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March 26, 2018

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E. Room 1A
Washington, D.C. 20426

Re: *Duke Energy Progress, LLC and PJM Interconnection, L.L.C.*
Docket No. ER18-1175-000

Dear Secretary Bose:

Pursuant to Section 205 of the Federal Power Act (“FPA”)¹ and the rules and regulations of the Federal Energy Regulatory Commission (the “Commission” or “FERC”) regulations,² Duke Energy Progress, LLC (“DEP”) and PJM Interconnection, L.L.C. (“PJM”) (collectively, the “Parties”) submit revisions to the *Amended and Restated Joint Operating Agreement Among and Between PJM Interconnection, L.L.C., and Duke Energy Progress, LLC* (the “DEP-PJM JOA”).³ The revisions proposed in this filing align the settlement intervals in the DEP-PJM JOA with the settlement interval revisions to the *PJM Open Access Transmission Tariff* (“PJM OATT”), *Amended and*

¹ 16 U.S.C. § 824d.

² 18 C.F.R. Part 35.

³ Order No. 714, *Electronic Tariff Filings*, 124 FERC ¶ 61,270, 73 Fed. Reg. 57,515 (2008), and section 35.1 of the Commission’s regulations, 18 C.F.R. § 35.1(a), allow multiple public utilities that are parties to the same tariff (e.g., a joint tariff such as the DEP-PJM JOA) to designate one of the public utilities as the designated filer of the joint tariff. The designated filer submits a single tariff filing for inclusion in its database that reflects the joint tariff. PJM is the designated filing party for the DEP-PJM JOA. Therefore, PJM is submitting the DEP-PJM JOA modifications in the instant filing. The designation of PJM as the designated filer for the DEP-PJM JOA is for administrative convenience and in no way shall limit DEP’s filing rights under the FPA as they relate to the DEP-PJM JOA.

Restated Operating Agreement of PJM Interconnection, L.L.C. (“Operating Agreement”), and *Reliability Assurance Agreement Among Load Serving Entities in the PJM Region* (“RAA”) (collectively, “PJM Tariffs”) accepted by the Commission in FERC docket number ER17-775.⁴

The Parties request an effective date of April 1, 2018, for the revisions proposed in this filing and a waiver of the Commission’s prior notice requirements.⁵ As described in section II.A and III below, an effective date of April 1, 2018 is required for the revisions to the DEP-PJM JOA proposed in this filing to avoid a conflict between the five-minute settlement revisions to the PJM Tariffs, which will be effective April 1, 2018, and the hourly settlement revisions in the currently-effective DEP-PJM JOA.

I. BACKGROUND

On January 11, 2017, as amended on August 14, 2017, PJM filed revisions to the PJM Tariffs⁶ pursuant to section 206 of the FPA⁷ to align settlement and dispatch intervals to comply with the requirements of Order No. 825.⁸ The revisions included modifications to the PJM Tariffs that require PJM to stop settling transactions based on

⁴ Order on Compliance Filing, *PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,150 (2018) (“February 21, 2018 Order”).

⁵ See the Parties waiver request *infra* § III.

⁶ *PJM Interconnection, L.L.C.*, Order No. 825 Compliance Filing, FERC Docket No. ER17-775-000, p. 5 (Jan. 11, 2017) (“2017 Compliance Filing”).

⁷ 16 U.S.C. § 824e.

⁸ Order No. 825, *Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 155 FERC ¶ 61,276, 82 Fed. Reg. 46,940 (2016).

the hourly integrated locational marginal price (“LMP”) and begin settling each transaction based on the five-minute LMPs for a transaction interval.⁹

In the 2017 Compliance Filing, PJM explained that revisions to the DEP-PJM JOA would also be required and proposed to submit such revisions in a separate proceeding after the Commission approved the 2017 Compliance Filing.¹⁰ PJM requested that the Commission issue an order approximately ten months prior to the requested effective date of the proposed revisions to the PJM Tariffs to provide PJM with sufficient time to make system changes, coordinate with DEP on proposed revisions to the DEP-PJM JOA, and file with the Commission any proposed revisions to the DEP-PJM JOA required to effectuate five-minute settlement intervals.¹¹ On December 8, 2017, PJM filed a notice informing the Commission that, although it had not yet received an order from the Commission regarding the 2017 Compliance Filing, PJM intended to implement five-minute settlements in its real-time energy and ancillary services markets on April 1, 2018.¹²

On February 21, 2018, the Commission issued an order conditionally accepting the proposed revisions to the PJM Tariffs and granting the PJM-requested effective date of April 1, 2018.¹³ In the February 21, 2018 Order, the Commission recognized that PJM and DEP, in a separate proceeding, would file any changes to the DEP-PJM JOA

⁹ See 2017 Compliance Filing at p.4.

¹⁰ *Id.* at p. 5.

¹¹ *Id.* at pp. 32-33.

¹² *PJM Interconnection, L.L.C.*, Notice of PJM Interconnection L.L.C. Concerning Implementation Date of Five-Minute Settlements, FERC Docket No. ER17-775-000, p. 2 (Dec. 8, 2017).

¹³ Order on Compliance Filing, *PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,150 (2018) (“February 21, 2018 Order”).

necessary to effectuate the settlement interval reforms.¹⁴ PJM and DEP submit this filing to align the DEP-PJM JOA with the settlement interval reforms in the PJM Tariffs.

