface and new construction mitigation exemptions.³

3. Some of the protesting parties in that proceeding also raised questions about whether, if these exemptions were eliminated, PJM's existing market power screen, the three-pivotal-supplier test, should be retained as the test for determining whether to mitigate offers. The Commission was concerned that the three-pivotal supplier "test could result in imposing offer caps more often than is justified."⁴ Accordingly, the Commission established this FPA section 206 proceeding to examine whether the continued use of the three-pivotal-supplier test and its related mitigation procedures results in unjust and unreasonable rates.⁵ To allow PJM's stakeholder process to continue its deliberations, the Commission held the hearing in abeyance and required PJM to submit a report within thirty days of the conclusion of the stakeholder process, followed by an opportunity for both initial and reply comments. PJM's report on the stakeholder process was filed on September 5, 2008 (PJM Report); initial comments were filed on October 5, 2008, and reply comments were filed on November 5, 2008.

4. Notice of this proceeding was published in the *Federal Register*, 73 Fed. Reg. 31,454 (2008). Notices of intervention were filed by the Maryland Public Service Commission (Maryland PSC) and the New Jersey Board of Public Utilities. Timely motions to intervene were filed by the Pennsylvania Office of Consumer Advocate; PJM Industrial Customer Coalition; Borough of Chambersburg, Pennsylvania; North Carolina Electric Membership Corporation; American Municipal Power-Ohio, Inc.; Office of the Ohio Consumers' Counsel; Exelon Corporation (Exelon); DTE Energy Trading, Inc. (DTE Energy); Reliant Energy, Inc. (Reliant); Liberty Electric Power, LLC (Liberty); Mirant Parties;⁶ CEG Companies;⁷ Allegheny Power and Allegheny Energy Supply

³ *PJM Interconnection, L.L.C.*, 123 FERC ¶ 61,169, *order on reh'g*, 125 FERC ¶ 61,340 (2008) (May 16, 2008 Order).

⁴ May 16, 2008 Order, 123 FERC ¶ 61,169 at P 59.

⁵ *Id.*

⁶ Mirant Energy Trading, LLC; Mirant Potomac River, LLC; Mirant Chalk Point, LLC; and Mirant Mid-Atlantic, LLC.

⁷ Constellation Power Source Generation Inc.; Constellation Energy Commodities Group, Inc.; and Constellation NewEnergy, Inc.

Company; PPL Companies;⁸ PHI Companies;⁹ Dominion Resources Services, Inc.; PSEG Companies;¹⁰ Duke Energy Corporation;¹¹ Bear Subsidiaries;¹² Competitive Power Ventures, Inc.; CPV Power Development, Inc.; and Shell Energy North America (US) L.P. (Shell Energy).

5. Motions to intervene out-of-time were filed by American Electric Power Service Corporation (AEP);¹³ Old Dominion Electric Cooperative (Old Dominion); Public Service Commission of the District of Columbia (DC Commission); Pennsylvania Public Utility Commission (Pennsylvania PUC); and Monitoring Analytics, LLC.¹⁴

II. Description of Market Screen

6. Section 6.4 of the PJM Tariff provides for offer price caps. Section 6.4.1 defines the applicability of the offer price cap mechanism and establishes the three-pivotal-supplier test. A generation resource that is dispatched out of merit order to maintain system reliability as a result of a transmission constraint may be offer-capped at specified levels.¹⁵ PJM imposes offer price capping on suppliers when, for any given hour, the

⁸ PPL Electric Utilities Corporation; PPL EnergyPlus, LLC; PPL Brunner Island, LLC; PPL Holtwood, LLC; PPL Martins Creek, LLC; PPL Montour, LLC; PPL Susquehanna, LLC; PPL University Park, LLC; and Lower Mount Bethel Energy, LLC.

⁹ Pepco Holdings, Inc.; Potomac Electric Power Company; Atlantic City Electric Company; Delmarva Power & Light Company; Conectiv Energy Supply, Inc.; and Pepco Energy Services, Inc.

¹⁰ Public Service Electric and Gas Company; PSEG Power LLC; and PSEG Energy Resources & Trade LLC.

¹¹ Duke Energy Ohio, Inc.; Duke Energy Indiana, Inc.; Duke Energy Kentucky, Inc.; Duke Energy Carolinas, LLC; and Duke Energy Shared Services, Inc.

¹² Bear Energy LP; BE Allegheny LLC; BE Ironwood LLC; and BE Red Oak LLC.

¹³ Appalachian Power Company; Columbus Southern Power Company; Indiana Michigan Power Company; Kentucky Power Company; Kingsport Power Company; and Wheeling Power Company.

¹⁴ Filing as PJM's independent market monitor (PJM IMM).

¹⁵ PJM Tariff, § 6.4.

generation supplier is one of three or fewer generation suppliers available for redispatch that are jointly pivotal with respect to a transmission limit. That is, the output required to serve load would not be available from alternative sources in the event that the three generation suppliers withhold their output. Another aspect of this screen is that PJM subjects to mitigation any generation unit whose owner, when combined with the two largest other generation suppliers, is jointly pivotal, not merely the three largest suppliers.

