

exceeding \$1,000 per MWh. PJM's proposal, however, fails to incorporate its proposed verification process into the existing market power mitigation framework.

Contrary to PJM's assertion in its June 12th Answer, the Market Monitor does not misunderstand PJM's proposal.⁴ As PJM acknowledges in the June 12th Answer, PJM's proposed offer screening process is not consistent with the cost-based offer calculation required by Operating Agreement Schedule 2.⁵ Therefore, PJM's screening process cannot correctly verify cost-based offers. The multiple differences between the cost-based offer requirements and PJM's proposed screening calculation will result in incorrect conclusions by PJM about whether submitted cost-based offers above \$1,000 per MWh are accurate.

The penalty for inaccurate cost-based offers is an insufficient incentive to submit accurate cost-based offers (consistent with Operating Agreement Schedule 2) in situations when Market Sellers expect prices above \$1,000 per MWh.⁶ Effective mitigation of offers over \$1,000 per MWh requires an accurate cost-based offer verification process consistent with Order No. 831 and Operating Agreement Schedule 2.

B. PJM's Proposed Calculation Is Incorrect.

The June 12th Answer argues that the proposed Maximum Allowable Incremental Cost calculation is correct and the method proposed by the Market Monitor is incorrect because PJM's method (and not the Market Monitor's) takes into account circumstances in which Market Sellers must change No Load Cost to create a monotonically increasing cost curve.⁷ PJM's assertion is based on an error in an example in Manual 15.

⁴ June 12th Answer at 2.

⁵ June 12th Answer at 3.

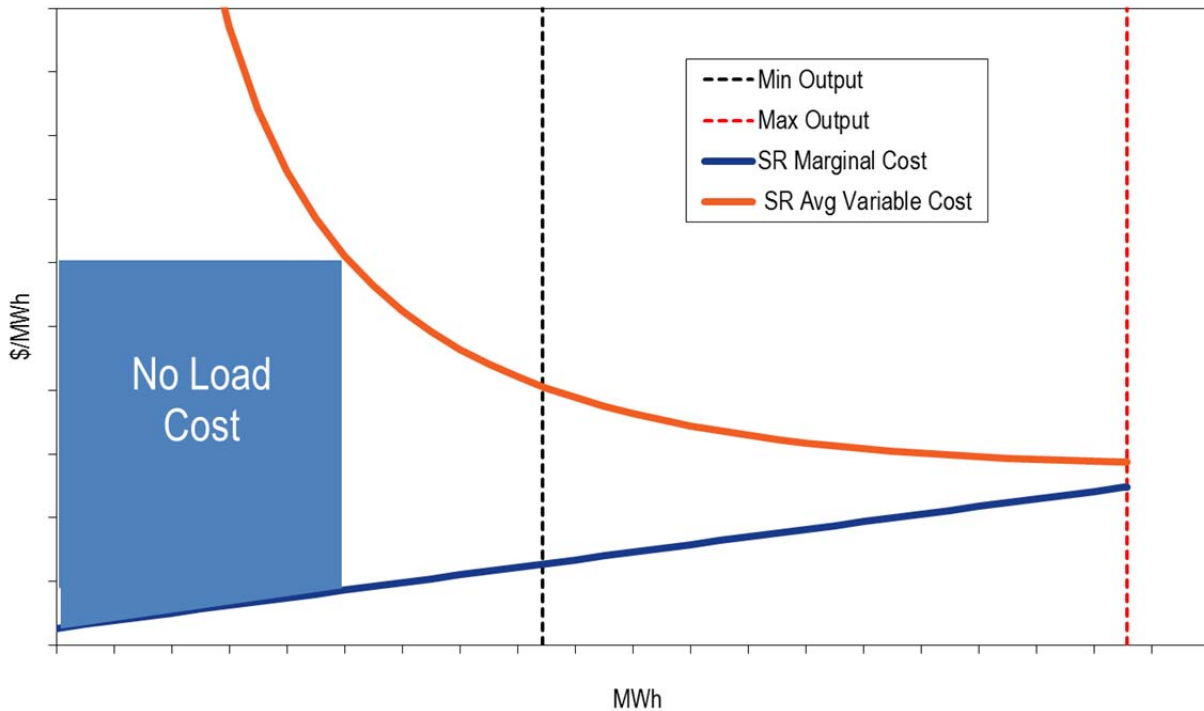
⁶ See Protest of the Independent Market Monitor for PJM, Docket No. ER16-372 (September 16, 2016) at 44-47.

⁷ June 12th Answer at 3.

