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The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: *PJM Interconnection, L.L.C.*, Docket No. ER17-1138-000
Response to Deficiency Letter re: Proposed External Capacity Enhancements

Dear Ms. Bose:

Pursuant to the Federal Energy Regulatory Commission's ("Commission" or "FERC") letter issued on May 5, 2017 in this proceeding,[1] PJM Interconnection, L.L.C. ("PJM") submits additional information concerning the filing it submitted on March 9, 2017, in Docket No. ER17-1138.[2]

I. BACKGROUND

In its External Capacity Enhancements Filing, PJM proposed revisions to the Reliability Assurance Agreement Among Load Serving Entities in the PJM Region ("RAA") and the PJM Open Access Transmission Tariff ("Tariff") to implement enhancements to the rules governing generation resources physically located outside the PJM Region that serve as capacity for loads in the PJM Region.[3] These changes build on those previously approved by the Commission to

1 *PJM Interconnection, L.L.C.*, Deficiency Letter, Docket No. ER17-1138-000 (May 5, 2017) ("Deficiency Letter").

2 External Capacity Enhancements of PJM Interconnection, L.L.C., Docket No. ER17-1138-000 (Mar. 9, 2017) ("External Capacity Enhancements Filing").

3 Capitalized terms not otherwise defined herein have the meaning specified in, as applicable, the Tariff, Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. ("Operating Agreement"), or RAA, or as proposed in PJM's External Capacity Enhancements Filing in this proceeding.

facilitate PJM's reliance on external capacity, constructively resolving practical challenges that reside at a more detailed level than the Commission has addressed in its prior orders,[4] as identified through PJM's experience managing substantial amounts of external capacity in coordination with neighboring Balancing Authorities ("BAs"). Through that experience, PJM encountered challenges in a few areas: (1) operational, reliability and compliance risks associated with Energy Management System ("EMS") external network model expansion; (2) congestion management challenges and compliance risks resulting from the delivery of external capacity and energy; (3) transmission service evaluation process and planning requirements for external resources; and (4) operational impacts on neighboring systems resulting from an external entity committing and dispatching resources within their Balancing Authority Area.

PJM recognizes the importance of coordination with its neighboring BAs due to complexity of the interconnected transmission systems. PJM has undertaken such coordination efforts as detailed further below in response to the questions concerning interregional coordination, as well as in various ongoing proceedings concerning participation of external generation resources in neighboring systems markets. Such coordination efforts include developing Joint Operating Agreement ("JOA") language, engaging in negotiations over pseudo-tie agreements, and developing a standard pseudo-tie agreement for efficiency of process.

In short, the proposed changes provide reasonable solutions to these challenges when loads in one Balancing Authority Area rely for capacity on generation physically located in other Balancing Authority Areas that have different planning, operating, and market rules and practices.

II. RESPONSE TO DEFICIENCY LETTER

Interregional Coordination of Generation Resources that are External to PJM

[4] *See PJM Interconnection, L.L.C.*, 147 FERC ¶ 61,060 (2014), *reh'g denied*, 150 FERC ¶ 61,041, at P 14 (2015) ("PJM provided evidence and facts sufficient to justify the justness and reasonableness of the Capacity Import Limit proposal by, among other things, establishing that a pseudo-tie is needed to address the risk of curtailment of firm transmission by surrounding systems"); *PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208, at P 97 ("PJM states that absent the pseudo-tie requirement, PJM will not have the unit-specific visibility of external resource performance necessary to accurately apply Non-Performance Charges to external resources. Based on the information that PJM has provided, we agree that this component of the Capacity Performance design is just and reasonable."), *order denying clarification*, 152 FERC ¶ 61,064 (2015), *order on reh'g*, 155 FERC ¶ 61,157 (2016), *petition for review denied sub nom. Advanced Energy Mgmt. All. v. FERC*, 860 F.3d 656 (D.C. Cir. 2017).

1) **PJM proposes revisions to the rules governing external generation resources that plan to pseudo-tie or have previously pseudo-tied into the PJM Region. PJM explains that relying on a large number of external pseudo-tied resources has revealed several complications and that incorporating more distant external pseudo-tied resources could increase operational risks.**

   a. **Please explain the extent to which PJM worked with neighboring Balancing Authorities (e.g., Midcontinent Independent System Operator (MISO)) in developing the proposed revisions to the rules governing external generation resources. Please describe any efforts to incorporate the rules governing pseudo-ties into the Joint Operating Agreement (JOA).**

PJM Response

PJM has reached out to all its neighboring BAs to work together on Pseudo-Ties and other issues related to generation resources external to PJM participating in PJM's markets. For example, PJM and MISO have been reviewing Pseudo-Tie-related issues and have worked to address these issues in a comprehensive fashion as detailed below. In addition, PJM and MISO have also been transparent to stakeholders by providing updates at multiple PJM-MISO Joint and Common Market ("JCM") meetings for nearly two years.[5]

The changes PJM proposes in this docket are focused on ensuring pseudo-tied external generation resources are comparable to internal generation resources if they are going to be treated as Generation Capacity Resources by PJM. The concept of pseudo-tying is not new, but due to the complex nature of the interconnected transmission system and the mandatory varying reliability requirements applicable to distinct custodians of the system such as Generation Owners ("GOs"), Transmisison Owners ("TOs"), and Transmission Operators ("TOPs"), there is need for coordination. To that end, PJM has coordinated with and kept neighboring BAs informed throughout the process and made itself available to receive feedback from other BAs.

Specifically, PJM and MISO have coordinated and continue to coordinate on multiple initiatives associated with Pseudo-Ties, including, as described below: (1) coordination of the Tariff changes proposed in this docket, (2) MISO-PJM JOA[6] changes to accommodate operational and implementation of Pseudo-Ties between PJM and MISO, and (3) a solution to the congestion overlap charges that are the subject of the complaint proceedings discussed below.

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5 Issues around Pseudo-Ties have been discussed at the MISO-PJM Joint and Common Stakeholders Group since November 2015. Information can be found at: *Joint and Common Market*, PJM Interconnection, L.L.C., http://www.miso-pjm.com/working-groups/joint-and-common-wg.aspx (last visited Sept. 18, 2017).

6 Joint Operating Agreement Between the Midcontinent Independent System Operator, Inc. And PJM Interconnection, L.L.C. ("MISO-PJM JOA").

