UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. ER17-775-002

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 in response to the amended compliance filing submitted by PJM Interconnection, L.L.C. on August 14, 2017 ("PJM"), in compliance with Order No. 825 ("August 14th Filing").[3] The Market Monitor generally supports the August 14th Filing, but recommends that its approval be conditioned on certain refinements.

PJM proposed revisions to the OATT that update the calculation of the Nonperformance Charge Rate for Capacity Performance Resources and Base Capacity Resources. The proposed changes result in an error in the calculation of nonperformance charges.

---

1 18 CFR § 385.211 (2016).

2 Capitalized terms used herein and not otherwise defined have the meaning used in the PJM Open Access Transmission Tariff ("OATT"), the PJM Operating Agreement ("OA") or the PJM Reliability Assurance Agreement ("RAA").

3 *Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 824, 155 FERC ¶ 61,276 (2016) ("Order No. 825").

I. BACKGROUND

A. NonPerformance Charge Calculation

Nonperformance charges are calculated as the product of the performance shortfall of energy (in MWh) and a nonperformance charge rate (in dollars per MWh).[4] Section 10A(c) of Attachment DD to the OATT defines performance shortfall as:

> Performance Shortfall = Expected Performance - Actual Performance

Section 10A(c) of Attachment DD to the OATT defines Expected Performance for Capacity Performance and Base Capacity Resources as:

> Expected Performance = for Generation Capacity Resources (including external Generation Capacity Resources for any Performance Assessment Interval for which performance by such external resource would have helped resolve a declared Emergency Action; provided, however, that for any Delivery Year up to and including the 2019/2020 Delivery Year, performance of external Generation Capacity Resources shall be assessed only during Performance Assessment Hours for Emergency Actions declared for the entire PJM Region) and Capacity Storage Resources: [(Resource Committed Capacity * the Balancing Ratio)];
>
> where
>
> Resource Committed Capacity = the total megawatts of Unforced Capacity of the Capacity Resource committed by such Capacity Market Seller or Locational UCAP Seller; and…

Section 10A(c) defines Actual Performance for Capacity Performance and Base Capacity Resources as:

> Actual Performance =
>
> for each generation resource, the metered output of energy delivered by such resource plus the resource's real-time reserve or

[4] *See* OATT Attachment DD § 10A(e).

> regulation assignment, if any, during the Performance Assessment Hour…

Section 10A(e) of Attachment DD to the OATT currently defines nonperformance charge rate as:

> For Capacity Performance Resources and Seasonal Capacity Performance Resources, the Non-Performance Charge Rate = (Net Cost of New Entry (stated in terms of installed capacity) for the LDA and Delivery Year for which such calculation is performed * (365 / 30)
>
> and for Base Capacity Resources the Non-Performance Charge Rate = (Weighted Average Resource Clearing Price applicable to the resource * (365 / 30)…

The nonperformance charge rate is a penalty rate that is applied to each MWh of energy that a capacity performance resource (or a base capacity resource) fails to deliver during a PJM declared emergency event that is considered a Performance Assessment Hour. It is currently defined as the Net CONE (in dollars per MW-day) times 365 (days per year) divided by 30 (expected number of performance assessment hours per year). This calculation results in a dollars per MWh rate that is multiplied by the performance shortfall (measured in MWh) to calculate the nonperformance charges in dollars.

B. Revisions in the August 14th Filing

The August 14th Filing includes proposed revisions to the OATT to the nonperformance charge calculation to account for the change from hourly settlements to five minute settlements. Specifically, the proposal revises the formula of the nonperformance charge rate component of the calculation. The proposed revisions to Section 10A(e) are:

> For Capacity Performance Resources and Seasonal Capacity Performance Resources, the Non-Performance Charge Rate = (Net Cost of New Entry (stated in terms of installed capacity) for the LDA and Delivery Year for which such calculation is performed * (365 / 30) /(the number of Real-Time Settlement Intervals in an hour).

> and for Base Capacity Resources the Non-Performance Charge Rate = (Weighted Average Resource Clearing Price applicable to the resource * (365 / 30) /(the number of Real-Time Settlement Intervals in an hour).

PJM proposed no changes to the Expected Performance and Actual Performance components of the nonperformance charge calculation. PJM proposed no changes to the Bonus Performance calculation that is defined in Section 10A(g) of Attachment DD to the OATT.

II. COMMENTS

A. Nonperformance and Bonus Performance

PJM's proposed revisions result in an incorrect calculation of nonperformance charges for Capacity Performance resources and Base Capacity resources. The change to five minute settlements should not change a dollar per MWh nonperformance charge rate. The nonperformance charge rate is still applied to each unit of energy (MWh) that a resource fails to deliver during a performance assessment interval. PJM's proposed change converts the dollar per MWh rate to a dollar per MW-five minute rate. PJM's proposed change to the nonperformance charge rate is unnecessary and inaccurate.

PJM does not change the performance shortfall calculation to which this rate applies, which results in an error in the performance shortfall calculation. The change to five minute settlements from hourly settlements only changes the time interval over which the performance of a resource is evaluated. Under hourly settlements, assuming a balancing ratio of one, the expected performance is equal to the resource's committed UCAP MW. This is because over a period of one hour, the energy (in MWh) expected to be generated by a resource operating at its UCAP MW is equal to its UCAP MW times one hour. The UCAP MW value and the energy generated in MWh are mathematically equivalent over a period of one hour. Under five minute settlements, the energy (in MWh) expected to be generated by a resource in a five minute interval operating at its UCAP MW is its UCAP MW times (5/60) hours or one-twelfth of its UCAP MW. However, the August 14th Filing does not

revise the definition of Expected Performance to measure the expected output of a resource over five minutes. This results in a flaw in the nonperformance charge calculation.