7. Section 6.4.2 of the PJM Tariff establishes the mitigation levels for generators that fail the three-pivotal-supplier test. For most generators, the mitigated offer price is its incremental operating cost plus a 10 percent adder (the default bid).¹⁶ For generators that are frequently mitigated, the mitigated bid is set at a variety of levels depending on the extent of mitigation.¹⁷ However, mitigation is not applied during scarcity conditions.¹⁸

III. PJM's September 5, 2008 Report

8. In its Report, PJM summarizes the work done by the Three Pivotal Supplier Task Force, and provides copies of, or links to, the task force's work product and analyses it

¹⁶ The PJM Tariff provides for the seller to specify the methodology for calculation of the mitigation cap, which may also include the weighted average locational marginal price, or an amount as determined by agreement between PJM and the seller, unless otherwise determined by the Commission where no agreement is reached.

¹⁷ For frequently mitigated units, the PJM Tariff provides: (a) for units that are offer price capped for 60 percent or more of their run hours, but less than 70 percent of their run hours, the offer price cap will be either: (i) incremental cost plus 10 percent, or (ii) incremental cost plus \$20 per megawatt-hour; (b) for units that are offer price capped for 70 percent or more of their run hours, but less than 80 percent of their run hours, the offer price cap will be either: (i) incremental cost plus 15 percent, not to exceed incremental cost plus \$40 per megawatt-hour, or (ii) incremental cost plus \$30 per megawatt-hour; and (c) for units that are offer price capped for 80 percent or more of their run hours, the offer price cap will be either: (i) incremental costs plus 10 percent, (ii) incremental cost plus \$40 per megawatt-hour, or (iii) the agreed unit-specific going forward costs of the affected unit as reflected in an agreement with Office of Interconnection. PJM Tariff, § 6.4.2(a)(iii).

¹⁸ Under scarcity conditions (defined generally as the dispatch of maximum emergency generation, certain voltage reductions, emergency energy purchases, and manual load dumping), the price in the scarcity region is set equal to the highest market-based offer price of all generating units, and no mitigation is initiated or continued, recognizing, however, that all generation in the scarcity region remains subject to an overall \$1,000 offer price cap. PJM Tariff, § 6A.3.

reviewed, including the Brattle Group's study of mitigation practices.¹⁹ PJM states that the stakeholder process did not reach consensus on retaining, replacing, or modifying the three-pivotal-supplier test, but rather prioritized recommendations from the Brattle Report for further consideration. PJM maintains that stakeholders gained a greater understanding of both the theory and practical implementation of the three-pivotal-supplier test.²⁰ Further, PJM contends that the discussions sharpened the stakeholders' focus on the distinction between the three-pivotal-supplier test and the offer-capping and other rules triggered when a generator fails the three-pivotal-supplier test. Finally, PJM points out that the stakeholder process underscored that the three-pivotal-supplier test has both supporters and detractors.²¹

A. Brattle Report

9. In preparation for the stakeholder process on these issues, PJM commissioned the Brattle Group to review PJM's market power mitigation practices, including the three-pivotal-supplier test. The Brattle Group recommended three different goals. First, "market power" and "market power abuse" should be defined. Second, the test should accurately reflect the policy maker's preference for false positives (declaring a seller to have market power when it does not; which is over-mitigation) or false negatives (declaring a seller to not have market power when it does; which is under-mitigation). Finally, the Brattle Group states that the policy maker should specify what mitigation actions will be taken and the reference levels used, and these should be compatible with the definition of market power abuse.

10. The Brattle Report was critical of the three-pivotal-supplier test. It found the three-pivotal-supplier test to be a particularly strict standard of the ability to raise price.²² While the Brattle Group found that other structural tests, such as a single pivotal supplier test, or a residual supply index test, has reasonable theoretical and empirical support and is thus consistent with a best practices framework, it determined that "we cannot find that

¹⁹ The Brattle Report, "Review of PJM's Market Power Mitigation Practices in Comparison to Other Organized Electricity Markets," is available at: http://www.brattle.org/_documents/UploadLibrary/Upload631.pdf

²⁰ The PJM Report included a detailed description of the operation of the three-pivotal-supplier test within the PJM energy markets, and its comments on the test.

²¹ The Three Pivotal Supplier Task Force meeting agenda, notes, and presentations are available at: <http://www.pjm.com/committees-and-groups/closed-groups/tpstf.aspx>

²² Brattle Report at 104.

a three-pivotal-supplier test constitutes best practice at this time.”²³ As a result, it recommended the following changes and initiatives: (1) define “market power” and “market power abuse” more clearly; (2) make the application of the market power screens more transparent to market participants; (3) consider adding a conduct-and-impact assessment to the existing three-pivotal-supplier test; (4) analyze whether identifying suppliers that can provide congestion relief on individual transmission constraints results in economically sensible delineations of geographic markets; (5) consider using the three-pivotal-supplier test less frequently, especially if it is used only as a first-stage screen; and (6) analyze the appropriateness of the reference levels used for mitigation.

