UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. ER17-1567-000

COMMENTS OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to Rule 211 of the Commission's Rules and Regulations,[1] Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM[2] ("Market Monitor"), submits these comments responding to the Order No. 831 compliance filing submitted May 8, 2017, in this proceeding by PJM Interconnection, L.L.C. ("PJM") ("May 8th Filing").

In Order No. 831, the Commission requires that the RTO or its Market Monitoring Unit verify that offers in excess of $1,000 per MWh reasonably reflect the offered resource's actual or expected costs prior to making the offer eligible to determine energy market Location Marginal Prices ("LMP") in market clearing. The Commission states that it expects that the verification process will build upon the existing mitigation processes for calculating and updating cost-based incremental energy offers.[3] The goal of the verification process is to ensure that prices are set consistent with the actual short run marginal costs faced by generators and that market power is not exercised.

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1 18 CFR § 385.211 (2012).

2 Capitalized terms used herein and not otherwise defined have the meaning used in the PJM Open Access Transmission Tariff ("OATT").

3 157 FERC ¶ 61,115 at PP 139–141 ("Order No. 831").

The May 8th Filing has PJM performing the verification of cost-based offers exceeding $1,000 per MWh prior to market clearing and makes no mention of the Market Monitor's participation in that process. The May 8th Filing does not build on the existing verification process for cost-based offers, which is performed by the Market Monitor under the PJM OATT Attachment M IV.E-1 and Attachment M – Appendix II.A.2. The May 8th Filing proposes to create a new cost-based offer verification process where none currently exists, founded on scant RTO experience and expertise. PJM's proposed automated verification screen does not ensure that cost-based offers over $1,000 per MWh reasonably reflect costs. PJM's proposal also fails to provide a method or standard to verify cost-based offers that fail its automated screen. The PJM proposal does not provide a process for verifying Demand Response offers over $1,000 per MWh prior to market clearing, and it includes adders above costs that exceed $100 per MWh. For these reasons, the Commission should deem PJM's compliance filing deficient and require a new proposal that builds on existing cost verification processes, including the Market Monitor's cost verification process and Fuel Cost Policies, to ensure, prior to market clearing, that cost-based offers over $1,000 per MWh reasonably reflect actual or expected costs.

I. COMMENTS

The May 8th Filing provides for the verification of cost-based incremental offer curves using an automated screening process. The screen calculates a Maximum Allowable Incremental Cost from a combination of data provided by the Market Seller and data provided by PJM.[4] The calculation and its inputs are incorrect. The May 8th Filing includes no provisions requiring that the data inputs to the calculation adhere to the current standards for cost-based offer inputs, as defined in Schedule 2 of the Operating Agreement, the Manual 15: Cost Development Guidelines, or the Market Seller's Fuel Cost Policy. The

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4 *See* May 8th Filing at 9–10.

May 8th Filing does not rely on the existing provisions for the verification of cost-based offers in Attachment M and Attachment M – Appendix of the PJM OATT.

In the case that a Market Seller's cost-based incremental offer curve exceeds the Maximum Allowable Incremental Cost in the screen, the May 8th Filing includes a process for the Market Seller to contest PJM's maximum allowable value by presenting documentation of its costs to PJM.[5] The May 8th Filing provides no standards for evaluating the costs or whether the documentation sufficiently justifies the cost-based offer.

The May 8th Filing does not adequately address the verification of Demand Response offers over $1,000 per MWh. PJM's proposed provisions do not require that PJM or the Market Monitor verify the cost basis of the Demand Response offers prior to market clearing as required by Order No. 831.

A. The Proposed Verification Process Does Not Ensure that Offers Over $1,000 per MWh Reasonably Reflect the Resources' Actual or Expected Costs.

The best source of the actual or expected costs of a resource is the Market Seller. The Market Seller's submitted cost must nonetheless be verified. This is why the PJM market power mitigation process relies on Market Seller submitted cost-based offers, supported by Market Sellers' incremental cost data and Fuel Cost Policies. Unfortunately, Market Sellers have an incentive to overstate cost-based offers in order to exercise market power when possible. To ensure that offer caps do not understate or exceed short run marginal costs, the verification process should use validated Market Seller data to construct the offer cap.

PJM's proposal to use its own determination of applicable fuel costs in its verification screen will result in the inaccurate calculation of the Maximum Allowable Incremental Cost (MAIC).[6] In cases where PJM overstates the costs, the proposal would

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5 *See* May 8th Filing at 12.