PJM has coordinated with MISO for several months to develop PJM-MISO JOA revisions to address the implementation and operation of Pseudo-Ties between the respective Balancing Authority Areas. On August 1, 2017, PJM and MISO submitted their coordinated filings with FERC requesting acceptance of their mutually agreeable JOA provisions in Docket Nos. ER17-2218-000 and ER17-2220-000, respectively.[7]

In addition, PJM has worked with MISO on an issue concerning overlapping congestion charges between PJM and MISO.[8] PJM and MISO reviewed and sought input on proposed JOA and tariff changes needed to address the congestion charge overlap with stakeholders at PJM-MISO JCM meetings held in 2017. As a result, PJM and MISO, with stakeholder feedback, have developed joint JOA changes to resolve this issue. The solution involves two phases. The first phase – to incorporate the removal of the overlap properly in the Locational Marginal Price calculation in the PJM and MISO day-ahead energy markets and adjusting real-time market-to-market ("M2M")—will include MISO-PJM JOA only changes and is expected to be filed in October 2017, for implementation in December 2017. The second phase—which will address the allocation of potential additional refunds in the form of Financial Transmission Rights eligibility or direct payments as well as the ability for the pseudo-tying entity to hedge real-time congestion charges in the native BA—involves Tariff changes which PJM expects to file in December 2017 for a target implementation for June 1, 2018.

In addition to the coordination between PJM and MISO, PJM has also coordinated with multiple—neighboring or nearby BAs—including Southwest Power Pool ("SPP"), Tennessee Valley Authority ("TVA"), Duke Energy Progress ("Duke Progress"), and Louisville Gas & Electric/Kentucky Utilities ("LG&E-KU"). This coordination involved discussions with or reaching out to the BAs about developing JOA provisions and changes to address the implementation, costs, modeling, and operation of Pseudo-Ties. To date, PJM has negotiated the terms of acceptable forms of Pseudo-Tie agreements with two other BAs—TVA and Duke Progress, most recently in Docket Nos. ER17-2499-000 and ER17-2500-000. PJM seeks to develop standard applicable rules for implementing and operating Pseudo-Ties with all applicable BAs in the near future.

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7 Submittal of PJM Interconnection, L.L.C., Docket No. ER17-2218-000 (Aug. 1, 2017) (Proposed Revisions to Joint Operating Agreement between PJM and MISO); Submittal of Midcontinent Independent System Operator, Inc., Docket No. ER17-2220-000 (Aug. 1, 2017) (Proposed Revisions to Joint Operating Agreement between PJM and MISO).

8 Complaint of Tilton Energy LLC, Docket No. EL16-108-000 (Aug. 25, 2016); Complaint and Motion for Consolidation by American Power, Inc., Docket No. EL17-29-000 (Dec. 19, 2016); Complaint and Motion for Consolidation by Northern Illinois Municipal Power Agency, Docket No. EL17-31-000 (Dec. 21, 2016); Complaint and Motion for Consolidation by American Municipal Power, Inc., Docket No. EL17-37-000 (Jan. 6, 2017); Complaint and Motion to Consolidate of Dynegy Marketing and Trade, LLC and Illinois Power Marketing Company, Docket No. EL17-54-000 (Mar. 28, 2017).

Finally, PJM and the New York Independent Operator ("NYISO") have had several conversations about the proposed rules regarding coordination of pseudo-tie resources. Although there are currently no Pseudo-Ties between PJM and the NYISO,[9] these conversations will continue in order to attempt to address NYISO reliability and tariff concerns.

[9] PJM acknowledges that there are energy delivery arrangements with the Niagara and St. Lawrence hydroelectric facilities in New York that predate the existence of PJM and are grandfathered arrangements, meaning these arrangements will be unaffected by and not subject to PJM's new requirements for external generators wishing to bid capacity into the RPM Auction. Answer of PJM Interconnection, L.L.C. to Protests and Comments, Docket No. ER17-1138-000, at 47 (Apr. 25, 2017) ("PJM Answer"). Because these are grandfathered arrangements, PJM does not consider them to be "Pseudo-Ties" in the way Pseudo-Ties are defined in the PJM Tariff. *Id.*

b. Does PJM foresee any operational risks for neighboring Balancing Authorities with external resources pseudo-tying into PJM? Please explain.

PJM Response[10]

As PJM responded in the complaint filed by Potomac Economics,[11] PJM does not see operational or reliability harms to the host BAs due to PJM dispatch of a pseudo-tied resource. However, Indeed, MISO and PJM advised stakeholders in November 2016 that "MISO and PJM have implemented pseudo ties without any reliability issues."[12] That achievement is attributable in part to PJM and MISO's increased and improved communication and coordination on Pseudo-Ties.

Nevertheless, PJM's proposed Tariff changes in this proceeding aim to establish an objective "Electrical Distance" prerequisite for external Generation Capacity Resources precisely so that PJM does not become dependent on external generation resources located so deep within a neighboring BA that PJM does not adequately model and cannot assure continuous PJM operational visibility of those external generation resources. In addition, MISO and PJM coordinate on the following:

- PJM provides its day-ahead generation commitment to MISO, including Pseudo-Ties and their expected dispatch for the Operating Day;
- MISO uses the PJM commitment information to enhance MISO's reliability analysis;

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10 Of all the BAs with which PJM could have Pseudo-Ties, it has by far the most experience working with Pseudo-Ties between itself and MISO. This is because the vast majority of PJM's Pseudo-Ties are Pseudo-Ties that are physically located in MISO and electrically located in PJM. PJM would be happy to work with other BAs on Pseudo-Ties, but its most practical need for cooperation has been with MISO due to the prevalence of Pseudo-Ties between the two BAs, especially as compared to other BAs. For example, although the two BAs are adjacent to one another, PJM does not have any Pseudo-Ties from generation located in NYISO

11 *Potomac Economics, Ltd. v. PJM Interconnection, L.L.C.*, Motion to Dismiss and Answer of PJM Interconnection, L.L.C. at 4, Docket No. EL17-82-000 (May 8, 2017).

12 MISO-PJM Joint and Common Market Initiative, *Meeting Materials*, PJM Interconnection, L.L.C., 3 (Nov. 15, 2016), http://www.pjm.com/-/media/committees-groups/stakeholder-meetings/pjm-miso-joint-common/20161115/20161115-item-04-pseudo-tie.ashx (Item 4 - Pseudo Ties).

- MISO operators have visibility of PJM Pseudo-Ties in their Energy Management System one-line diagrams, and can see the external generation resource's output during real-time; and
- MISO and PJM's real-time M2M coordination will include dispatch of on-line Pseudo-Tie external generation resources.