B. PJM Comments on Three-Pivotal-Supplier Test

11. In its comments on the stakeholder process, PJM states that there is no perfect screen for either structural market power or potential exercises of market power in electricity markets. PJM contends that, while implementation of the three-pivotal-supplier test could be improved, it does not believe the three-pivotal-supplier test is *per se* unjust and unreasonable. PJM maintains that structural screens (e.g., the three-pivotal-supplier test) and behavioral screens (e.g., conduct and impact tests) have specific advantages and disadvantages, and either one could work with the appropriate design details. PJM states that, while economic theory may dictate optimal strategy for suppliers in a perfectly competitive market, there is no bright-line test to discern whether suppliers possess market power. PJM states that, in practice, both the three-pivotal-supplier test and conduct and impact tests are the product of judgments based on experience about how suppliers compete and on assumptions about how accurately marginal costs can be measured.

12. PJM points out that market power screens are an integral part of a market power mitigation program, and alternatives must be weighed in terms of their effectiveness and interaction with other rules and markets. Further, PJM argues concerns relating to the three-pivotal-supplier test itself are different than concerns regarding the mitigation measures, such as offer capping levels when suppliers fail the screen. Should the Commission retain the three-pivotal-supplier test, PJM requests that the Commission direct PJM and stakeholders to address changes to eligible supply, opportunity costs, and scarcity pricing.

IV. Comments

13. Initial comments were filed by Maryland PSC (with testimony of Seth Blumsack, and attachments); DC Commission; Pennsylvania PUC; Monitoring Analytics;

²³ *Id.* at 114.

Organization of PJM States, Inc. (OPSI); Concerned Customers (with affidavit of Frank A. Wolak);²⁴ Coalition of Indicated PJM Suppliers (with affidavit of Scott M. Harvey);²⁵ Mirant Parties (with affidavit of Robert B. Stoddard); DTE Energy; Reliant; Exelon; AEP; PSEG Companies; EME Companies;²⁶ and Shell Energy. Reply comments were filed by PJM, Monitoring Analytics (with attachments); Concerned Customers; Mirant Parties (including a reply affidavit of Robert B. Stoddard); Maryland PSC (with attachments); Pennsylvania PUC; OPSI; and Commission Trial Staff.²⁷

A. PJM Independent Market Monitor Comments

14. PJM IMM requests that the Commission retain the three-pivotal-supplier test and confirm that the test is a just, reasonable, and non-discriminatory test because it allows for the suspension of mitigation in energy markets during hours when competition is adequate to ensure competitive prices, but generally leaves mitigation in place when non-competitive prices could result. Moreover, PJM IMM states that the test is consistent with other market power tests and the Commission's preference that organized markets employ, wherever possible, transparent, automatic, and non-discretionary market rules.

15. PJM IMM does not support a number of the modifications to the three-pivotal-supplier test that PJM and the stakeholders recommended. Specifically, PJM IMM does not agree that the three-pivotal-supplier test is run too frequently and contends that running it less frequently would be similar to determining the locational marginal price less frequently. PJM IMM also opposes suggestions that the three-pivotal-supplier test does not appropriately define the market for analysis, e.g., the number of suppliers that are considered for potential relief of the transmission constraint, and the definition of the geographic market for analysis. PJM IMM maintains that the use of geographic definitions of markets would be arbitrary at best, and that, because the effective supply

²⁴ Pennsylvania Office of Consumer Advocate; Borough of Chambersburg; North Carolina Electric Membership Corporation; American Municipal Power-Ohio, Inc.; Office of the Ohio Consumers' Counsel; PJM Industrial Customer Coalition; Old Dominion; Southern Maryland Electric Membership Corporation; Office of the People's Counsel for the District of Columbia; and Maryland Office of People's Counsel.

²⁵ CEG Companies, Dayton Power and Light Company; Duke Energy Corporation; Liberty; and PPL Companies.

²⁶ Edison Mission Energy and Edison Mission Marketing & Trading.

²⁷ On October 31, 2008, Commission Trial Staff conducted a meeting to discuss the three-pivotal-supplier test.

available to relieve a transmission constraint is determined by PJM distribution factor (DFAX) software, the DFAX software captures the actual definition of the markets extremely precisely.

16. PJM IMM maintains, however, that there are other areas of PJM's overall market design that should be reformed. Specifically, PJM IMM contends that the design of the RPM capacity market reflects the recognition that the energy markets, by themselves and in the absence of a carefully designed expansion of scarcity pricing, will not result in adequate revenues. PJM IMM states that scarcity revenues can come entirely from energy markets, or they can come from a combination of energy and capacity markets. PJM IMM contends that it is preferable to have a scarcity pricing mechanism in the energy market, as long as it is designed to ensure that energy scarcity revenues offset capacity market revenues.

