168 FERC ¶ 61,113
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
                        Cheryl A. LaFleur and Richard Glick.

Cube Yadkin Generation, L.L.C.	Docket No. EL19-51-000
v.	
PJM Interconnection, L.L.C.	

ORDER ON COMPLAINT, ESTABLISHING PAPER HEARING PROCEDURES

(Issued August 26, 2019)

1.   On March 1, 2019, Cube Yadkin Generation, L.L.C. (Cube Yadkin), pursuant to sections 206 and 306 of the Federal Power Act (FPA)[1] and Rule 206 of the Commission's Rules of Practice and Procedure,[2] filed a complaint against PJM Interconnection, L.L.C. (PJM) (Complaint). Cube Yadkin alleges that PJM wrongly determined that its hydroelectric generating resources (the Cube Yadkin Resources) failed PJM's Electrical Distance requirement, which PJM applies to external generating resources seeking to pseudo-tie into PJM to deliver capacity. Cube Yadkin asserts that PJM's Electrical Distance requirement is unjust, unreasonable and unduly discriminatory and preferential.[3] In this order, we establish paper hearing procedures to examine PJM's selection of three closest buses in its application of the Electrical Distance requirement to the Cube Yadkin Resources, as discussed below, and set a refund effective date of March 1, 2019.

I.   **Background**

2.   In order for new, external generation resources to participate in PJM's capacity auctions, PJM's tariff (Tariff) requires external resources to be pseudo-tied from their

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[1] 16 U.S.C. §§ 824e, 825e (2012).

[2] 18 C.F.R. § 385.206 (2018).

[3] Cube Yadkin Complaint at 1.

native Balancing Authority Area (BAA) into PJM.[4] In order to be eligible for a pseudo-tie into PJM, an external resource must meet a set of threshold requirements approved in a November 17, 2017 order accepting proposed enhancements to PJM's pseudo-tie procedures.[5] These requirements include an Electrical Distance requirement, which requires that:

> the external Generation Capacity Resource must have a minimum Electrical Distance impedance equal to or less than 0.065 p.u.; or is within one station of a transmission bus that has a minimum Electrical Distance impedance equal to or less than 0.065 p.u.[6]

3.   PJM's Tariff defines "Electrical Distance" as "for a Generation Capacity Resource geographically located outside the metered bounds of the PJM Region the measure of distance, based on impedance and in accordance with the PJM Manuals, from the Generation Capacity Resource to the PJM Region."[7]

4.   In the Pseudo-Tie Enhancement proceeding, PJM characterized the Electrical Distance requirement as helping to resolve modeling challenges and limit expansion of its Energy Management System (EMS) model.[8] PJM stated that if a resource met the Electrical Distance requirement, that resource and its affected area could be included in the EMS or market model without raising an undue risk of model performance solution problems.[9] In the Pseudo-Tie Enhancement Order, the Commission found the Electrical Distance requirement to be just and reasonable because it struck an appropriate balance between allowing external resources to participate in PJM's capacity market while

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[4] *See PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208, at PP 96-97 (2015), *order on reh'g*, 155 FERC ¶ 61,157 (2016).

[5] *PJM Interconnection, L.L.C.*, 161 FERC ¶ 61,197 (2017) (Pseudo-Tie Enhancement Order).

[6] PJM, OATT Attachment DD.5.5A Capacity Resource Types, § 5A(b)(1)(A) (2.0.2).

[7] PJM Interconnection, L.L.C., E-F, OATT Definitions – E – F, (16.0.1).

[8] Pseudo-Tie Enhancement Order, 161 FERC ¶ 61,197 at P 48 (referring to PJM, Transmittal, Docket No. ER17-1138-000, at 14 (filed March 9, 2017) (PJM Transmittal)).