In short, PJM and MISO have taken affirmative steps to ensure coordination of Pseudo-Tie arrangements in order to address any perceived operational risks in the future.

External generation resources pseudo-tied from another BA into the PJM Balancing Authority Area are considered to be electrically in the PJM Balancing Authority Area. As a result of the Market Seller's economic choice to commit its external generation resource to the PJM markets, the native BA is no longer able to commit and dispatch the resource to meet its load and reserve requirements. That economic choice of the Market Seller to use its external generation resource to serve capacity and energy needs in the PJM Balancing Authority Area can affect the native BA's ability to meet its capacity and energy requirements. Of course, this fact is offset by the fact that Pseudo-Tie arrangements are designed to recognize that long-standing arrangements may exist between load serving entities and external generation resources which should not be wholly disrupted as a result of the integration of a transmission owner into a particular Regional Transmission Organization ("RTO"). As a result, Pseudo-Tie arrangements are a means to address resolution of seams consistent with the Commission's directives toward ensuring seams resolutions in Order 2000.[13]

To address these realities, PJM has coordinated Energy Management System ("EMS") model updates with neighboring BAs, Reliability Coordinators ("RCs"), and TOPs to ensure PJM is able to accurately observe and control pseudo-tied external generation resource impacts on external Bulk Electric System ("BES") flowgates. This allows for effective congestion management coordination between PJM and market and non-market entities. The EMS model's capabilities are robust but still limited because, for example, the PJM EMS model expansion currently only includes BES facilities, resulting in a lack of visibility for external sub-BES facility congestion.

Also, PJM and MISO have developed an operating guide to ensure the concept of "Operational Authority for Transmission Emergencies" was clear so that the attaining TOP and RC take any action necessary to maintain local reliability (including actions for underlying

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[13] *See Regional Transmission Organizations*, Order No. 2000, 1996-2000 FERC Stats. & Regs., Regs. Preambles ¶ 31,089, at 31,167 (1999) ("RTO reliability and market interface practices must be compatible with each other, especially at the "seams." RTOs must coordinate their practices with neighboring regions to ensure that market activity is not limited because of different regional practices."), *order on reh'g*, Order No. 2000-A, 1996-2000 FERC Stats. & Regs., Regs. Preambles ¶ 31,092 (2000), *petitions for review dismissed sub nom. Public Util. Dist. No. 1 v. FERC*, 272 F.3d 607 (D.C. Cir. 2001).

transmission systems).[14] PJM has also developed similar operating guides in cooperation with TVA and Duke.

c. Please explain the extent to which PJM worked with MISO on the treatment of Firm Flowgate Entitlements between MISO and PJM. Please describe any efforts to incorporate the rules regarding Firm Flow Entitlements into the JOA.

PJM Response

MISO and PJM have coordinated application of rules associated with Firm Flow Entitlements specifically associated with Pseudo-Ties as part of the solution to Pseudo-Tie over-lapping congestion counting concerns as described in response to question (1)(a) above. The solution to the congestion overlap, subject to Commission approval, involves transfer of the Pseudo-Tie Firm Flow Entitlement impacts from the Native BA to the Attaining BA *before* the day-ahead model run, so that congestion and Day-ahead Energy Market prices for pseudo-tied external generation resource will better reflect actual congestion. Therefore, the Firm Flow Entitlements associated with Pseudo-Ties will be properly accounted for in both the PJM and MISO model.

PJM, MISO, and members of the Congestion Management Process Group ("CMPG") are also developing a solution to the longstanding Freeze date initiative that includes updates to the Firm Flow Entitlements between entities. These updates as well as longer term resolutions are detailed in a filings to be made by PJM, MISO, TVA, SPP, Manitoba Hydro, Associated Electric Cooperative, Inc., Minnkota Power Cooperative, and LG&E-KU in the very near future.

Electrical Distance Requirement Test

2) PJM proposes an Electrical Distance requirement test under which an external resource must either (i) have a minimum Electrical Distance impedance equal to or less than 0.065 or (ii) be within one station of a transmission bus that has a minimum Electrical Distance impedance of or less than 0.065.

a. Please provide support for the 0.065 impedance level as an appropriate threshold. Provide any quantitative data as to how PJM determined this 0.065 threshold. Explain how establishing a higher or lower threshold value would impair or improve reliability. Indicate whether this threshold is measured in ohms or per-unit impedance.

PJM Response

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[14] *PJM-MISO Pseudo-Tied Units Operating Procedure*, *RTO-PTU-OP1-r0*, PJM Interconnection, L.L.C. and Midcontinent Independent System Operator (Sept. 1, 2016), http://www.pjm.com/-/media/etools/oasis/special-notices/pjm-miso-pseudo-tied-units-operating-procedure.ashx?la=en ("Pseudo-Tie Operating Guide").

The 0.065 impedance level is an appropriate Electrical Distance threshold that PJM developed with careful consideration of its markets' reliability needs and generators' interest in participating in the PJM capacity market. A distance criteria of this type necessarily involves judgment in balancing concerns of model visibility, effective operational control of external generation resources that are committed as Generation Capacity Resources in PJM, and maintenance of competitive market access. The value proposed here balances these interests and is well supported. In establishing the proposed Electrical Distance[15] criteria, PJM worked on, and discussed with stakeholders, several different approaches before arriving at the proposed approach. First, PJM performed Distribution Factor Analysis ("DFAX") analyses to identify the external facilities that would be impacted by PJM's dispatch of the external generation resources. The analysis identified the magnitude and complexity of reliably coordinating electrically distant external generation resources.

As an example, in the recent initial DFAX analysis for Tatanka's Pseudo-Tie request, the initial DFAX analysis identified over 700 buses that could be impacted by dispatching transfers to PJM. Over 60 percent of the buses are in transmission zones two or more transmission zones away from PJM. The actual modeled bus count would increase further from the initial DFAX analysis to accurately model the affected facilities. The complete planning model for the affected areas contains over 14,000 buses. The current PJM model contains approximately 16,000 buses, and it contains a minimal equivalent of areas two or more transmission zones from PJM.

To ensure compliance with North American Electric Reliability Corporation ("NERC") standards,[16] a significant expansion in the size of the external model to support Dynamic Transfers, such as Pseudo-Ties, requires:

- Reliable and accurate external real-time telemetry data;
- Timely external model update coordination to assure the ongoing reliability of the PJM State Estimator;
- Exchange, notification and coordination of operational planning analyses to assure that PJM planned operations of external generation resources do not cause exceedances of any external system operations limits; and
- Real-time notification and coordination of real-time operational changes including operational procedures to address any actual exceedances of any external system operations limits

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15 In its External Capacity Enhancements Filing, PJM proposed to add "Electrical Distance" as a defined term under the PJM Tariff. *See* External Capacity Enhancements Filing at 14; Proposed Tariff at Definitions E-F.