B. Comments from Sellers

17. Indicated Suppliers state that they do not oppose, in concept, the use of the three-pivotal-supplier test as a market power screen. However, Indicated Suppliers criticize several aspects of the way PJM mitigates suppliers that fail the test. Indicated Suppliers object to defining markets based on fluctuating transmission constraints; they argue that PJM should follow the standard adopted in the market-based rate context of using a stable, predictable geographic market. Indicated Suppliers also object to PJM's practice of including in the market only those generators that can provide congestion relief at less than one hundred fifty percent of the constraint's shadow price,²⁸ rather than the actual market-clearing price in the constrained area. Indicated Suppliers oppose PJM's practice of calculating effective supply by considering only generation that would be dispatched up to relieve the constraint. Indicated Suppliers also criticize PJM for calculating available supply on a constraint-by-constraint basis without regard to whether some generation might be used to relieve multiple constraints. Finally, Indicated Suppliers criticize PJM for omitting price-capped load bids and DEC bids (virtual demand) from the available supply to relieve a transmission constraint in the day-ahead market.²⁹

18. Indicated Suppliers do not advocate replacing the three-pivotal-supplier test. Rather, they recommend modification to address what they argue are defects in application of the test: (1) institute shortage pricing tied to the depletion of operating

²⁸ The "shadow price" is the cost of relieving a constraint, expressed in dollars per MW of relief provided, that would result from a supply consisting of all units physically available to relieve the constraint, based on the least-cost schedules from those units.

²⁹ According to PJM, price capped load and DEC bids are considered part of system load and are therefore not included in the supply.

reserves (similar to New York Independent System Operator (NYISO) and ISO-New England (ISO-NE)); (2) develop a look-ahead dispatch model that considers all units available to resolve a constraint; and (3) develop mitigated offer caps that include all operating values, including opportunity costs and the costs of wear and tear. Reliant, Exelon, PSEG, and AEP offer recommendations similar to these.

19. Mirant and Shell Energy argue that the three-pivotal-supplier test has no economic foundation, and that it results in mitigation even when the market is competitive. Mirant and Shell, as well as Indicated Suppliers, argue that applying offer caps to competitive suppliers is harmful because PJM's bid mitigation does not always match full marginal costs. In particular, mitigated bids are unlikely to reflect difficult-to-measure operating costs and opportunity costs and, market prices will fail to reflect market conditions, especially scarcity.

20. Mirant recommends converting the three-pivotal-supplier test to the role of a first-stage screen, followed by a conduct and impact test for suppliers that fail the first stage, similar to that used in NYISO, ISO-NE, and Midwest Independent Transmission System Operator (MISO). A seller would be subject to mitigation only if it fails both tests. Any seller that passes the three-pivotal-supplier test almost certainly lacks structural market power, and thus, would not be subject to mitigation.

21. Mirant also suggests revising the three-pivotal-supplier test by making it a "sequential" pivotal supplier test. That is, PJM would test whether the largest supplier(s) in a market is pivotal. If not, then all sellers are deemed to have passed the test. However, if the largest supplier is pivotal, it would be mitigated, and PJM would remove it, and a matching amount of demand, from the market. PJM would then test whether the next largest supplier is pivotal to meet the remaining residual demand, and so forth, until the largest supplier remaining is found not to be pivotal. DTE also proposes a dominant supplier analysis as a modification to the three-pivotal-supplier test. Mirant argues that smaller suppliers which, by themselves, lack market power cannot coordinate with larger suppliers to exercise market power if larger suppliers are mitigated. Mirant states that the sequential nature of this proposal could readily be applied to two or three jointly pivotal suppliers.

C. Comments from Buyers

22. Concerned Customers support continuation of the three-pivotal-supplier test, which, they argue, is firmly grounded in economic theory. Moreover, even if some competitive sellers fail the three-pivotal-supplier test and are mitigated, Concerned Customers contend that no harm results because the mitigation cap is fully compensatory. That is, the offer cap mitigates an offer to what a supplier would submit in a competitive market, since the cap reflects sellers' marginal costs plus ten percent. Also, in their view, the conduct and impact test allows the exercise of some (and perhaps much) market

power, where thresholds are established that are above marginal cost. Concerned Customers argue that scarcity pricing and opportunity cost issues are beyond the scope of the instant proceeding.

23. Maryland PSC and Pennsylvania PUC support continuation of the three-pivotal-supplier test. Maryland PSC contends that no facts support a finding that the existing three-pivotal-supplier test is unjust and unreasonable. Maryland PSC contests the claim that PJM over-mitigates suppliers' offers because suppliers can submit their actual marginal costs as a basis for developing a mitigation reference price that is at least ten percent above marginal costs. Maryland PSC also contends that the Commission has not set scarcity pricing for hearing in this proceeding, and as such, it is beyond the scope of the instant proceeding. Pennsylvania PUC argues that any revisions to PJM's mitigation tariff that increases the likelihood that generators will be able to exercise unmitigated market power are unjust and unreasonable. Pennsylvania PUC contends that, given the high degree of market concentration in PJM, relaxing market power mitigation would damage competition and reward anti-competitive behavior. OPSI supports continuation of the three-pivotal-supplier test. OPSI contends that elimination of the three-pivotal-supplier test and market mitigation offer caps would undermine confidence in PJM's markets.

D. Commission Trial Staff

24. Commission Trial Staff states that, while there are concerns with the three-pivotal-supplier test, no party to this point has shown the test to be unjust and unreasonable. Trial Staff contends that the record contains only anecdotal evidence and insufficient probative data to support the claims that the three-pivotal-supplier over-mitigates. Further, Trial Staff contends that no party has detailed the implementation of a specific test that could readily and adequately substitute for the existing three-pivotal-supplier test.