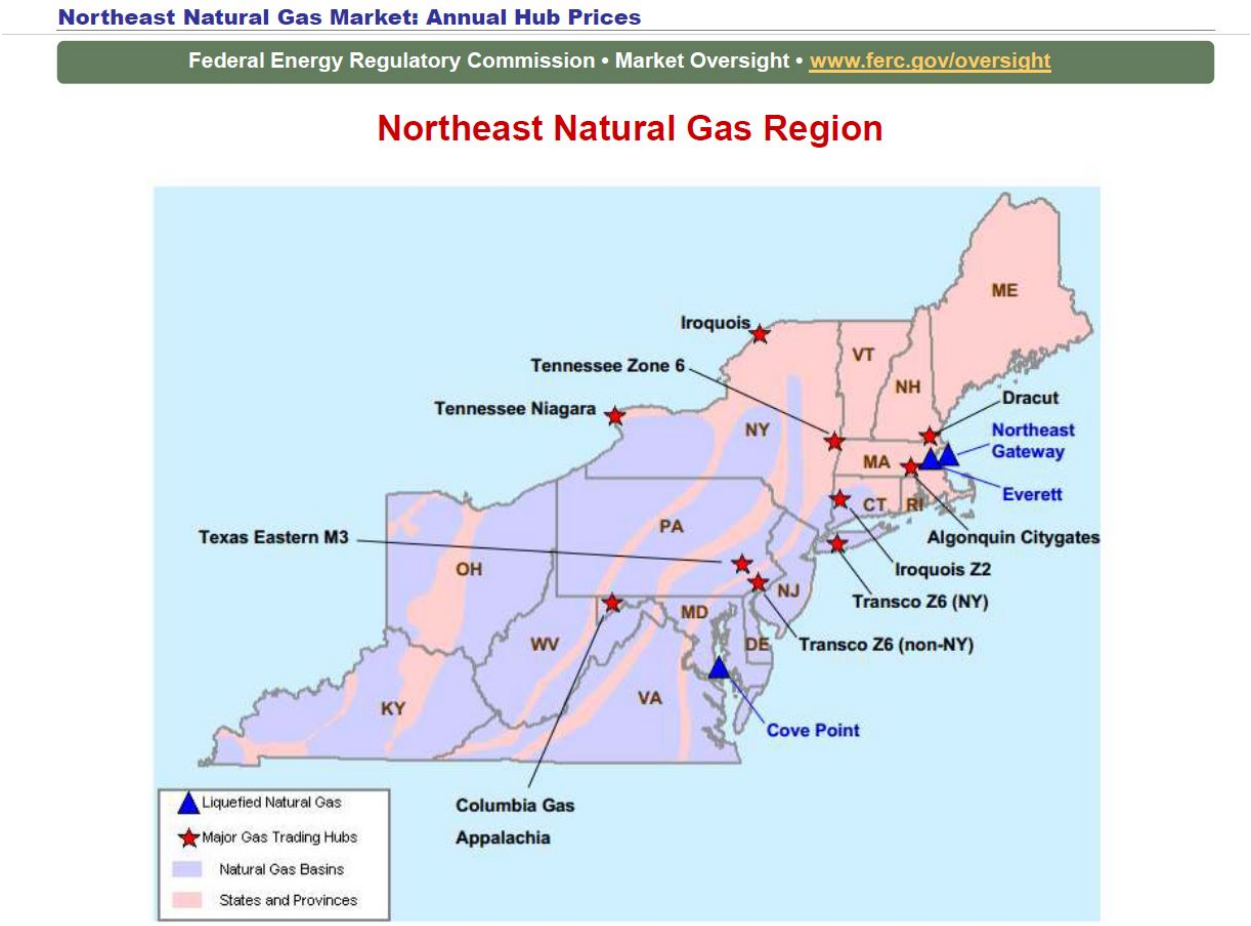
6 *See* Greater than $1,000/MWh Cost Offer Revised Verification Procedure, PJM Presentation to the Markets Implementation Committee, May 3, 2017, at 8, <*http://pjm.com/~/media/committees-groups/committees/mic/20170503/20170503-item-14-offer-verification.ashx*> .

allow unnecessarily high offer caps to prevail. In cases where PJM understates the costs, the proposal would result in suppressing prices below the competitive level. In cases where PJM understates the costs and market participants submit new documentation, the proposal would create the unworkable requirement to review cost documentation in a very short time period before the market clears.

1. Verifiable Fuel Costs Should Adhere to Fuel Cost Policies.

PJM proposes to use "a geographically appropriate commodity trading hub" to determine the fuel cost for gas fired generators. Multiple interstate natural gas pipeline systems serve the PJM region, often in close geographic proximity. Many natural gas fired generators have access to multiple natural gas trading hubs. Figure 1 presents a map of some of the natural gas trading hubs in the PJM region. It shows, for example, the close proximity of the Texas Eastern M3 trading hub to the Transco Z6 (non-NY) trading hub. Further south, generators also have access to Columbia Gas, Dominion (DTI) and two Transco zones (Z6 non-NY South and Z5) trading areas. There are also multiple trading hubs in close proximity in the Chicago area. Some generators have consistent access to the lowest price of multiple hubs. Other generators face conditions where the market price at the generating unit's location consistently converges on the highest price of multiple hubs. The determination of the appropriate trading hub varies with economic conditions in the gas market, physical interconnections, and the business practices of the generator. Geography is not sufficient to determine the appropriate trading hub. It is not appropriate for PJM to substitute its vague and undefined "geographically appropriate" criterion for the results of the Market Monitor's thorough fuel cost policy review process, which covers at least 89 percent of all gas-fired units.