16 Including but not limited to NERC Standard TOP-002-4 and NERC Standard IRO-002-4.

Increased distance from the PJM border increases the magnitude of the external model expansion and maintenance. It would also increase the complexity of the operational coordination required as it increases the number of entities that need to be involved in day-ahead and real-time monitoring and dispatch and control.

PJM used an initial EMS model with criteria that took into account the reliability risks associated with expanding the EMS and impacts on the State Estimator such that the majority of the real-time coordination and model expansion would be performed under existing agreements and procedures with entities directly adjacent to PJM. PJM selected an Electrical Distance of 0.065 because external generation resources meeting that Electrical Distance threshold would include facilities that were previously identified as feasible and excluded facilities previously identified as infeasible based on the DFAX analyses performed to date. The 0.065 threshold encompasses at least 130 GW of existing external generation resources based on external generation resource locations analyzed to date. The final amount of external generation resources of course will increase as additional external generation resources are analyzed.

A higher threshold value would impair the reliability of the PJM EMS model by requiring more extensive expansion of the external network model. Expanding the portion of the network model that is external to PJM adds to the risk of failure of State Estimator solutions that would impact the situational awareness in the PJM footprint. A lower threshold value would improve the reliability of the EMS model by reducing or eliminating the need to expand the PJM external model.

As PJM mentioned in its April 25, 2017, answer in this docket, "[a]ccurate real-time knowledge of the system is critical—failure of a State Estimator to reflect actual system conditions was one of 'the major events . . . leading up to and causing the [2003 northeast] blackout.'"[17] Electrical Distance is an analytical measurement that can be used as a bright-line screen to communicate the amount of operational and compliance risk that a BA like PJM is willing to take on when expanding its State Estimator to incorporate Pseudo-Ties. Accuracy and availability of results from the State Estimator and the continually updated contingency analyses that depend on the State Estimator, are high priority reliability and compliance concerns for PJM, generation and transmission facility owners and operators, and market participants and must be managed judiciously. PJM would not increase or decrease the Electrical Distance requirement without careful and judicious consideration.

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[17] PJM Answer at 9 (quoting NERC Steering Group, *Technical Analysis of the August 14, 2003, Blackout: What Happened, Why, and What Did We Learn?* North American Electric Reliability Council, 27 (July 13, 2004), www.nerc.com/docs/docs/blackout/NERC_Final_Blackout_Report_07_13_04.pdf ("NERC Final Blackout Report")); *see also* NERC Final Blackout Report at 28 ("By the time the failure to reset the . . . state estimator to run automatically was discovered at 14:40, the state estimator was missing data on the Stuart-Atlanta outage and, when finally reset, again failed to solve correctly.").

The 0.065 threshold is calculated as an equivalent per-unit impedance of parallel paths between the facility and the PJM border.

b. Please explain the system conditions with which you evaluate the equivalent system impedance for each external resource and why those assumptions are appropriate for a more predictable, systematic, and repeatable process of determining whether an external resource will be able to pseudo-tie to PJM.

PJM Response

The analysis is performed using a complete peak base cases developed by Multiregional Modeling Working Group ("MMWG") Eastern Interconnection. MMWG, under direction from the Eastern Interconnection Reliability Assessment Group ("ERAG"), which includes PJM and other BAs located in the Eastern Interconnection, is responsible for the joint development of a library of Eastern Interconnection models that are used for future planning and current operating conditions.[18] Since the analysis is based on the system impedance matrix derived from the case, the results are independent of system dispatch or load level. As a result, the analysis will generate consistent Electrical Distance results based on the topology represented in the case, such that all similarly interconnected facilities will have the same opportunity in the model to be studied as a Pseudo-Tie into the PJM Balancing Authority Area.

c. Explain how often and under what circumstances PJM will reevaluate the 0.065 threshold. If PJM reevaluates this threshold and elects to change it, how will market participants be notified?

PJM Response

PJM would reevaluate, and potentially change the 0.065 threshold in the event either (1) increased experience with the expanded PJM external model suggests it can be further expanded with minimal additional risk or (2) more standardized real-time nodal model exchange processes, such as the use of the Common Information Model and new State Estimator approaches, such as hierarchical State Estimation, become commercially available to ensure resilience of large external models, and more standardized real-time nodal model exchange processes.

If PJM reevaluates this threshold and elects to change it, PJM will propose a change to the PJM Manual 12 (Balancing Operations) in which the threshold is documented. Any proposed change would be reviewed and subject to endorsement through the PJM's stakeholder process and would have prospective effect only for sell offers in future auctions.

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[18] For additional details on MMWG case development, see *Multiregional Modeling Working Group*, Eastern Reliability Assessment Group, https://rfirst.org/reliability/easterninterconnectionreliabilityassessmentgroup/mmwg/Pages/default.aspx (last visited Sept. 18, 2017).

d. What actions can a Capacity Market Seller, whose resource is located external to the PJM Region and has failed this impedance test, take to be compliant with the impedance requirement?

PJM Response

PJM estimates that its proposed Electrical Distance requirement will accommodate approximately 130 GW of pseudo-tied external generation for potential eligibility in the PJM capacity market, meaning that most external generation resources located in close proximity to the PJM border may be able to participate in that market as Generation Capacity Resources. PJM raises this fact now to emphasize that, in its view, an external generation resource that does not meet its 0.065 Electrical Distance requirement truly is located far away from the PJM Region, and that there would be real underlying challenges to PJM actually being able to rely on an external generation resource located that far away. However, if an external generation resource that is located that far away wishes to participate as a Capacity Resource, the installation of additional transmission facilities external to the PJM Balancing Authority Area such as a Direct Current transmission line or other transmission asset could reduce the Electrical Distance and remove the need to model and coordinate the dispatch of remote facilities with external transmission owners.

e. Please explain any further details PJM will include in its Manuals on this Electrical Distance test.

PJM Response

PJM is working on Manual language and, to the extent the Commission accepts PJM's proposal in this proceeding, PJM will update Manual 12, Attachment F to document the Electric Distance test criteria of 0.065 along with the other requirements that must be met to document the specific Pseudo-Tie business rules that are consistent with the Tariff.