PJM previously updated the Actual Performance definition correctly from the metered output of energy and reserves during an hour to the metered output of energy and reserves during an interval, to account for the change from hourly settlements to five minute settlements.

The flaw in PJM's proposed revisions can be explained with a simple example. Consider a 120 MW UCAP capacity resource operating during an emergency event that triggers a Performance Assessment Hour/Interval with a balancing ratio of one. Assume that the nonperformance charge rate is $2000 per MWh. Under hourly settlements, it is expected to produce 120 MWh of energy and reserves in that hour. If it produces 120 MWh of energy and reserves in that hour, then its actual performance is equal to its expected performance and it will not be assessed any nonperformance charges. If it produces 60 MWh of energy and reserves in that hour, it has a performance shortfall of 120 MWh minus 60 MWh, or 60 MWh in that hour, and it will subject to nonperformance charges of 60 MWh* $ 2000 per MWh, or $120,000.

Under five minute settlements, if the resource produces its full output for 5 minutes, under PJM's proposal, the expected performance is still 120 but its actual performance, even at its full output, is only 120*(5/60), or 10 MWh. The resource will be subject to nonperformance charges, even though it has met its obligation. This is because PJM did not revise the expected performance definition to account for the expected output of a resource in five minutes. The performance shortfall for the five minute interval will be incorrectly calculated as 120 minus 10, or 110 MWh. The expected performance should be corrected to be defined as the expected energy output in a performance assessment interval, defined as UCAP MW divided by the number of Real-Time Settlement Intervals in an hour. This will adjust the UCAP MW of a resource to the corresponding energy (MWh) output in an interval that it is expected to produce. This change will ensure that the nonperformance

charge is accurately calculated under five minute settlements without having to change the nonperformance charge rate.

PJM should also update the language in Section 10A(g) of Attachment DD to the OATT that defines Bonus Performance calculation to ensure accuracy of the calculation. The Market Monitor proposes the following minor updates:

> Revenues collected from assessment of Non-Performance Charges for a Performance Assessment *Interval* shall be distributed to each Market Participant, whether or not such Market Participant committed a Capacity Resource or Locational UCAP for a Performance Assessment *Interval*, that provided energy or load reductions above the levels expected for such resource during such ~~**hour**~~ **interval**.
>
> Actual Performance is as defined in subsection (c), provided, however, that Actual Performance for purposes of this calculation shall not exceed the megawatt **hour** level at which such resource was scheduled by the Office of the Interconnection during the Performance Assessment *Intervals*; and provided further that Actual Performance for a Market Participant that imports energy into the PJM Region during such Performance Assessment *Interval* shall be the net import, if any, from all interchange transactions scheduled by such Market Participant during such Performance Assessment *Interval*;

The proposed changes to the nonperformance charge rate formula in the August 14th Filing should not be approved, and PJM should instead be directed to correct the definition of Expected Performance to account for the expected output of a resource during a five minute settlement interval, and update the Bonus Performance calculation section for consistency and accuracy.

B. Consistent Division by 12 Is Needed for Accuracy and Clarity.

In its February 1, 2017, comments and its April 17, 2017, comments, the Market Monitor highlighted sections of the Operating Agreement that have to be updated in order to accurately reflect the use of five minute settlements instead of hourly settlements.

In its compliance filing, PJM attempted to address this issue with a generic section specifying that any dollar per MWh ($/MWh) value in Section 3.2 of Schedule 1 to the OA will be divided by the number of real-time settlement intervals in the hour:[5]

> 3.2 Market Settlements.
>
> If a dollar-per-MW-hour value is applied in a calculation under this section 3.2 where the interval of the value produced in that calculation is less than an hour, then for purposes of that calculation the dollar-per-MW hour value is divided by the number of Real-time Settlement Intervals in the hour.

The division of a dollar per MWh value by 12 does not address the issue. Under five minute settlements, PJM payments must reflect the energy, reserves and regulation services provided or not provided (in the case of opportunity cost payments) in five minutes and apply the corresponding LMP, ancillary service price and offer. Lack of precision can lead to inconsistency in application and unintended settlements. In addition, lack of precision may result in vulnerability to market manipulation.

The Market Monitor identified several incorrect settlement calculations in Schedule 1 to the OA that need to be corrected:

Regulation: 3.2.2 (e);

Operating Reserves: 3.2.3 (f) and 3.2.3(f-4);

Synchronized Reserves: 3.2.3A(f);

Nonsynchronized Reserves: 3.2.3A.001(e);

Day-Ahead Scheduling Reserves: 3.2.3A.01(c) and 3.2.3A.01(d); and

Reactive Services: 3.2.3B(c), 3.2.3B(d) and 3.2.3B(f).

---

[5] *See* August 14th Filing, Marked Tariff Changes, OA Schedule 1 § 3.2.

III. CONCLUSION

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

Respectfully submitted,

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

Jeffrey W. Mayes

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

Siva Josyula
Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8054
siva.josyula@monitoringanalytics.com

Joel Romero Luna
Analyst
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Eagleville, Pennsylvania 19403
(610) 271-8054
joel.luna@monitoringanalytics.com

Dated: September 5, 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 5th day of September, 2017.

Jeffrey W. Mayes
General Counsel
Monitoring Analytics, LLC
2621 Van Buren Avenue, Suite 160
Valley Forge Corporate Center
Eagleville, Pennsylvania 19403
(610) 271-8053
jeffrey.mayes@monitoringanalytics.com