V. Discussion

A. Procedural Matters

25. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure,³⁰ the notices of intervention and the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding. Given the early stage of the proceeding, their interests, and the absence of undue prejudice or delay, we will grant the late-filed motions to intervene of AEP, Old Dominion, DC Commission, Pennsylvania PSC, and Monitoring Analytics.

³⁰ 18 C.F.R. § 385.214 (2008).

B. Three-Pivotal-Supplier Test and Related Mitigation Measures

26. The three-pivotal-supplier test was approved and implemented as part of a comprehensive settlement. But, as the parties have noted, various aspects of this settlement have been revised over the years, including changes to the definition of exempt generators and the application of mitigation across PJM interfaces. Because the three-pivotal-supplier screen is the currently effective tariff, under FPA section 206, we must first examine whether the current tariff provisions result in rates that are unjust and unreasonable. Upon a finding that the current rate has become unjust and unreasonable, any replacement rate then must be shown to be just and reasonable.³¹

27. The three-pivotal-supplier test is a relatively conservative test for determining whether the potential for market power exists.³² As discussed below, we do not find that there is sufficient evidence to establish that the three-pivotal-supplier test results in rates that are unjust and unreasonable. While we do not find that using the three-pivotal-supplier test as the screen to identify suppliers with the potential to exercise market power is unjust and unreasonable, we find that the use of such a conservative screen does require close examination of the mitigation measures applied to suppliers as a result of failing the test.

28. PJM itself agrees that if the three-pivotal-supplier test is retained, certain concerns in the application of the screen should be addressed.³³ Accordingly, in examining the market power mitigation provisions, we look at: (1) how suppliers with the potential to exercise market power are identified; and (2) the related mitigation measures applied to those suppliers. As discussed below, we find that the current mitigation measures

³¹ *FPC v. Sierra Pacific Power Co.*, 350 U.S. 348, 353-54 (1956); May 16, 2008 Order, 123 FERC ¶ 61,169 at P31.

³² Brattle Report at 104 (“Because PJM imposes mitigation using a screen that does not assess the magnitude that price can be raised by an individual supplier (or the incentive of the supplier to raise price), but rather uses a somewhat inclusive screen that merely assesses the joint ability of suppliers to influence a particular transmission constraint, PJM is implicitly defining market power abuse based on a particularly strict standard of the ability to raise price.”).

³³ PJM Report at 22.

imposed on those that fail the screen fail to fully account for opportunity costs,³⁴ particularly for energy- and environmentally-limited resources. We also consider how the mitigation measures may interact with other elements of the market design. We will address each of these issues separately below.

1. **Identification of Sellers with the Potential To Exercise Market Power**

29. We agree with those commenters who maintain that there is no perfect market power test or screen. Because no one test can identify with one hundred percent accuracy firms that have potential to exercise market power, judgment is needed to evaluate proposed tests.³⁵ PJM explains that market screens, whether structural or behavioral, are the product of judgments based on experience about how suppliers compete and on implicit assumptions about how accurately marginal costs can be measured. The Brattle Group states that market power testing and mitigation involves implicit judgments about the consequences associated with the estimated “losses” resulting from the chosen method.

30. The three-pivotal-supplier test is an *ex ante* structural approach intended to identify the potential to exercise market power, and then provide competitive market results for suppliers that are mitigated. Concerned Customers contend that, because of the concentrated ownership structure of the PJM market, a strict test to identify the potential to exercise market power is necessary to prevent both overt and implicit collusion.³⁶ Maryland PSC contends that suppliers in electricity markets would develop

³⁴ An opportunity cost exists if a unit must be run by PJM for a transmission constraint and if that unit has only a significantly limited number of available annual run hours (a hydro unit or a unit with environmental run-time limits). The opportunity cost associated with providing ‘must run’ output is the value associated with the lost opportunity to produce energy during a higher valued time period within the year.

³⁵ See *Colorado Interstate Co. v. FPC*, 324 U.S. 581, at 589 (1945) (rate design involves judgment on a myriad of facts; it has no claim to an exact science); *Blumenthal v. FERC*, No. 07-1130, 2009, U.S. App. LEXIS 1101, at 12-13 (D.C. Cir. Jan. 23, 2009) (*Blumenthal*) (there is no single just and reasonable rate, but rather a zone of reasonableness and the Commission must balance competing considerations in deciding on a just and reasonable rate within the zone); *Wisconsin v. FERC*, No. 06-1408, slip op at 8 (D.C. Cir. Oct. 31, 2008) (deference accorded ratemaking determinations); *Association of Oil Pipe Lines v. FERC*, 83 F.3d 1424, at 1431 (D.C. Cir. 1996) (ratemaking involves “complex industry analyses and difficult policy choices”).

³⁶ Concerned Customers Initial Comments at 18-19; Wolak Affidavit at P 41-49.

bid strategies designed to bid up the market price.³⁷ Some suppliers argue that the three-pivotal-supplier test is not grounded in economic theory. We disagree. There is work in the economics literature supporting the three-pivotal-supplier test.³⁸

31. Supporters of the three-pivotal-supplier test contend that it identifies only suppliers that are pivotal and that submit energy offers above the competitive level as having the potential to exercise market power. Maryland PSC states that offers have been capped in fewer hours since PJM implemented the three-pivotal-supplier test in 2006,³⁹ and because offer-capped units still receive the locational marginal price if the locational marginal price is above their mitigated rate, the units, in effect, are not mitigated in those hours.⁴⁰ Indicated Suppliers state that the three-pivotal-supplier test suffers from various systemic design flaws, and that, as a result of these flaws, regularly causes the test to over-mitigate, but neither Indicated Suppliers nor Mirant point to specific instances of over-mitigation.