3) PJM states that it discussed alternatives to define Electrical Distance, including alternatives based on physical geographic distance. Please explain what operational and deliverability concerns arising from external resources located farther away from PJM are addressed with a physical geographic distance test and how the impedance test does or does not account for these concerns.

PJM Response

As noted in response to Question 2(a) above, PJM has considered various alternatives to an Electrical Distance requirement. PJM found that alternatives based on geographic distance did not adequately reflect the actual differences in electric transmission capability. Alternatives based on geographic distance resulted in excluding external generation resources that could be modeled without causing significant operational and deliverability risks, and would include external generation resources that would cause these significant risks. For example, a geographically nearby external generation resource that uses a 69 kV line to transmit electricity

to PJM could pose more delivery risk than a more geographically distant external generation resource that uses a 345 kV line to transmit electricity to PJM. While geographic approaches are simpler to explain, PJM found that the Electrical Distance approach, which looked at impedance, produced criteria that more accurately identified the external generation resource for which PJM had operational and deliverability concerns. As PJM explained in the PJM Answer:

> During the analysis, PJM recognized that the geography of the utility service territories are not well aligned to either electric distance or the magnitude and complexity of reliably coordinating electrically distant resources. As a result, PJM developed the electrical distance methodology to provide a consistent, objective, non-discriminatory process that was repeatable, and based on the actual engineering parameters and topology of the system, rather than on facility ownership or jurisdictional boundaries.[19]

Market-to-Market Flowgate Test

4) PJM proposes to coordinate a new market-to-market flowgate to facilitate a pseudo-tie if at least one of PJM's internal generation resources also has an appropriate minimum flow impact of 1.5 percent on that flowgate. Please explain the extent to which PJM worked with neighboring Balancing Authorities (e.g., MISO) to develop the 1.5 percent flow impact threshold. Please describe any efforts to incorporate the rules governing this market-to-market flowgate test into the JOA.

PJM Response

PJM bases its 1.5 percent internal resource impact test on the value developed in collaboration with MISO, the entity with which PJM has the most Pseudo-Ties. The 1.5 percent internal resource impact test is directly targeted at ensuring that any Pseudo-Tie flowgates that are put in place have some level of controllability with PJM internal resources, to help avoid costs from excess congestion on MISO facilities. If the proposed pseudo-tied external generation resource was the only generation resource with a flow impact greater than 1.5 percent, then that proposed Pseudo-Tie would not qualify a resource to become a PJM Capacity Resource because it would cause less than optimal dispatch.

The 1.5 percent value was developed in collaboration with MISO as part of the MISO-PJM coordination process and reflects consensus between PJM and MISO. In essence, PJM's proposal means that PJM will not approve a Pseudo-Tie of an external generation resource if there are no generation resources internal to PJM with at least a 1.5 percent DFAX on any new flowgates required to implement the Pseudo-Tie. This rule ensures that if a new coordinated flowgate is required to implement a Pseudo-Tie, that PJM has some operational control to manage flows on that flowgate other than the pseudo-tied external generation resource itself. For that purpose, PJM is adopting the threshold already agreed by PJM and MISO in the MISO-PJM JOA as the minimum percentage impact an internal generation resource can have on a flowgate

[19] PJM Answer at 13.

for it to be considered a redispatch option to help control flow on that flowgate. PJM simply is applying that agreed threshold to help define here a PJM-internal generation resource that can be redispatched to control flow on the flowgate needed by the pseudo-tied external generation resource.

Expanding on this general explanation, the 1.5 percent value aligns with the current minimum percentage impact threshold at which PJM would re-dispatch a generation resource that affects flows on coordinated flowgates. Currently in the PJM-MISO coordination process, if no internal generation resources meet this 1.5 percent flow impact threshold, then PJM has no options for constraint relief, which often results in discontinuation of coordination for that flowgate. This minimum percentage was derived as a result of coordination between MISO and PJM and is described in section 1.1.4 of Attachment 3 of the PJM-MISO JOA and provided as follows:

Existing PJM-MISO JOA, Attachments 3, section 1.1.4:

> The Parties will lower their generator binding threshold to match the lower generator binding threshold utilized by the other Party. The generator binding threshold will not be set below 1.5% except by mutual consent. (This requirement applies to M2M Flowgates. It is not an additional criteria for determination of M2M Flowgates.)[20]

5) PJM proposes that an external market-to-market flowgate will not be added to support a pseudo-tie unless the reciprocal coordinating entities maintain network models that produce results for such flowgates that are within two percent of one another.

a. Please explain how PJM determined that two percent is the appropriate standard.

PJM Response

PJM and MISO jointly developed the two percent standard for modeling accuracy within respective EMS applications for model expansions resulting from the implementation of a Pseudo-Tie. This benchmark was negotiated and memorialized in a PJM/MISO operating guide which sets the two percent accuracy standard in order to align Generator Shift Factors ("GSF") and Generator to Load DFAX ("GLDF") calculations between PJM and MISO to support the market-to-market process.

The two percent standard for external coordinated flowgates recognizes that use of different models by the different coordinating entities inherently can result in some amount of difference, but that difference should be as little as possible. The two percent standard

20 MISO-PJM JOA, Att. 3, Section 1.14.

recognizes that by working together on modeling result variances, coordinating entities can reduce those variances to relative insignificance. PJM and MISO already have this two percent standard in place as part of a process for existing pseudo-tied external generation resources.

b. Which, if any, of the external entities with which PJM is required to coordinate flowgates maintain a network model that produces results for such flowgates that are within two percent of the results produced by the PJM network model?

PJM Response

All modeling associated with flowgates that are being added to accommodate a Pseudo-Tie must be within two percent.

Firm Transmission Service with Rollover Rights Requirement

6) PJM proposes that a Capacity Market Seller of an external resource that wishes to pseudo-tie into PJM be required to obtain long-term firm transmission service with rollover rights. Please explain how PJM will coordinate the process of Transmission Service Reservations between PJM and the other Balancing Authorities. For example, please explain who will perform the studies, who will pay for any necessary transmission upgrades, and how rollover rights will be managed. Please also explain any differences in procedures or charges for transmission service reservations associated with pseudo-ties between MISO and PJM as compared to PJM and other neighboring Balancing Authorities.