Figure 1 FERC northeast natural gas trading hub map[7]



During the Fuel Cost Policy review process, the Market Monitor carefully reviews and discusses in detail with market participants all scenarios to ensure that the Fuel Cost Policy accurately represents the market conditions facing each generator. The determination of the accurate trading hub under the defined scenarios in the Fuel Cost Policy is the best source of information available to PJM and the Market Monitor. The use of a trading hub different than those defined in the Fuel Cost Policy would mean substituting PJM's judgment, based on no stated criteria, for the clearly defined, reviewed and agreed upon Fuel Cost Policy. The result would be an incorrect fuel price, an incorrect offer and

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7 Natural Gas Markets: Northeast, Market Oversight, Federal Energy Regulatory Commission, <https://www.ferc.gov/market-oversight/mkt-gas/northeast.asp>, accessed May 17, 2017.

incorrect energy market clearing prices. To illustrate the significance of this point, Table 1 includes several natural gas trading hubs used by generators in each PJM zone and the largest difference, converted to incremental energy costs in dollars per MWh, between any two of those index prices on January 22, 2014, when natural gas prices exceeded levels that would result in incremental costs greater than $1,000 per MWh.[8]

Table 1 Natural gas trading hubs and implied natural gas fired generation fuel cost by PJM zone for January 22, 2014[9]

PJM Zone(s)	Geographically Appropriate Gas Trading Hubs				Greatest Difference Between Hub Gas Costs ($ per MWh)
AECO, JCPL, METED, PECO	TETCO-M3	Transco Zone 6 Non-NY *			$516.92
PPL	TETCO-M3	Transco Zone 6 Non-NY *	Transco Leidy	Tenn Zone 4 *	$1,192.01
BGE	Transco Z6 Non-NY *	TCO			$1,187.89
DPL	Transco Z6 Non-NY *	TETCO-M3			$516.92
PEPCO	Transco Z6 Non-NY *	Transco Zone 5 *			$32.95
DOM	Transco Z5 *	TCO	Dominion South Point		$1,154.94
PENELEC	Dominion North Point	TCO	Tenn Zone 4 *	TETCO-M3	$7.24
PSEG	Transco Z6 NY	TETCO-M3			$488.87

These examples show the extreme range of natural gas prices in small geographic areas. Divergence of over 100 percent is common when winter temperatures fall below freezing. If PJM makes simplistic, static assignments of generators to single, "geographically appropriate" trading hubs, it will grossly understate the cost of gas in some cases and grossly overstate the cost of gas in other cases. The Commission should require use of the

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[8] Commercial use of gas trading hubs is not limited to this subset of hubs for units in the indicated zones, and some fuel cost policies for units in the indicated PJM zones appropriately use other hubs.

[9] Source: S&P Global Platts Gas Daily for January 22, 2014. The greatest difference between hub gas costs is the difference between the highest and lowest of the next day gas indexes among the indicated hubs multiplied by a generic natural gas fired combustion turbine heat rate of 10 MMBtu per MWh. An asterisk (*) indicates that Platts publishes multiple similar indexes for the indicated hub.

most accurate information available, the Fuel Cost Policy, for estimation of fuel prices for each generator using trading hubs.

2. Verifiable Fuel Costs Should Not Include an Arbitrary Additional 10 Percent.

PJM proposes to add a generic 10 percent to the fuel cost of all resources in calculating the Maximum Allowable Incremental Cost. This is in addition to the current 10 percent adder to cost-based offers. The May 8th Filing describes the new 10 percent as a "variance adder to allow for uncertainty." PJM's additional 10 percent adder is inappropriate and impermissible under Order 831. Fuel prices do vary. On days when the natural gas pipeline system has been constrained, the variance of some indexed fuel prices during the course of the trading day has greatly exceeded 10 percent. For other indexed fuel prices, the variance, on the same constrained days, has been less than 10 percent. Due to fuel transportation costs and fuel procurement costs, the range of prices for generators using the same trading hub may vary by more than 10 percent. A generic addition to fuel commodity costs, of any percent, is inaccurate.

A 10 percent adder to fuel cost to cover uncertainty and risk in the commodity cost of natural gas is not appropriate. Fuel Cost Policies fully define the cost of gas, accounting for actual market conditions, and there is no reason to add an arbitrary, additional 10 percent to the cost of gas.

Differences between a generator's verifiable fuel cost and the index price are documented in Fuel Cost Policies. Market Sellers add to the commodity cost of fuel: basis differentials; transportation costs; distribution charges; taxes; pipeline losses; and variable charges for fuel manager or supplier services, as applicable. These costs may be less than or greater than 10 percent of the commodity fuel cost. Any deviations from the index fuel price should be based on the Fuel Cost Policy, not set at an arbitrary 10 percent.