32. The Commission finds that insufficient evidence has been presented to warrant finding that the three-pivotal-supplier test is an unjust and unreasonable approach to identify sellers with the potential to exercise market power. Further, as discussed below, because the related mitigation measures are intended to compensate suppliers that are mitigated as a result of failing the test, the parties have not supported their claim that the three-pivotal-supplier test has a negative impact on market outcomes, or that the three-pivotal-supplier test is an unreasonable approach for monitoring the potential to exercise market power.

³⁷ Maryland PSC Reply Comments at 22; Blumsack Initial Testimony at 27-28; Blumsack Reply Testimony at 16-24.

³⁸ See Wolak Initial Testimony at P 32 (the PJM three-pivotal-supplier test provides superior protection for consumers against prices that reflect the exercise of market power, while still protecting suppliers from over mitigation); Blumsack Initial Testimony at 25 (the pivotal supplier test is the correct test for structural market power in electricity markets because it most accurately identifies suppliers with the ability to withhold supply or submit offers above the competitive price), *citing* Seth Blumsack, Dmitri Perekhodtsev, and Lester Lave, *Market Power in Deregulated Wholesale Electricity Markets: Issues in Measurements and the Cost of Mitigation*, *The Electricity Journal*, Vol. 15, No. 9 (2002); *see also* Jean Tirole, *The Theory of Industrial Organization*, 239-276, MIT Press (1992).

³⁹ Maryland PSC Ex. MDC-31 at 12.

⁴⁰ Blumsack Initial Testimony at 16-20, 30-31, Maryland PSC Ex. MDC-29 at 14.

33. We also consider whether operational assumptions are reasonable and the mechanics of implementation are consistent with the stated objectives. Commenters have raised a concern with both the definition of relevant markets and mitigation of suppliers with small market shares.

a. Relevant Market

34. The reliability of any market power screen depends critically on correctly defined product and geographic markets. PJM states that application of the three-pivotal-supplier test requires the definition of the supply available to resolve a constraint. As previously noted, PJM's definition of eligible supply includes only those offers priced at less than or equal to one hundred fifty percent of the shadow price for the congested constraint. Commenters have raised a concern that the one hundred fifty percent threshold inappropriately defines the relevant market, suggesting that the threshold should be modified or eliminated. PJM states that excluding offers from units that could relieve the constraint if the cost of those units is above the shadow price may result in an increased likelihood of the remaining offers being found pivotal, thus making mitigation more likely. PJM thus suggests revisiting the level of this screen. However, PJM IMM and other commenters point out that the one hundred fifty percent threshold is much higher than the one hundred five percent threshold used in the Commission's Delivered Price Test.

35. The one hundred fifty percent threshold serves to identify actual economic substitutes, and while commenters raise a concern that the existing threshold excludes potentially relevant supply, we are not convinced that the definition is too restrictive. The threshold is a mechanism that allows PJM to define a pool of eligible resources that are available based on economic conditions rather than physical availability. As a result, we find that the definition permits PJM to make meaningful decisions when dispatching resources to resolve any particular constraint. Accordingly, we do not find it appropriate to eliminate this constraint on the definition of eligible supply. Further, while some commenters contend that the threshold should be modified, we note that no party has proposed an alternative threshold.

36. PJM, the Brattle Group and several commenters also express concern with the lack of geographic definition of the relevant markets. For the three-pivotal-supplier test, the relevant market is not a pre-determined geographic area; rather, the test determines the incremental effective MW of supply available to relieve the constraint based on application of PJM's market solution software, and each eligible supplier's DFAX.⁴¹

⁴¹ A unit's contribution toward effective, incremental available supply is based on the DFAX analysis of the unit relative to a transmission constraint and the unit's

PJM acknowledges that the limitation on available supply is strict because the eligible supply is limited by physical location and electrical capability. Indicated Suppliers contend that the transitory nature of the constraint-by-constraint analysis is not consistent with Commission precedent.⁴² PJM IMM contends that the definition of eligible supply is grounded in the DFAX methodology, and the electrical system appropriately defines the market for the purposes of the three-pivotal-supplier analysis.