PJM Response

PJM will work closely with other BAs to coordinate the process of Transmission Service Reservations between PJM and the other BAs. With respect to coordinating the process of Transmission Service Reservations between PJM and other BAs, PJM will provide the other BA its study criteria and help those conducting the studies to understand the criteria and provide guidance where needed. In doing so, PJM will continue to employ its processes to screen areas outside of PJM to determine if PJM sees any potential impacts to those external entities using a DFAX screen method. If PJM identifies any entities, external to PJM, as having potential impacts from an external generation resource's request for transmission service to support its participation in PJM's capacity market, PJM will ask the external entity to screen its system to determine whether there are any violations requiring reinforcement on the external entity's system, thereby alerting those entities of the need to examine their system for impacts. PJM does not anticipate this process would be any different as between PJM and MISO compared to any other neighboring BAs. Rollover rights will be managed just as they are today.

As for who will pay for the necessary upgrades, that will be dependent on the native Balancing Authority's cost allocation provisions; but PJM expects that for initial upgrades needed to support the transmission service, the external generation resource will be required to pay for all reinforcements identified as being required to mitigate violations identified on the

PJM system and the other BA's system. That is comparable to how internal generation is allocated upgrade costs in PJM.

Operational Deliverability Requirement

7) **PJM proposes to require external resources to be "operationally deliverable," which equates to a forward-looking planning determination to examine, based on experienced or required conditions, whether there will be any threats or degradation to the reliable delivery of energy to load.**

    a. **PJM states that it may, "in its sole judgment," determine that an external resource is not operationally deliverable for a delivery year. Please provide further details or evaluation for what PJM will include as part of this operational deliverability test.**

PJM Response

As PJM noted in the External Capacity Enhancements Filing and the PJM Answer in this proceeding, PJM recognizes equitable concerns for sellers that previously pseudo-tied their resources under PJM's current requirements, and are relying on such pseudo-tied resources to serve their customers.[21] PJM therefore has proposed a transition period for those external generation resources, which PJM has proposed to refer to as Prior CIL Exception External Resources, with the goal of allowing these Prior CIL[22] Exception External Resources time to adjust to PJM's new Capacity Resource requirements while continuing to participate in Reliability Pricing Model ("RPM") Auctions as long as the resource does not pose an operational challenge or risk to the PJM market.[23] Bcause these equitable considerations cannot moot any actual operational concerns that may arise for these Prior CIL Exception External Resources during the transition period, PJM is proposing procedures to apply if such Prior CIL Exception External Resources is found to not be Operationally Deliverable, as defined in this filing, for any Delivery Year during their transition. This provision primarily reflects PJM's willingness to work with the owners of such resources to resolve any operational concerns that do arise.

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21 External Capacity Enhancements Filing at 4.

22 "CIL" stands for Capacity Import Limit.

23 As PJM has proposed in the tariff revisions in this docket, a Prior CIL Exception External Resource will be defined as "an external Generation Capacity Resource for which a Capacity Market Seller had, prior to May 9, 2017, cleared a Sell Offer in an RPM Auction" under the CIL exception. Proposed Tariff, Definitions O-P-Q.

As stated in its previous filings in this proceeding,[24] PJM has determined key triggers that it will use when determining the ability of a Prior CIL Exception External Resources to be deliverable to meet PJM's operational needs, and they are as following:

1) Need for remedial action scheme or manual generation dump protocol to manage external transmission emergencies—PJM will consider this trigger to be met if a 24X7 remedial scheme is required for operation of a Prior CIL Exception External Resource.

2) Need for transmission facility switching arrangements that would have the effect of radializing load in order to manage external transmission emergencies—PJM will consider this trigger to be met if a switching solution is implemented isolating load one or more times during a delivery year to support operation of a Prior CIL Exception External Resource.

3) Need for "out of market" external BA or TOP directed dispatch instructions to manage excessive or unacceptable frequency of external regional reliability limit violations or (outside an interregional agreed congestion management process) of local reliability limit violations—PJM will consider this trigger to be met if a Prior CIL Exception External Resources is dispatched three times or more to either manage an external regional reliability violation via the application of Transmission Loading Relief ("TLR") level 5 firm generation to load relief obligation process or manage and external local reliability violation during a delivery year.

PJM will undertake a two-step process to declare a Prior CIL Exception External Resource to be operationally undeliverable. Under Step 1, PJM would identify if any of the aforementioned triggers are met during a Delivery Year. Under Step 2, PJM would validate the persistent nature of such trigger(s) via coordination with external entity(s). During this 2-step process if PJM determines that a Prior CIL Exception External Resource will not be fully deliverable to PJM for transitory conditions (i.e. weather emergencies or temporary transmission equipment emergencies) that are not going to persist in the future, the Prior CIL Exception External Resource will continue operate in PJM's market as a Capacity Resource. However, if PJM discovers that the Prior CIL Exception External Resource's deliverability deficiencies will persist in the future, PJM will deem the Prior CIL Exception External Resource to be operationally undeliverable. PJM provided specific examples of its intended application of this provision in the PJM Answer.[25]

b. When will this test apply? If PJM originally certified an external resource as being pseudo-tied, and the external resource was able to obtain a capacity

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24 *See* PJM Answer at 38–39; *see also* External Capacity Enhancements Filing at 18–19.

25 PJM Answer at 39–43.

supply obligation, please describe the circumstances in which the resource would later be found undeliverable into PJM.

PJM Response

PJM will test each Prior CIL Exception External Resource by October 1 of the delivery year. Please see the answer to part (a) of this question to address the circumstances in which PJM will find an Prior CIL Exception External Resource to be undeliverable.

c. How long will it take PJM to complete this test?

PJM Response

The timing of the completion of the test may vary depending on the situation. It is PJM's intent to initiate coordination with external BAs and other entities whose system may be impacted, once any of the specified triggers were met and come to a conclusion prior to the October 1 deadline, so that the Prior CIL Exception External Resource is informed of the challenge and considers future capacity eligibility with respect to the Prior CIL Exception External Resource.

d. Please explain how PJM will make the determination that an external resource did not pass this test. Is PJM proposing a bright line test?

PJM Response

PJM's response to Question 7(a) above provides the detailed explanation of the evaluation PJM will perform when conducting the test. The two-step test amounts to a first step that uses a "bright line" test to identify triggers that speak to deliverability, followed by a second step that requires communication with the host BA to determine whether these triggers are persistent in nature. Thus, there is a bright-line aspect in the first step, but it is followed by deliberate evaluation of "persistence," which PJM would not characterize as a "bright line" test.

e. What would prevent an external pseudo-tied resource with firm transmission service from being fully deliverable into PJM?