For offers between $1,000 per MWh and $2,000 per MWh PJM's proposed adder would allow an additional $100 to $200 per MWh. At a winter peak load of approximately 140,000 MW, the cost to the PJM market would be $14 to $28 million per hour. By adding

this amount to the Maximum Allowable Incremental Cost, PJM proposes to impose a significant cost on the load without justification. Furthermore, allowing an adder above costs to exceed $100 per MWh is not permissible under Order No. 831.[10] The PJM Operating Agreement already allows for an additional 10 percent above costs. This current 10 percent adder must be capped at $100 per MWh, and no further addition to costs to capture uncertainty is permissible.

3. The Proposed Maximum Allowable Incremental Cost Formula is Incorrect.

The May 8th Filing contains significant mathematical mistakes that will, in some cases, underestimate the correct incremental cost curve and, in some cases, overestimate the correct incremental cost curve. The May 8th Filing also contains several terminology mistakes. The Maximum Allowable Incremental Cost calculation that PJM proposes to use for cost-based offer screening is neither accurate nor is it consistent with the PJM Cost Development Guidelines (Manual 15), which also fail to provide methods for accurate calculations of incremental costs.

PJM mistakenly proposes to calculate a Maximum Allowable Incremental Cost that uses units' actual submitted cost-based offers to calculate the cap on those same offers.[11] The Maximum Allowable Incremental Cost calculation takes the Bid Production Cost as an input, where the Bid Production Cost is derived from the same incremental energy offer under evaluation. It is incorrect and illogical to use the offer submitted by Market Sellers as an input to the calculation of the cap PJM will impose on such offer. As a result, Market Sellers could increase or decrease the Maximum Allowable Incremental Cost PJM will calculate based on their specification of the Incremental Energy Offer and No Load Cost. For example, if a Market Seller decides to offer a No Load Cost of zero dollars per hour, the

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10 *See* Order No. 831 at P.207.

11 *See* May 8th Filing at Marked Tariff 6.4.3(a).

second segment of the Maximum Allowable Incremental Cost will be higher than the correct Incremental Energy Offer at that segment. This issue will also decrease the Maximum Allowable Incremental Cost below the proper Incremental Energy Offer because PJM will not take into account other offer components such as VOM, emission and opportunity costs.

PJM proposes to calculate the Maximum Allowable Incremental Cost in dollars per MWh as the difference in total hourly production costs from one MW segment to another divided by the difference in MW from one segment to another. This approach is correct for one type of offer calculation method: a step function. This calculation will underestimate the Incremental Energy Offer of all units offered with a sloped function. The May 8th Filing does not explain what Bid Production Cost PJM would apply when calculating the MAIC for the first offer curve segment. Assuming that the Bid Production Cost is zero for a nonexistent segment, the MAIC calculation will overestimate the first segment of all units offered with a step function. The Attachment provides an illustration of the mistake in the formula proposed by PJM.[12]

The product of incremental heat rates and fuel cost in combination with VOM costs, emission costs, opportunity costs and any other defined short run marginal cost are the inputs needed to calculate a correct Maximum Allowable Incremental Cost. The formula for the Maximum Allowable Incremental Cost should be:

$$\text{Incremental Offer}_i = \text{Incremental Heat Rate}_i \times (\text{Fuel Cost}_i + \text{Fuel Adders}_i) + \text{Energy Adders}_i + \text{Tariff Adder}$$

Where:

> Incremental Offer$_i$ is the incremental offer in $ per MWh for offer curve segment i.
>
> Incremental Heat Rate$_i$ is the heat rate in MMBtu per MWh for segment i determined based on the methods defined in Manual 15.

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[12] A version in PDF format and a version in spreadsheet format are included as attachments.

> Fuel Cost$_i$ is the fuel related cost in $ per MMBtu. The fuel cost may include commodity, transportation, fuel handling and any other fuel related short run marginal cost.
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> Fuel Adders$_i$ are any short run marginal costs measured in $ per MMBtu, such as VOM or Emission adders.
>
> Energy Adders$_i$ are any short run marginal costs measured in $ per MWh, such as VOM, Emission or Opportunity Cost adders.
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> Tariff Adder is the adder defined in section 6.4.2 of the PJM Operating Agreement Schedule 1.

The equation above is all the PJM tariff needs to specify regarding the calculation of the Maximum Allowable Incremental Cost. The calculations of the inputs used in this equation should be based on methods defined in Manual 15 or in Market Sellers' fuel cost policies.