[9] PJM Transmittal, Docket No. ER17-1138-000 at 14.

providing PJM with a level of reliability assurance.[10] The Commission also found that the Electrical Distance requirement establishes a bright-line test, with clear values for determining eligibility of pseudo-ties from BAAs outside of PJM.[11] The Commission accepted PJM's representation that the further the State Estimator model extends beyond its own borders the less resilient the PJM system becomes to data loss and inaccuracy of data and models.[12]

5.   PJM explained in the Pseudo-Tie Enhancements proceeding that the calculation of the 0.065 threshold is an equivalent per-unit impedance of parallel paths between the facility and the PJM border.[13] The Commission ordered PJM to include the 0.065 p.u. impedance value in its Tariff, but acknowledged that the methodology that PJM will use to conduct the Electrical Distance requirement can remain in the PJM Manuals.[14]

6.   PJM Manual 12 states:

> PJM staff will evaluate the feasibility of upgrading the PJM Energy Management System (EMS) model to explicitly model the pseudo-tied resource by performing an electrical distance test, from the highest connected voltage at the station the unit is inter-connected, to determine the Thévenin equivalent impedance into PJM. If determined to be feasible, meaning the resulting equivalent impedance is determined to be less than or equal to .065 plus one adjacent bus, the cost of the model upgrade will be borne by the Market Participant requesting to Pseudo-Tie.[15]

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[10] Pseudo-Tie Enhancement Order, 161 FERC ¶ 61,197 at P 60.

[11] *Id.*

[12] *Id.* P 54.

[13] PJM, Deficiency Response, Docket No. ER17-1138-001, at 11 (filed September 18, 2017).

[14] Pseudo-Tie Enhancement Order, 161 FERC ¶ 61,197 at P 62.

[15] PJM Manual 12, Attachment F at 96.

II.   Complaint

7.   Cube Yadkin states that in May 2018, it applied to have the Cube Yadkin Resources pseudo-tied into PJM, but that on June 21, 2018, PJM informed Cube Yadkin that it had failed the Electrical Distance requirement.[16] Cube Yadkin contends that PJM acted inconsistently with its Tariff and Manuals in determining that the Cube Yadkin Resources failed the Electrical Distance requirement and are ineligible to pseudo-tie into PJM and that PJM's application of its Electrical Distance requirement is unjust and unreasonable.[17]

8.   Cube Yadkin owns and operates the Yadkin Project, a hydroelectric project consisting of four sites – Tuckertown, High Rock, Falls and Narrows with an aggregate nameplate generation capacity of 220 MW.[18] Cube Yadkin explains that the four Cube Yadkin Resources are connected to the transmission grid in series with two of the four resources – Narrows and Falls – connected at a single node, i.e., bus – Badin.[19] Cube Yadkin further explains that of the four resources, Tuckertown lies directly between High Rock and Badin.[20] Cube Yadkin further explains that as the four resources are modeled as three nodes in a series (High Rock – Tuckertown – Badin), all power flowing out of them and onto the transmission system would have to flow out of either High Rock or Badin, and as such, there are only two possible connections through which all power must flow from these resources to reach the PJM system.[21]

9.   Cube Yadkin uses a graph theory diagram to illustrate that given this configuration, there can be no more than two buses from which PJM would analyze impedance.[22] Cube Yadkin states that from both a Thévenin equivalence and graph theory perspective, it is not possible to have three closest buses from four generators modeled and connected in a series as three nodes – the number of closest nodes cannot

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[16] Cube Yadkin Complaint at 2.

[17] *Id.* at 2-3.

[18] *Id.* at 5.

[19] *Id.* at 23. The Commission understands PJM and Cube Yadkin to use the terms "bus" and "node' interchangeably.