No Load Cost equals the cost difference between the short run variable operating cost of a generator and the sum of short run marginal costs for any output level. For any unit offering an output range for PJM dispatch, the efficient dispatch of the unit requires an incremental energy cost curve equal to the short run marginal cost and a No Load Cost. Both the incremental energy cost curve and the No Load Cost are derived from a single heat input curve. Otherwise, they are inconsistent and will not result in accurate dispatch and compensation for the unit.

No Load Cost is calculated by multiplying the heat input at a theoretical zero MWh output level by fuel costs and other fuel related costs measured in \$ per MMBtu. The incremental energy cost curve is calculated by multiplying the incremental heat rate at any output level by fuel costs and other fuel related costs measured in \$ per MMBtu and adding any other short run marginal costs measured in \$ per MWh. Figure 1 shows the short run marginal cost curve, the short run average variable cost curve, and No Load Cost. The No Load Cost is equal to the short run average variable cost times MWh minus the area under the short run marginal cost curve. The magnitude of the No Load Cost is the same for every MWh.

Figure 1 Short Run Marginal Cost Curve and No Load Cost



If a Market Seller offers a unit at a single output level (also known as block loading the unit), the differentiation between marginal cost and No Load Cost is not necessary.

The June 12th Answer continues to argue in favor of OATT implementation of an incorrect method for adjusting No Load Cost based on an incorrect example in Manual 15 instead of correcting the Manual and including the correct definitions in the OATT. The current No Load Cost and Incremental Energy Cost definitions in the OATT are not correct.⁸ Manual 15 does not contain any calculation for the incremental energy cost curve,

⁸ See Protest of the Independent Market Monitor for PJM (September 9th, 2016), ER16-372-001 at 56–59 and PJM Compliance Filing March 6th, 2017, ER16-372-003 at 17. The Market Monitor raised the issue of PJM’s proposed No Load Cost definition in September 16, 2016. PJM dismissed the arguments by claiming that the complaints were without merit, but PJM did not provide a thorough explanation. PJM partially corrected the Incremental Energy Offer definition after clarifying comments made by the Market Monitor. PJM did not completely correct the definition of Incremental Energy Offer because it continues to reference the Economic Minimum as the starting

even though correct cost development requires consistent calculation of marginal cost and no load cost. The impact of the flawed No Load Cost method is currently limited to improper definitions in the Operating Agreement. In the case of the proposed Maximum Allowable Incremental Cost calculation, the incorrect calculation can have direct impacts on market results.

1. The PJM Manual 15 No Load Definition Is Based on a Flawed Example.

PJM argues that must account for circumstances in which Market Sellers must adjust their No Load Cost in order to have a nondecreasing cost curve. PJM bases its argument on an example in Attachment B of Manual 15 which includes an adjustment to No Load Cost intended to ensure that the cost curve is nondecreasing. The curve is already nondecreasing. The example is not correct.

In Manual 15 example B.5, there is no reason to adjust the heat inputs, incremental or no load, because the heat input curve results in a nondecreasing cost curve. All the coefficients in the heat input curve are positive. Therefore, it is impossible to have a decreasing incremental curve.

The adjustment to the No Load Cost in the Manual 15 example was required as a result of the failure to include the VOM adder in \$ per MMBtu in the No Load Cost calculation. Due to this failure, the incremental cost of the first MWh segment is higher than the incremental cost of the second MWh segment, meaning that the incremental cost curve is decreasing. The Manual proposes to resolve this problem by increasing the No Load Cost and reducing the incremental cost of the first MWh segment so that it is \$1 per MWh lower than the incremental cost of the second MWh segment. The result is a No Load Cost approximately equal to the heat input at zero output times the fuel plus VOM, measured in \$ per MMBtu. The result is approximately correct, but the method is not.

point of the curve and it explicitly prevents units from being offered with an average heat rate (units offered with an average heat rate include the no load in the incremental curve).

The Attachment to this filing includes example B.5 from Manual 15 and the correct calculation of the incremental cost curve and No Load Cost without any need for an adjustment to No Load Cost.⁹

C. Other Mistakes Not Addressed.

In its June 12th Answer, PJM did not address other issues raised by the Market Monitor regarding the terminology used in the PJM tariff. PJM used incorrect terms or definitions for operating rate, heat input, heat rate and British Thermal Unit.

Also, even though PJM agreed on the application of the lower of 10 percent and \$100 per MWh in its June 12th answer, PJM did not make the corresponding change to the Maximum Allowable Incremental Cost formula.

II. MOTION FOR LEAVE TO ANSWER

The Commission's Rules of Practice and Procedure, 18 CFR § 385.213(a)(2), do not permit answers to answers or protests unless otherwise ordered by the decisional authority. The Commission has made exceptions, however, where an answer clarifies the issues or assists in creating a complete record.¹⁰ In this answer, the Market Monitor provides the Commission with information useful to the Commission's decision-making process and which provides a more complete record. Accordingly, the Market Monitor respectfully requests that this answer be permitted.