37. The three-pivotal-supplier test is applied on a real-time basis, under varying transmission and generation conditions. A test that reflects these dynamics is necessary. Based on the record before us, we do not find that use of the DFAX analysis is unjust and unreasonable. On the contrary, it is consistent with a real-time analysis of the actual market under dynamic conditions. PJM applies the three-pivotal-supplier test to units dispatched out of merit order to address constraints. Since PJM applies this test hourly, on a constraint-by-constraint basis, the geographic market is not fixed by definition because it will vary with the affected constraints. As a result, the PJM mitigation screen is much more focused on short-term analysis than that utilized in a market-based rate or an FPA section 203 proceeding. Thus, for the purposes of PJM's real-time automatic mitigation, the use of a pre-determined, fixed geographic market would not reflect the real-time realities of available supply, and is therefore not appropriate.

b. Suppliers with Small Market Share

38. Some commenters argue that the existing method of implementing the three-pivotal-supplier test unfairly mitigates generators with small market shares. Commenters contend that these small suppliers cannot exercise market power. To address this concern, commenters propose that the use of a sequential or dominant supplier analysis be incorporated with the implementation of the three-pivotal-supplier test. PJM IMM argues, however, that such proposals are based on the false assumption that market participants compete sequentially rather than simultaneously.

39. The Commission notes that parties proposing such analysis offer only hypothetical examples and no significant evidence that small suppliers are inappropriately identified as having the potential to exercise market power. Small suppliers, when pivotal, are able

incrementally available capacity over current load levels. DFAX analysis essentially measures the effectiveness of generation that will aid in reducing the constraint.

⁴² *Citing Market-Based Rates for Wholesale Sales of Electric Energy, Capacity and Ancillary Services by Public Utilities*, Order No. 697, 72 Fed. Reg. 39,904 (July 20, 2007), FERC Stats. & Regs. ¶ 31,252, *clarified*, 121 FERC ¶ 61,260 (2007), *order on reh'g*, Order No. 697-A, 73 Fed. Reg. 25,832 (May 7, 2008), FERC Stats. & Regs. ¶ 31,268 (2008).

to exercise market power and simply because a supplier is small does not mean that it will not be able, or would not have an incentive, to manipulate the market-clearing price.⁴³ While the structural screen is not a perfect measure of actual market behavior, we do not find that the three-pivotal-supplier test misidentifies structural market power of all suppliers in the PJM region.

2. Related Mitigation Measures

40. Once the three-pivotal-supplier test identifies suppliers with the potential to exercise market power, suppliers are mitigated to a level designed to prevent the exercise of that market power. Indicated Suppliers argue that the mitigation measures do not include all costs, including opportunity costs, and requests that such costs should be expressly included. Mirant supports this approach, but notes the difficulty in determining opportunity costs. Concerned Customers contend that suppliers can currently include opportunity costs that result from environmental constraints on generating units. However, Concerned Customers support the continued evaluation in the stakeholder process (through PJM's Cost Development Task Force) of opportunity costs arising from emissions limitations. PJM states that its market rules do not fully account for opportunity costs related to emissions or other environmental limits, and acknowledges that such costs are valid, and are likely to become more significant as generators encounter more operational limits due to environmental constraints. As a result, PJM recommends that the Commission direct the stakeholders to consider possible changes to the PJM Tariff as necessary to reflect opportunity costs, specifically relating to environmental limitations.

41. As previously noted, section 6.4.2 of the PJM Tariff establishes the mitigation levels for generators that fail the three-pivotal-supplier test. For most generators, the mitigated offer price is its incremental operating cost plus a 10 percent adder (the default bid). The PJM Tariff provides for the seller to specify the methodology for calculation of the mitigation cap, which may also include the weighted average locational marginal price, the incremental operating cost as determined in Schedule 2 of the Operating Agreement, or an amount as determined by agreement between PJM and the seller, unless otherwise determined by the Commission where no agreement is reached. These provisions do not explicitly provide for the inclusion of opportunity cost. Schedule 2 lists

⁴³ In *Blumenthal* the court recognized that under Commission policy, mitigation is applied only to those generators that have the potential to exercise market power, not to the entire market: "what matters is whether an individual seller can exercise market power, not whether the market as a whole is structurally competitive." Because we recognize that small suppliers have the potential to exercise market power under certain circumstances, our findings are not inconsistent with *Blumenthal*.

the components of cost calculation, but does not reference opportunity costs. This is inconsistent with PJM's Tariff provisions in other markets, such as ancillary services, which explicitly provide for recovery of opportunity costs.⁴⁴ PJM is currently addressing this issue in its stakeholder process.⁴⁵

42. Some commenters contend that these modifications are not necessary, because the current tariff provides for inclusion of these costs, as negotiated. However, we find that because opportunity cost are not specifically provided for or clearly defined, the current provisions for including this component of costs are limited to a case-by-case process. Default bids that do not account for opportunity costs can lead to inefficient use of scarce resources and increase costs to customers.⁴⁶ We find that, because default bids do not clearly and explicitly provide for the inclusion of opportunity costs, especially for energy and environmentally-limited resources, the mitigation measures related to determining default bids are unjust and unreasonable. With retention of the three-pivotal-supplier test, we agree that it is critical to assure that mitigation measures account for opportunity costs, while not violating the environmental limitations.