[20] *Id.*

[21] *Id.*

[22] *Id.* at 24.

exceed the number of connections to the grid.[23] Cube Yadkin deems PJM's Electrical Distance requirement results to not be electrically possible.[24]

10.   In addition, Cube Yadkin argues that given the unique geographical locations of its four facilities, power flows sourced from Cube Yadkin's BAA must flow out of only two buses into PJM.[25] Therefore, Cube Yadkin asserts, also in this way, it is not possible for PJM's analysis to identify the three "closest" buses, a result Cube Yadkin asserts is "electrically impossible." For these reasons, Cube Yadkin contends PJM improperly conducted the electrical distance requirement and that PJM should be required to perform the electrical distance test correctly and accept Cube Yadkin's pseudo-tie.

III.   **Notice and Responsive Pleadings**

11.   Notice of the Complaint was published in the *Federal Register*, 84 Fed. Reg. 8523-01 (2019), with answers, interventions and protests due on or before March 21, 2019. The following parties filed timely motions to intervene: Monitoring Analytics, LLC, in its capacity as the Independent Market Monitor for PJM (IMM); Tilton Energy, LLC; Exelon Corporation; Dominion Energy Services, Inc.; Calpine Corporation; NRG Power Marketing LLC; American Municipal Power, Inc.; and North Carolina Electric Membership Corporation. Also on March 21, 2019, Brookfield Energy Marketing LP (Brookfield) filed a motion to intervene and comments.

12.   On March 21, 2019, PJM filed its answer. On April 11, 2019, the IMM filed a motion for leave to answer and answer. On April 26, 2019, Cube Yadkin filed a motion for leave to answer and answer.

A.   **PJM's Answer**

13.   According to PJM, its finding slightly different "closest" PJM border buses for the different Cube Yadkin generator buses does not mean that PJM's approach is unjust and unreasonable. PJM argues that the graph used by Cube Yadkin to make its argument is oversimplified because it shows three Cube Yadkin generators in a line connected to the bulk electric system at only one end, whereas in the Eastern Interconnection model used for the analysis, that line is connected to the grid at both ends. PJM explains that each of the three plant locations has a unique set of paths through and out of the Yadkin area to

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[23] *Id.*; Cube Yadkin Complaint, Exhibit A (Affidavit of Walter Neal Simmons) at 10-11 (Simmons Aff.).

[24] *Id.*

[25] Simmons Aff. at 15-17.

the PJM border and, given these unique paths, finding differences between each location is not an unexpected result. According to PJM, this is the case because PJM's algorithm identifies and selects a set of adjacent paths from each generator bus to the PJM border, so there is no guarantee that the same set of parallel paths will be selected for adjacent generator buses to be included in the Electric Distance calculation.[26]

B.   Cube Yadkin's Answer

14.   Cube Yadkin responds that PJM has not explained why it identified three electrically closest buses for the Yadkin Project while it should only be possible to have two closest buses. Cube Yadkin asserts that PJM's explanation concerning the graphical representation is insufficient in that the graph was only a visual exemplar, and that "four generators arranged in series as three nodes [i.e., buses] connected to the grid at two points *cannot* have three closest nodes [i.e., buses]."[27]

IV.   Discussion

A.   Procedural Matters

15.   Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2018), the notices of intervention and timely, unopposed motion to intervene serve to make the entities that filed them parties to this proceeding.

16.   Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2018), prohibits an answer to an answer unless otherwise ordered by the decisional authority. We accept the answers of the IMM, PJM and Cube Yadkin and the comments of Brookfield because they have provided information that assisted us in our decision-making process.

B.   Substantive Matters

17.   We find that Cube Yadkin has raised questions of material fact about the manner in which PJM administered its Electrical Distance requirement to Cube Yadkin's generation that cannot be resolved based on the current record in this proceedings. Accordingly, as discussed below, we establish paper hearing procedures on the application of PJM's Electrical Distance requirement, as applied to the Cube Yadkin Resources.

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[26] *Id.* at 21-22.

[27] Cube Yadkin Answer at 11.

18.   Cube Yadkin argues that PJM's identification of three electrically closest buses for the Cube Yadkin Resources is electrically impossible because, by virtue of the series arrangement of the resources, it would only be possible to have two closest buses. Cube Yadkin argues the record is clear that the Cube Yadkin Resources are connected to the transmission grid at two points – High Rock and Badin – leaving only two possible connections through which all power must flow from these resources to reach the PJM system.