PJM's proposed revisions appear to be driven by the fallacy that Market Sellers are allowed to adjust their no load in order to alter their incremental heat rates. This activity is clearly not allowed. The no load heat and incremental heat rates are values developed by Market Sellers either via performance tests, original equipment manufacturer ("OEM") data or historical performance. These values should only change if the inputs used in their development are updated. Any Market Seller that shifts heat input between no load and the incremental heat in the calculation of cost-based offers without following their fuel cost policy would be subject to penalties for incorrect cost-based offers.[13]

PJM's proposed Maximum Allowable Incremental Cost calculation also contains several terminology mistakes:[14]

Operating Rate: Operating rate is the average cost in $ per MWh of a resource at a given MWh output. PJM incorrectly defines the term to equal the hourly cost, in $ per hour, of a resource at a given MWh. The correct operating rate would divide the hourly cost by

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13 *See PJM Interconnection, L.L.C.*, 158 FERC ¶ 61,133 at P63 (2017).

14 *See* May 8th Filing at OATT revisions 6.4.3(a).

the applicable MWh output. The Commission should require PJM to use correct terminology.

Heat Input: Heat input is the amount of fuel (commonly measured in MMBtu, not MW per mmBTU) needed to produce electricity (commonly measured in MWh). The heat input curve shows the heat input by MWh output level.

Heat Rate: A heat rate measures the efficiency of power plants and is commonly measured in MMBtu per MWh, not in MW per MMBtu. A unit's heat input is derived from either heat input curves or average heat rate calculations, not from a heat rate curve.

British Thermal Unit (Btu): The correct abbreviation of British Thermal Unit, which is a unit of measurement, is Btu. The correct abbreviation of a million Btu is MMBtu.

The 'A' term: The term is defined as "up to 10% cost adder, in accordance with section 6.4.2".[15] The Maximum Allowable Incremental Cost needs to be corrected to incorporate this adder as the lower of ten percent or $100 per MWh.

B. The Proposed Verification Process Does Not Apply to a Resource's Operating Rate.

In Order No. 831 (at P.132) the Commission acknowledges the Market Monitor's recommendation "that the $1,000/MWh offer cap apply to a resource's 'operating rate,' which is calculated by adding a resource's incremental offer to its no-load offer." The Maximum Allowable Incremental Cost calculation proposed in the May 8th Filing does not apply to the operating rate. No load cost is included in both the "Maximum Allowable Operating Rate" and the "Bid Production Cost" for all but the first offer curve segment in the proposed calculation. When PJM takes the difference between the "Maximum Allowable Operating Rate" and the "Bid Production Cost," no load costs are eliminated

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15 *Id.*

from the calculation.[16] Therefore, the verification only applies to the incremental energy offer curve portion of the offer schedule. Market power mitigation in PJM applies to the entire offer schedule, not only the incremental energy offer curve. The Commission should accordingly require the validation of any energy offers with operating rates higher than $1,000 per MWh prior to market clearing.

C. PJM's Proposed Verification Process Does Not Build on the Existing Mitigation Processes for Calculating or Updating Cost-Based Offers.

In Order No. 831 at P. 141, the Commission states that "[t]o create such a verification process, we expect that the RTO/ISO would build on its existing mitigation processes for calculating or updating cost-based incremental energy offers." In the May 8th Filing, PJM refers to the new provisions for Fuel Cost Policies and penalties for inaccurate cost-based offers, but it does not incorporate the Fuel Cost Policy or the existing review process for cost-based offer accuracy in its proposed verification process. The only data that PJM proposes to use that are currently used by the Market Monitor to verify cost-based offers are the heat input and performance factor. Much of the potential inaccuracy in the Maximum Allowable Incremental Cost calculation could be eliminated by using the existing process for cost verification under Attachment M and the new Fuel Cost Policy process.

1. The May 8th Filing Does Not Use the Existing Cost Verification Process.

PJM has no current process for calculating, verifying, or updating costs. This is a market monitoring function. The Market Monitor has a process for reviewing and consulting with Market Sellers regarding their costs.[17] The May 8th Filing does not build on the current process. The May 8th Filing contemplates no use of the Market Monitor's

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[16] Any discrepancies between the level of the Market Seller's offered no load cost and PJM's calculated no load cost will remain in the calculation.

[17] *See* OATT Attachment M Section IV. E-1 and Attachment M – Appendix Section II.A.2.

extensive tools and expertise in verifying cost-based offers other than the transfer of heat input data collected by the Market Monitor to PJM.[18]

2. The May 8th Filing Does Not Use Fuel Cost Policies.

Market Sellers and the Market Monitor have invested significant time and resources in developing Fuel Cost Policies to define in detail how Market Sellers calculate fuel costs for use in cost-based offers. The need to verify incremental costs exceeding $1,000 per MWh was an impetus for improving the requirements for fuel cost policies.[19] As of May 15, 2017, 89 percent of PJM units have algorithmic, systematic, and verifiable Fuel Cost Policies. These policies provide sufficient information to verify the accuracy of the fuel cost included in incremental costs exceeding $1,000 per MWh. These policies are the best source of the relevant information. The May 8th Filing proposes no use of Fuel Cost Policies for the verification of incremental costs prior to market clearing.