PJM Response

For all new external generation resources seeking to be a Capacity Resource in PJM, PJM anticipates the studies conducted under the proposed enhancements in this filing will be robust such that the resource would be fully deliverable in to PJM. The subset of resources PJM will apply the operational deliverability requirement are those external generation resources which were granted Capacity Resource status prior to PJM's External Capacity Enhancements Filing (i.e., the Prior CIL Exception External Resources). As noted previously here and in PJM's prior filings in this proceeding, PJM balanced the equitable considerations for a resource that has already been in our market, with the need for ensuring that, ultimately, PJM can ensure the reliability of the PJM system is maintained.

With that as a backdrop, there are various reasons why a Prior CIL Exception External Resource may not be fully deliverable in to PJM. For instance, coal transmission congestion identified by PJM that was not identified during the Transmission Service Request Study conducted by the entity that conducts planning studies for the external BA , for example, would make a Prior CIL Exception External Resource partially or completely undeliverable to PJM.

As PJM explained in its External Capacity Enhancements Filing at pages 12 to 13, one goal of these revisions is to put external generation resources on equal footing with those located inside PJM in terms of deliverability of capacity. However, PJM recognizes that external generation resources need to use transmission facilities located in other BAs, BAs with transmission rules and standards that may or may not be as rigorous as PJM's.

During the transition period where Prior CIL Exception External Resource are permitted to continue to operate as capacity on PJM's system, PJM expects such studies may not have identified all necessary system reinforcements to reduce the potential for congestion and the need to re-dispatch generation under conditions for which re-dispatch would not be necessary inside the PJM Balancing Authority Area.

f. Where does PJM propose to maintain the details of this operational deliverability test (i.e., tariff or manual)?

PJM Response

PJM proposed a detailed definition for Operationally Deliverable to include in the Tariff, section 1, which sets forth the parameters that will be considered for operational deliverability. Technical guidance will be contained in the PJM Manuals.

g. Will an external resource that has failed the test be eligible to resubmit its request to be pseudo-tied into PJM before the upcoming Base Residual Auction?

PJM Response

An external resource that has failed the "Operationally Deliverable" test should not need to resubmit its request to be pseudo-tied into PJM. The "Operationally Deliverable" standard only applies to Prior CIL Exception External Resources, which already have Pseudo-Ties into PJM. Failing the Operationally Deliverable standard thus does not necessarily result in losing its Pseudo-Tie. Instead, if a Prior CIL Exception External Resource has a capacity obligation for the coming Delivery Year and is determined to be not operationally deliverable, it will have the choice, as set forth in more detail in proposed revised Section 5.5A(c)(i) of Attachment DD of PJM's Tariff revisions, to either (1) take steps to make itself operationally deliverable before the commencement of the upcoming Delivery Year for which it has a capacity obligation, (2) be relieved of its capacity obligation for the upcoming Delivery Year and all subsequent must-offer obligations (i.e., give up its Pseudo-Tie), or (3) procure replacement capacity for the upcoming Delivery Year. An external generation resource which fails the Operational Deliverability

standard and does not take steps to make itself operationally deliverable or replace its commitment will no longer retain its Pseudo-Tie and would have to come back in to the process to reestablish a Pseudo-Tie if it seeks to be a Capacity Resource in PJM.

h. Please explain how this operational deliverability test differs from studies PJM conducts to provide firm transmission service.

PJM Response

Practically speaking, the operational deliverability test is a less stringent requirement than what PJM applies to internal Capacity Resources and external Capacity Resources that do not quality for the transition period provided to Prior CIL Exception External Resources, which PJM has discussed in more detail in its response to Question 7(a) above. The operational deliverability test is a look at actual Pseudo-Tie operation and resultant impacts taking into consideration various actual system conditions (load, outages, etc.). In contrast, PJM's Firm Transmission service studies are a look forward typically using peak conditions as a base. As PJM has mentioned in response to Question 7(a) above, PJM has proposed this transition mechanism because it recognizes equitable concerns for sellers that previously pseudo-tied their resources under PJM's current requirements, and are relying on such pseudo-tied resources to serve their customers, and seeks to balance those concerns alongside the PJM market's interest in providing comparable oversight and treatment for internal and external Generation Capacity Resources.

PJM's long-term planning process incorporates a review of all applicable NERC, PJM, and Transmission Owner planning criteria in determining if any constraints exist on the system. The operational deliverability tests incorporate a subset of these contingencies and also allow for system re-dispatch as well as implementation of operating procedures in order to mitigate any constraints identified in the study, the use of re-dispatch and operating procedures not being allowed in the long term planning process final solution**.**

i. Please explain whether PJM evaluates internal resources to determine if they are operationally deliverable prior to each delivery year. If so, please provide the relevant tariff or manual provisions governing such an evaluation. Please explain why the deliverability of external resources should be comparable to that of internal resources.

PJM Response

As PJM explains in response to Questions 7(a) and 7(h) above, the "Operationally Deliverable" requirement it proposes would only apply as part of the transition period PJM has proposed to allow for Prior CIL Exception External Resources, and will not apply more generally to either internal generation resources or external generation resources except to the extent the external resource qualifies as a Prior CIL Exception External Resource and is operating within its allowed transition period. After the transition period expires for a Prior CIL Exception External Resource, the resource will need to comply with the general requirements for new external Generation Capacity Resources, which are not subject to an operational

deliverability review, but are subject to other requirements that ensure the deliverability of electricity from such resources, such as the Electrical Distance and M2M flowgate requirements discussed earlier in this Response. The requirements for new Generation Capacity Resources are equivalent to those that apply to internal Generation Capacity Resources. For internal PJM Generation Capacity Resources, PJM continues to use the increased level of screening, incorporating all required long term planning criteria, in determining if an internal generation resource might be able to operate without upgrades being completed as required to meet all applicable criteria when the internal generation resource was studied under the processes incorporated in the System Impact Study which is documented in procedures associated with Interim Deliverability Studies which are located in section 1.14 of Manual 14A.[26] For a discussion of why deliverability of external resources should be comparable to that of internal resources, please refer to Section III.A of the External Capacity Enhancements Filing in this docket.

j. Tatanka Wind Power, LLC explains that PJM previously denied the request of one of its external resources to pseudo-tie to PJM.[27] Please explain what operational concerns this external resource raised that prevented PJM from completing the pseudo-tie. Did PJM previously determine whether this external resource would be able to pseudo-tie into PJM? Is the test that PJM applied to Tatanka the same that PJM is proposing as part of its requirements in this filing? Under which tariff or manual provisions did PJM determine that Tatanka would be unable to deliver into PJM?