19.   PJM does not directly rebut Cube Yadkin's arguments. Instead, PJM responds that each of the three plant locations (High Rock, Tuckertown, and Badin) has a unique set of paths through and out of the Yadkin areas to the PJM border, and that given these unique paths, finding differences between each location is not unexpected.[28] However, questions of material fact remain, such as how PJM's algorithm selects particular buses for each generator for purposes of its Electrical Distance requirement and how the algorithm determines the specific path from each generator to these buses; how PJM's selection of three closest buses is consistent with PJM's Tariff and electrically feasible; and whether PJM's algorithm's selection of three closest buses, if erroneous, could cause an external generator to fail the Electrical Distance requirement when it would have otherwise passed.

20.   We therefore establish paper hearing procedures to examine these issues. PJM is required to respond to the questions posed below, accompanied by documents or affidavits, if necessary, within 30 days of the date of this order, with replies due within 15 days of PJM's filing. After receipt of these filings, Commission staff is authorized to establish additional procedures, including a staff technical conference, if further information on these issues is needed.

21.   Please explain with specificity:

(1)   How PJM's algorithm selects particular buses for each generator for purposes of its Electrical Distance requirement, as well as how the algorithm determines the specific paths from each generator to these buses;

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[28] PJM explains that its algorithm identifies and selects a set of adjacent paths from each generator bus to the PJM border, so there is no guarantee that the same set of parallel paths will be selected for adjacent generator buses to be included in the Electric Distance calculation. PJM also argues that while it identified three "closest buses," it found that each generator bus had the same "top four" buses, and failed the 0.065 p.u. threshold test for all of them.

(2)   How PJM's selection of three closest buses was consistent with PJM's algorithm and is electrically feasible;

(3)   PJM's algorithm validation methods;

(4)   Whether, if PJM selected only the two closest buses for the Cube Yadkin Resources, that would have changed the outcome of the Electrical Distance requirement; and

(5)   The transmission elements (name, circuit number and bus numbers) that PJM's algorithm selected for each path to the closest bus and the three alternative buses for each of the Cube Yadkin Resources.

22.   Section 206(b) of the FPA provides that upon the filing of a complaint, the Commission must establish a refund effective date that is no earlier than the date of the complaint and no later than five months subsequent to the date of the complaint. In such cases, in order to give maximum protection to customers, and consistent with our precedent, we have historically tended to establish the section 206 refund effective date at the earliest date allowed by section 206, and we do so here as well.[29] That date is March 1, 2019, the date of the complaint.

The Commission orders:

(A)   Pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Energy Regulatory Commission by section 402(a) of the Department of Energy Organization Act and the FPA, particularly section 206 thereof, and pursuant to the Commission's Rules of Practice and Procedure and the regulations under the FPA (18 C.F.R. Chapter I), the Commission hereby institutes paper hearing procedures in Docket No. EL19-51-000, concerning issues raised in the Complaint, as discussed in the body of this order.

(B)   The refund effective date in Docket No. EL19-51-000 established pursuant to section 206 of the FPA shall be March 1, 2019, the date of the Complaint.

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[29] *See, e.g., Idaho Power Co.*, 145 FERC ¶ 61,122 (2013); *Canal Elec. Co.*, 46 FERC ¶ 61,153, *order on reh'g*, 47 FERC ¶ 61,275 (1989).

(C)   PJM is hereby directed to submit the filing discussed in the body of this order, accompanied by documents or affidavits, if necessary, within 30 days of the date of this order. Reply testimony, evidence, and/or argument may be submitted 15 days thereafter, or 45 days from the date of this order, as discussed in the body to this order.

By the Commission. Commissioner McNamee is not participating.

(S E A L)

<div align="center">Kimberly D. Bose,
Secretary.</div>