D. The May 8th Filing Does Not Explain What Nonfuel Costs Will Be Considered in the Verification Process or Whether Such Costs Must Be Consistent With Existing Market Power Mitigation Provisions.

In Order 831 at P.141, the Commission requires that

> RTOs/ISOs explain in their compliance filings what factors will be considered by the RTO/ISO or its Market Monitoring Unit in the verification process for cost-based incremental energy offers above $1,000/MWh and whether such factors are currently considered in existing market power mitigation provisions or whether new practices or tariff provisions are necessary given the verification requirement adopted in [Order 831].[20]

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18 *See* Greater than $1,000/MWh Cost Offer Revised Verification Procedure, PJM Presentation to the Markets Implementation Committee, May 3, 2017, at p. 8, <http://pjm.com/~/media/committees-groups/committees/mic/20170503/20170503-item-14-offer-verification.ashx>.

19 *See* Comments of the Independent Market Monitor for PJM, Docket No. ER16-76 (November 4, 2015) and *PJM Interconnection, L.L.C.*, 153 FERC ¶ 61, 289 at P41-46 (2015).

20 Order 831 at P141.

The May 8th Filing does not adequately explain the factors that PJM intends to consider in verifying costs or their relationship to current cost verification practices. The proposed Maximum Allowable Incremental Cost includes only fuel costs and two 10 percent adders, while the calculation of cost-based offers under the existing PJM Market Rules includes other incremental costs. The May 8th Filing does not reconcile this discrepancy. The PJM OATT should be clear which incremental costs Market Sellers may include in cost-based offers in excess of $1,000 per MWh. The allowable incremental costs should not differ based on whether or not costs exceed $1,000 per MWh.

For the determination of the Maximum Allowable Incremental Cost screen, PJM proposes to use the heat inputs and performance factors that are collected and used by the Market Monitor as part of its existing cost offer validation process under Attachment M of the OATT.[21] The May 8th Filing does not propose to use the Market Monitor's validation of that heat input data. The May 8th Filing proposes to use a fuel cost calculation that is not supported by either the existing Fuel Cost Policy or the Market Monitor's cost offer validation process. The Maximum Allowable Incremental Cost does not include incremental costs related to fuel transportation or procurement. It is not consistent with the existing PJM Market Rules. The May 8th Filing does not explain whether fuel transportation and procurement costs will be considered in the verification process if a Market Seller contests PJM's Maximum Allowable Incremental Cost calculation.

The PJM Market Rules allow Market Sellers to include nonfuel incremental costs in cost-based offers. These include variable operations and maintenance costs ("VOM"), emissions costs, and energy market opportunity costs. The May 8th Filing proposes to use none of these in the determination of the Maximum Allowable Incremental Cost. The May

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21 *See* Greater than $1,000/MWh Cost Offer Revised Verification Procedure, PJM Presentation to the Markets Implementation Committee, May 3, 2017, at p. 8, <http://pjm.com/~/media/committees-groups/committees/mic/20170503/20170503-item-14-offer-verification.ashx>.

8th Filing does not explain whether these factors will be considered in the verification process if a Market Seller contests PJM's Maximum Allowable Incremental Cost calculation. The Market Monitor has reviewed cases where the VOM rate calculated by a Market Seller using the formulas in PJM's Cost Development Guidelines (Manual 15) would result in an offer exceeding $1,000 per MWh, even with only moderate fuel costs. VOM rates at levels exceeding short run marginal costs should not result in allowable offers greater than $1,000 per MWh.[22] Market Sellers should only include validated short run marginal VOM costs, short run marginal emissions costs, and energy market opportunity costs in cost-based offers. The Market Monitor engages in detailed and extensive reviews of these costs with Market Sellers.

The PJM OATT should not allow cost-based offers exceeding $1,000 per MWh to clear the market if they include nonfuel incremental costs that are not consistent with that standard. The Commission should require PJM to include in OA Section 6.4.3 that the only nonfuel incremental costs allowable in the Maximum Allowable Incremental Cost calculation, or exceptions to the Maximum Allowable Incremental Cost calculation, be those validated by the Market Monitor prior to offer submittal. The Commission should further require PJM to specify that such costs must adhere to Schedule 2 of the Operating Agreement, the Cost Development Guidelines, and the short run marginal cost standard.