⁹ A version in PDF format and a version in spreadsheet format are included as attachments.

¹⁰ See, e.g., *PJM Interconnection, L.L.C.*, 119 FERC ¶61,318 at P 36 (2007) (accepted answer to answer that "provided information that assisted ... decision-making process"); *California Independent System Operator Corporation*, 110 FERC ¶ 61,007 (2005) (answer to answer permitted to assist Commission in decision-making process); *New Power Company v. PJM Interconnection, L.L.C.*, 98 FERC ¶ 61,208 (2002) (answer accepted to provide new factual and legal material to assist the Commission in decision-making process); *N.Y. Independent System Operator, Inc.*, 121 FERC ¶61,112 at P 4 (2007) (answer to protest accepted because it provided information that assisted the Commission in its decision-making process).

III. CONCLUSION

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

Respectfully submitted,



Jeffrey W. Mayes

Joseph E. Bowring
Independent Market Monitor for PJM
President
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8051
joseph.bowring@monitoringanalytics.com

General Counsel
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8053
jeffrey.mayes@monitoringanalytics.com

Catherine Tyler
Senior Economist
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8050
catherine.mooney@monitoringanalytics.com

Joel Romero Luna
Senior Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8050
joel.luna@monitoringanalytics.com

Dated: June 27, 2017

Attachment

Heat Input Function

a= 238.232 (No Load Fuel)
 b= 10.7195
 c= 0.000148321

Fuel Cost 4.00 \$/MMBtu
 VOM 0.15 \$/MMBtu
 Performance Factor 1.02

Net Gen MWh	Heat Input MMBtu/Hr	Heat Rate BTU/kWh	Operating Rate \$/MWh	Production Cost \$/Hr	Incremental Heat Rate Btu/kWh	Incremental Cost \$/MWh
0	238					
50	775	15,492	\$65.58	\$3,279	10,727	\$46.14
160	1,957	12,232	\$51.78	\$8,285	10,751	\$45.51
310	3,576	11,534	\$48.82	\$15,135	10,789	\$45.67
410	4,658	11,361	\$48.09	\$19,718	10,826	\$45.83
525	5,907	11,251	\$47.63	\$25,004	10,858	\$45.96
550	6,179	11,234	\$47.55	\$26,155	10,879	\$46.05

No Load Cost (\$/hr) 972 \$/hr

Heat Input Function

a=	238.232 (No Load Fuel)	Fuel Cost	4.00 \$/MMBtu
b=	10.7195	VOM	0.15 \$/MMBtu
c=	0.000148321	Performance Factor	1.02

Net Gen MWh	Heat Input MMBtu/Hr	Heat Rate BTU/kWh	Operating Rate \$/MWh	Production Cost \$/Hr	Incremental Heat Rate Btu/kWh	Incremental Cost \$/MWh
0	238					
50	775	15,492	\$65.58	\$3,279	10,727	\$46.14
160	1,957	12,232	\$51.78	\$8,285	10,751	\$45.51
310	3,576	11,534	\$48.82	\$15,135	10,789	\$45.67
410	4,658	11,361	\$48.09	\$19,718	10,826	\$45.83
525	5,907	11,251	\$47.63	\$25,004	10,858	\$45.96
550	6,179	11,234	\$47.55	\$26,155	10,879	\$46.05

No Load Cost (\$/hr) 972

Manual 15 proposed no load cost
\$1,008

Resulting Incremental Curve

MWh	\$/MWh
50	\$45.42
160	\$45.51
310	\$45.67
410	\$45.83
525	\$45.96
550	\$46.05

	Heat Input Function			
a=		238.232	Fuel Cost	4.00 \$/MMBtu
b=		10.7195	VOM	0.15 \$/MMBtu
c=		0.000148321	Performance Factor	1.02

Net Gen MWh	Heat Input MMBtu/Hr	Operating Cost \$/Hr	Incremental Cost \$/MWh
0	238	\$1,008	
50	775	\$3,279	\$45.41
160	1,957	\$8,285	\$45.51
310	3,576	\$15,135	\$45.67
410	4,658	\$19,718	\$45.83
525	5,907	\$25,004	\$45.96
550	6,179	\$26,155	\$46.05

Changes:

Including the VOM adder in the no load calculation
Calculating the incremental curve as the difference
in production costs divided by difference in MWh.

No Load Cost (\$/hr)	\$1,008
-----------------------------	---------

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 27th day of June, 2017.



Jeffrey W. Mayes

General Counsel

Monitoring Analytics, LLC

2621 Van Buren Avenue, Suite 160

Eagleville, Pennsylvania 19403

(610) 271-8053

jeffrey.mayes@monitoringanalytics.com