3. Interaction of Mitigation Measures with Other Elements of the Market Design

43. Numerous commenters argue that the scarcity pricing provision of the existing market rules should be modified to better reflect scarcity conditions. Indicated Suppliers state that one of the reasons the three-pivotal-supplier test is unjust and unreasonable is that, as applied, it does not differentiate between a resource's exercise of market power and resource scarcity. Indicated Suppliers, Edison Mission, and PSEG support PJM's adoption of scarcity pricing provisions similar to the NYISO, which they contend provide a transparent, predictable and repeatable means of reflecting supply shortages at a capped rate that escalates to reflect the depletion of reserves. Exelon supports provisions that make scarcity transparent to market participants prior to the point where the system has

⁴⁴ See e.g., PJM Tariff, Regulation, section 3.2.2(d) (providing for opportunity costs from a generation resource offering to sell Regulation service); Operating Reserves, section 3.2.3(f-3) (recognizing opportunity costs associated with reducing or suspending a unit's output due to a transmission constraint).

⁴⁵ Cost Development Task Force -- <http://www.pjm.com/committees-and-groups/task-forces/cdtf.aspx>

⁴⁶ See *H.Q. Energy Services (U.S.), Inc. v. New York Independent System Operator*, 110 FERC ¶ 61,243, at P 29-34 (2005) (recognizing that a hydroelectric unit has a legitimate basis for bidding opportunity costs).

reached critical operational levels. With the Commission's recent elimination of the interface exemption, PJM contends that there is an increased risk that mitigation would be triggered inappropriately, when the underlying fundamentals reflect scarcity not market power.

44. Maryland PSC and Concerned Customers oppose the consideration of scarcity pricing in this proceeding. Maryland PSC contends it is beyond the scope of this proceeding, and Concerned Customers state that scarcity pricing provisions are currently under discussion in the PJM stakeholder process. Further, Maryland PSC states that the Commission has implemented a capacity mechanism intended, in part, to compensate for the effect of offer price caps that can limit compensation in the energy market. PJM IMM contends that any reform of scarcity pricing in the energy market should ensure that scarcity pricing offsets capacity revenues.

45. In Order No. 719,⁴⁷ the Commission recognized concerns that RTO and ISO market rules may not produce prices that accurately reflect the value of energy, including participation by demand response resources, during periods of operating reserve shortages. As a result, the Commission required each RTO and ISO to review its existing rules and demonstrate their adequacy or propose reforms. Compliance filings addressing the Commission's concerns identified in Order No. 719 are due in April 2009. We therefore will not pre-empt the process established in Order No. 719. The parties' concerns are more appropriately addressed in that proceeding.

C. Replacement of the Three-Pivotal-Supplier Test

46. A number of parties advocated finding that the three-pivotal-supplier test is unjust and unreasonable and replacing it with a different market power screen, such as the conduct and impact test used by the NYISO, ISO-NE, and MISO. While we have found that certain aspects of the application of the three-pivotal-supplier test need to be modified, the parties have not made a sufficient showing that the test itself is unjust and unreasonable as a structural market screen, if the mitigated offer prices incorporate all legitimate marginal costs, including opportunity costs. The three-pivotal-supplier test is based on the generally accepted theory that market performance is likely to be less competitive when a small number of firms can dominate the relevant market.⁴⁸ While

⁴⁷ *Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, 73 Fed. Reg. 64,100 (Oct. 28, 2008), FERC Stats. & Regs. ¶ 31,281 (2008) (Order No. 719).

⁴⁸ See Order No. 697; Department of Justice & Federal Trade Commission, 1992 Horizontal Merger Guidelines (relying on measures of concentration in assessing mergers).

conduct and impact tests may be reasonable market power mitigation approaches, we cannot find that using a structural approach, such as the three-pivotal-supplier test, is itself necessarily unjust and unreasonable.⁴⁹

D. Procedures To Address Incorporation of Opportunity Costs

47. While we have found that the three-pivotal-supplier test itself is not unjust and unreasonable, we have found related mitigation measures, because they do not clearly and systematically provide for the inclusion of opportunity costs, are unjust and unreasonable. Parties have not made specific proposals for just and reasonable alternatives. We are therefore establishing the following procedures to help us determine the just and reasonable solutions to the above identified concern.

48. On or before July 31, 2009, PJM is to make a compliance filing that proposes an approach for addressing the incorporation of opportunity costs in mitigated offers. Within 30 days after that filing, other parties may provide comments on the PJM proposal or submit their own specific proposals for resolving this issue. PJM will then have 20 days from the date of filing to respond.

⁴⁹ *Petal Gas Storage, L.L.C. v. FERC*, 496 F.3d 695, 703 (D.C. Cir. 2007) (Commission is not required to choose the best solution, only a reasonable one); *Wisconsin Public Power, Inc. v. FERC*, 493 F.3d 239, 266 (D.C. Cir. 2007) (merely because petitioners can conceive of a refund allocation method that they believe would be superior to the one that the Commission approved does not mean that the Commission erred in concluding the latter was just and reasonable); *ExxonMobil Oil Corp. v. FERC*, 487 F.3d 945, 955 (D.C. Cir. 2007) (Commission need not adopt the best possible policy as long as the agency has acted within the scope of its discretion and reasonably explained its actions).

The Commission orders:

PJM is hereby directed to submit a compliance filing in this proceeding no later than July 31, 2009 consistent with the directives of this order, as discussed in the body of this order. Other parties are hereby granted 30 days in which to respond to that compliance filing, as discussed in the body of this order. PJM is hereby granted 20 days thereafter to respond to parties' comments.

By the Commission. Commissioner Kelliher is not participating.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.