E. Verification Only Requires an Incremental Change to the Existing Process.

As contemplated by the Commission in Order No. 831, offer verification could and should build on existing processes for market power mitigation, instead of creating a new and inaccurate process that ignores the available information on costs and lessons learned on cost review. The Market Monitor has an existing process which is used to validate cost-

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[22] The Market Monitor includes estimates of the level of short run marginal costs in the PJM State of the Market Report. See *2016 State of the Market Report for PJM*, Vol. II, Section 7: Net Revenue, Table 7-4.

based offers. The Market Monitor collects and reviews the relatively static components of costs, such as the heat inputs and VOM rates, along with the Fuel Cost Policies, which together define how the Market Seller arrives at a fuel cost. The Market Monitor consults with Market Sellers to understand any particular circumstances that may lead costs to fall outside an expected range. In many cases, the Market Monitor identifies calculation inaccuracies or inclusion of impermissible costs. As described in OATT Attachment M Section IV E-1, the Market Monitor and the Market Seller come to an agreement regarding the appropriate development of cost-based offers. Based on the agreed upon data and calculations, the Market Monitor evaluates daily cost-based offers using the validated information and publicly available commodity cost data. The Market Monitor applies information in the Fuel Cost Policy to the commodity cost data to arrive at the fuel cost. Frequently, the Market Monitor directly requests the fuel cost value from the Market Seller for further validation.

The Market Monitor requires only incremental changes to the existing process to perform offer cap verification. All of the heat inputs, VOM costs, and emissions costs are available in the Market Monitor's data collection system, MIRA. Currently available enhancements to MIRA include data such as fuel transportation costs, contract rates, and fuel blending. If PJM were to collect the fuel cost value used in the cost-based offer from the Market Seller at offer submittal, the Market Monitor could apply all the other validated costs in place prior to offer submittal. There would be no need for real time evaluation of any cost components other than the fuel cost.

Using all the cost components already validated as consistent with the PJM Market Rules along with the real time validated fuel cost submitted with the offer, the Market Monitor could approximate the incremental costs, both the incremental energy curve and no load, for offers with operating rates over $1,000 per MWh with much greater precision than PJM's proposed Maximum Allowable Incremental Cost calculation. Greater precision would result in less reliance on the real time evaluation of exceptions to the calculation, which would be prone to error and inconsistency. Any evaluation of documentation would

be straightforward using the Market Seller's algorithmic, systematic, and verifiable Fuel Cost Policy.

If the Market Monitor were unable to validate the fuel cost submitted with the offer, a verifiable unit specific cap, based on the Market Seller's Fuel Cost Policy, would apply directly to the fuel cost. The Market Monitor would apply the verified fuel cost in the calculation of the incremental energy cost curve and the no load cost using the validated heat inputs and nonfuel incremental costs. If the cost of the validated schedule is lower than the cost of the offered schedule, PJM should apply the validated schedule.

F. The May 8th Filing Does Not Comply with the Order 831 Requirement to Cap the 10 Percent Cost Adder at $100 per MWh.

Operating Agreement Section 6.4.2 specifies the offer price cap for market power mitigation. The May 8th Filing revised Section 6.4.2(a)(ii) to state that

> For offers of $2,000/MWh or less, the incremental operating cost of the generation resource as determined in accordance with Schedule 2 of the Operating Agreement and the PJM Manuals ("incremental cost"), plus up to 10% of such costs, the sum of which shall not exceed $2,000/MWh; and, for offers greater than $2,000/MWh, the incremental cost of the generation resource;[23]

The Commission requires that "if an RTO/ISO chooses to retain an adder above cost or proposes to include a new adder above cost in cost-based incremental energy offers above $1,000/MWh, such adders may not exceed $100/MWh."[24] The May 8th Filing does not comply with the Commission's requirement. The revised language allows offer caps to include the full 10 percent, up to $200 per MWh, which is 10 percent of $2,000 per MWh. The Commission should require PJM to modify OA Section 6.4.2(a)(ii) to state that

> For offers of $2,000/MWh or less, the incremental operating cost of the generation resource as determined in accordance with

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[23] May 8th Filing at Tariff Revisions Section 6.4.2.

[24] Order 831 at P207.

> Schedule 2 of the Operating Agreement and the PJM Manuals ("incremental cost"), plus up to the lesser of 10% of such costs or $100/MWh, the sum of which shall not exceed $2,000/MWh; and, for offers greater than $2,000/MWh, the incremental cost of the generation resource;

In addition, the newly proposed adder equal to 10 percent of fuel costs that PJM applies to the Maximum Allowable Incremental Cost, in addition to the existing 10 percent adder, is impermissible.

G. Demand Response Must Also Provide Ex Ante Verification of Costs.

The May 8th Filing proposes to exempt demand response resources in PJM from verification of offers over $1,000 per MWh prior to making such offers eligible to determine Locational Marginal Prices ("LMP") or eligible to be paid uplift. Exempting demand response from verification of costs by the RTO and the Market Monitor prior to market clearing does not comply with Order 831, which states that "a demand response resource that submits incremental energy offers to the energy market based on short-run marginal cost would be subject to the verification requirement."[25] Generating resources must submit to the verification requirement prior to the acceptance of their offers. Under Order 831, demand response resources are also be required to submit to the verification requirement prior to the acceptance of their offers. The PJM proposed rules would require only that the Load Response participant attest to its own verification of costs with its customers prior to offer submittal, but without having to submit the information to PJM and the Market Monitor. Under the PJM proposal, PJM and the Market Monitor would not review verification documentation before the offers would be eligible to determine LMP. Demand response resources would only provide PJM and the Market Monitor documentation of cost offers upon request. This is not consistent with Order No. 831 and this is not a resource neutral approach. The Commission should require that PJM comply with Order No. 831 by

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[25] Order No. 831 at P157.

including in the OATT a requirement for verification of demand response incremental energy offers exceeding $1,000 per MWh by PJM and the Market Monitor prior to clearing the market.