PJM Response

PJM denied the Tatanka Wind Power, LLC's ("Tatanka") Pseudo-Tie because the Tatanka units failed the electrical distance test. PJM has explained that the additional modeling needed to support that particular Pseudo-Tie creates an unacceptable risk to our State Estimator solution making the Psuedo-Tie infeasible from a reliability perspective.

The Tatanka units are both geographically and electrically distant from PJM. A Pseudo-Tie would require a significant increase to the size of the PJM EMS model to be able to monitor parallel transmission paths between the Tatanka units in South Dakota and PJM. PJM performed several analyses (including the proposed criteria) which all identified that it would be technically infeasible to expand the PJM model to establish a Pseudo-Tie of the Tatanka units. The Dynamic Transfer business rules and process flow indicate that first step in the PJM process is to

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26 Planning Division – Generation Interconnection Department, *PJM Manual 14A: Generation and Transmission Interconnection Process*, PJM Interconnection, L.L.C., 12 (Nov. 1, 2016), http://www.pjm.com/-/media/documents/manuals/m14a.ashx.

27 Motion to Intervene and Protest of Tatanka Wind Power, LLC, Docket No. ER17-1138-000, at 2-3 & Exh. B (Mar. 30, 2017).

provide a high level estimate of the cost to model the Pseudo-Tie if technically feasible. Tatanka was notified that modeling was not feasible as part of the process.

k. Has PJM previously denied other external generation resources the ability to pseudo-tie for deliverability or operational reasons? If so, please explain in further detail.

PJM Response

PJM has denied four Pseudo-Tie requests from external generation resources—Tatanka plus three others—based on similar analysis to that which it conducted for Tatanka that identified significant operational and deliverability risks. Like Tatanka, these external generation services were located hundreds of miles from the boundaries of the PJM Region.

Transition Period

8) PJM proposes a five year transition period to allow external resources that previously have pseudo-tied into PJM and cleared a Base Residual Auction to become compliant with its proposed requirements.

a. Please explain whether an external resource clearing a "prior" Base Residual Auction refers to only the most recent auction or any prior auction to date.

PJM Response

A Generation Capacity Resource that has cleared a Sell offer in any RPM Auction that occurred prior to May 9, 2017 would qualify for the transition period. That would include not just the most recent auction before May 9, 2017, but also any other RPM Auction prior to that date. PJM refers to Generation Capacity Resources that meet this standard as as "Prior CIL Exception External Resources."

b. Will PJM begin performing its operational deliverability test on all external resources that have previously pseudo-tied into PJM or will those tests begin at the conclusion of the transition period?

PJM Response

PJM will only apply the "Operationally Deliverable" standard to Prior CIL Exception External Resources; i.e., those external generation resources that qualify under the transition mechanism such that they are not subject to the new requirements for Generation Capacity Resources—including the new Pseudo-Tie requirements—for the length of their relevant transition period. In other words, the "Operationally Deliverable" requirement will only apply to Prior CIL Exception External Resources, which are "external Generation Capacity Resource[s]

for which a Capacity Market Seller had, prior to May 9, 2017, cleared a Sell Offer in an RPM Auction" under the Capacity Import Limit exception.[28]

Non-Performance Penalties

9) **Beginning in the 2020/2021 Delivery Year, PJM proposes to assess the performance of pseudo-tied resources at sub-regional transmission granularity and base the assessment on whether such resources have helped resolve a declared Emergency Action, rather than on whether an Emergency Action had been declared for the entire PJM Region. Please explain how PJM will determine whether a pseudo-tied resource "would have helped resolve a declared Emergency Action." Will PJM map external pseudo-tied resources to specific LDAs in PJM when determining non-performance penalties? If so, please explain how this will work.**

PJM Response

PJM will determine whether a pseudo-tied resource "would have helped resolve a declared Emergency Action" in the following manner:

1. If the Emergency Action includes the entire PJM RTO, all pseudo-tied resources will be eligible for Non-Performance Charges and Bonus payments.

2. Each pseudo-tied resource will be linked to a PJM transmission zone based on the shortest Electrical Distance between the pseudo-tied resource and a transmission zone within PJM. This linking will be made known to the owner of the pseudo-tied resource prior to the Delivery Year so they know when their resource is in a region experiencing a Performance Assessment Hour ("PAH"). If a PAH is triggered for the PJM transmission zone the pseudo-tied resource is linked to, that resource will be expected to respond and therefore be eligible for Non-Performance Charges and Bonus payments.

3. Notwithstanding the above, if PJM dispatches the pseudo-tied resource specifically for the purpose of mitigating an Emergency Action that has triggered a PAH, the resource will be expected to respond and therefore be eligible for Non-Performance Charges and Bonus payments. Communication of this type would occur via phone call from the PJM control room directly to the operator of the pseudo-tied resource.

PJM believes this methodology closely approximates the obligations, risks and benefits that an internal capacity resource.

PJM is not planning to map to a specific Local Delivery Area ("LDA") pseudo-tied

[28] Proposed Tariff, Definitions O-P-Q.

external generation resources that qualify as Generation Capacity Resources, however, for purposes of operational assessment, PJM will assign the resource to a transmission zone as noted in step 2 above.

III. CONCLUSION

Wherefore, PJM respectfully requests the Commission accept its External Capacity Enhancements Filing, as further supported in this response to the Commission's Deficiency Letter.

Respectfully submitted,

/s/ *Jennifer H. Tribulski*

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CERTIFICATE OF SERVICE

PJM has served a copy of this filing on all PJM members and on all state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,[29] PJM will post a copy of this filing to the FERC filings section of its internet site, located at the following link: http://www.pjm.com/documents/ferc-manuals/ferc-filings.aspx with a specific link to the newly-filed document, and will send an e-mail on the same date as this filing to all PJM members and all state utility regulatory commissions in the PJM Region[30] alerting them that this filing has been made by PJM and is available by following such link. PJM also serves the parties listed on the Commission's official service list for this docket. If the document is not immediately available by using the referenced link, the document will be available through the referenced link within 24 hours of the filing. Also, a copy of this filing will be available on the FERC's eLibrary website located at the following link: http://www.ferc.gov/docs-filing/elibrary.asp in accordance with the Commission's regulations and Order No. 714.

[29] *See* 18 C.F.R. §§ 35.2(e) and 385.2010(f)(3).

[30] PJM already maintains, updates and regularly uses e-mail lists for all PJM members and affected state commissions.