There is no incremental cost standard for demand response offers in the PJM Market Rules. Historically, economic demand response resources have made offers at an incremental energy cost below $1,000 per MWh, and emergency demand response resources have made offers at or near the offer cap of $1,849 per MWh. Table 2 shows the incremental energy offers, called strike prices, for emergency demand response registrations.[26]

Table 2 Distribution of registrations and associated MW in the emergency full options across ranges of minimum dispatch prices: 2016/2017 Delivery Year[27]

Ranges of Strike Prices ($/MWh)	Locations	Percent of Total	Nominated MW (ICAP)	Percent of Total	Shutdown Cost per Location	Shutdown Cost Per Nominated MW (ICAP)
$0-$1	576	3.6%	322.9	3.5%	$1.74	$3.10
$1-$999	261	1.6%	198.7	2.1%	$54.39	$71.43
$1,000-$1,100	2,357	14.8%	3,032.9	32.5%	$182.60	$141.91
$1,101-$1,275	0	0.0%	0.0	0.0%	$0.00	$0.00
$1,276-$1,549	292	1.8%	300.8	3.2%	$55.04	$53.43
$1,550-$1,850	12,416	78.1%	5,490.7	58.7%	$41.75	$94.41
Total	15,902	100.0%	9,346.1	100.0%	$61.63	$104.86

The PJM Market Rules should require economic and emergency demand response resources to offer incremental costs that do not exceed their short run marginal costs. The May 8th Filing states that the "end use customer's incremental costs shall include quantifiable costs incurred for not consuming electricity."[28]

The May 8th Filing does not propose to require incremental costs to be marginal to energy output. The May 8th Filing names "wages paid without production, lost sales, [and]

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26 *2016 State of the Market Report for PJM*, Vol. II, Section 6: Demand Response, Table 6-26.

27 In this analysis nominated MW does not include capacity only resources, which do not receive energy market credits.

28 May 8th Filing at Tariff revisions Section 6.4.3(b)(ii).

damaged products that cannot be sold" as incremental costs. But these are generally not incremental costs. Wages are not incremental energy costs if an end use customer pays wages whether or not production occurs. Lost sales are not incremental energy costs if lost sales do not vary with the amount of energy curtailed. Whether the damaged products occur due to shutdown of production or the quantity of energy curtailed determines whether the implied cost is a shutdown cost or an incremental cost. The Load Response Participant should face a requirement, equal to generators, that correctly categorizes costs, subject to the review of PJM and the Market Monitor. The Commission should require PJM to include sufficient detail in the Operating Agreement to ensure that the allowable costs to be defined in the PJM Manuals adhere to standards comparable to those of generating resources. The incremental costs of Demand Response resources should be limited to short run marginal costs.

II. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to this pleading as the Commission resolves the issues raised in this proceeding.

Respectfully submitted,

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Dated: May 30, 2017

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 30th day of May, 2017.

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Attachment

Heat Input Curve Coefficients

X0	250
X1	7.5
X2	0.01
Unit ICAP (MW)	100

Output (MWh)	Heat Input (MMBtu)	Production Cost ($)
0	250	$1,250
50	650	$3,250
100	1,100	$5,500

Fuel Cost ($/MMBtu)	$5.00
No Load Cost ($/hour)	$1,250

Incremental Heat Rates with sloped function

Output (MWh)	Heat Rate (MMBtu/MWh)	Incremental Rate ($/MWh)	PJM MAIC ($/MWh)	Difference ($/MWh)	Impact
0	7.5	$37.50	#DIV/0!	#DIV/0!	Math Error
50	8.5	$42.50	$40.00	($2.50)	Underestimation
100	9.5	$47.50	$45.00	($2.50)	Underestimation

Incremental Heat Rates with step function

Output (MWh)	Heat Rate (MMBtu/MWh)	Incremental Rate ($/MWh)	PJM MAIC ($/MWh)	Difference ($/MWh)	
50	8.0	$40.00	$65.00	$25.00	Overestimation
100	9.0	$45.00	$45.00	$0.00	Zero

Incremental Heat Rate using one step

Output (MWh)	Heat Rate (MMBtu/MWh)	Incremental Rate ($/MWh)	PJM MAIC ($/MWh)	Difference ($/MWh)	
100	8.5	$42.50	$55.00	$12.50	Overestimation

MAIC = Maximum Allowable Incremental Cost