II. DESCRIPTION OF PROPOSED REVISIONS TO DEP-PJM JOA

A. *Purpose of Proposed DEP-PJM JOA Revisions*

The revisions to the DEP-PJM JOA proposed in this filing are required to avoid a conflict between the five-minute settlement revisions to the PJM Tariffs, which revisions become effective on April 1, 2018, and the hourly settlement revisions in the currently-effective DEP-PJM JOA. Under Article 14 (*Managing Real-Time Congestion*) of the DEP-PJM JOA, the Parties manage interregional congestion across the DEP-PJM interface through dynamic schedule transactions between PJM and DEP.¹⁵ The Parties settle the dynamic schedule transactions and any associated make-whole payments for the dynamic schedule based on hourly integrated values.¹⁶

In contrast, under the five-minute settlement revisions to the PJM Tariffs, PJM will stop settling transactions based on the hourly integrated LMPs and begin settling each transaction based on the five-minute LMPs beginning on April 1, 2018.¹⁷ These revisions will also apply to the sections of the PJM Tariffs that contain PJM's rules pertaining to the pricing and settlement of dynamic schedules used to implement interregional congestion management, such as the DEP-PJM dynamic schedule.¹⁸

¹⁴ *Id.* at P 20.

¹⁵ *See* DEP-PJM JOA, § 14.2.

¹⁶ *Id.* §§ 14.5.3-14.5.5.

¹⁷ *See* 2017 Compliance Filing at p.4.

¹⁸ *See, e.g.*, 2017 Compliance Filing at pp. 4, 8-9 (revising, among other sections of the PJM Tariffs, Operating Agreement, Schedule 1, section 2.6A, and the parallel provisions of PJM OATT, Attachment K-

Therefore, effective April 1, 2018, PJM will begin settling the dynamic schedule transactions provided for under the DEP-PJM JOA based on five-minute intervals despite the conflicting DEP-PJM JOA provisions requiring the DEP-PJM dynamic schedule transactions and any associated make-whole payments to be settled based on hourly integrated LMPs.¹⁹ To avoid this conflict between the PJM Tariffs and DEP-PJM JOA, the Parties propose to revise the DEP-PJM JOA to settle dynamic schedule transactions based on the five-minute LMPs effective April 1, 2018, which date coincides with the effective date of the five-minute settlement revisions to the PJM Tariffs.

B. Revisions to Add Definition for Real-Time Settlement Interval

To reflect the shift to five-minute settlements, PJM and DEP are adding the term *Real-time Settlement Interval* to the DEP-PJM JOA, which means the interval at which PJM will settle real-time transactions (i.e., every five minutes).²⁰ The Parties propose to define *Real-time Settlement Interval* in the DEP-PJM JOA as follows:

“Real-time Settlement Interval” shall mean the interval used by settlements, which shall be every five minutes.

As discussed in the following section, this definition will replace the various hourly interval references in the DEP-PJM JOA to effectuate five-minute settlements for the DEP-PJM dynamic schedule transactions. The Commission accepted the addition of

Appendix—which sections contain PJM’s rules pertaining to the pricing and settlement of dynamic schedules used to implement interregional congestion management, such as the DEP-PJM dynamic schedule—to effectuate five settlement minute-intervals); *see also* DEP-PJM JOA, § 14.5.1 (applying the rules in Operating Agreement, Schedule 1, section 2.6A to the dynamic schedule used by the Parties to manage congestion).

¹⁹ *See* DEP-PJM JOA, §§ 14.5.3-14.5.5 (referencing settlement provisions and intervals as *hours, hourly, 24 hours, or hourly integrated*).

²⁰ Proposed DEP-PJM JOA, § 2.2.32 (*Definitions: Real-time Settlement Interval*).

the identical definition in the revisions to the PJM Tariffs proposed by PJM in the 2017 Compliance Filing.²¹

C. General Revisions to Replace Hourly Settlement References with Five-Minute Settlements

To implement five-minute settlement intervals, the Parties propose to replace applicable references to *hours*, *hourly*, *24 hours*, or *hourly integrated* in the settlement and make-whole provisions of the DEP-PJM JOA with references to *Real-time Settlement Interval* or *Real-time Settlement Intervals* (i.e., five-minute intervals).²² These revisions, which are similar and in some cases identical to the five-minute settlement revisions to the PJM Tariffs accepted by the Commission, are required to change the settlement of the DEP-PJM dynamic schedule transactions from a paradigm that uses hourly values (e.g., an hourly, integrated LMP and hourly megawatt quantities) to one that settles using values determined for every five minutes.²³

The Parties also propose to add language to DEP-PJM JOA explaining that where dollar-per-megawatt hour is used in a calculation, the resulting value must be converted into dollar-per-megawatt interval.²⁴ The purpose of the language is “...to divide the dollar-per-megawatt hour value by the amount of Real-time Settlement Intervals in an hour in the event that there are fewer than twelve Real-time Settlement Intervals within

²¹ See February 21, 2018 Order at PP 11, 43-54.

²² Proposed DEP-PJM JOA, §§ 14.5.3-14.5.5 (*Energy Settlement Process*, et al.).

²³ See 2017 Compliance Filing at pp.4, 8-9.

²⁴ Proposed DEP-PJM JOA, §§ 14.5.4 (*Energy Settlement Process, Calculation of DEP Total Cost/Revenue*).

an hour, which can occur if there are anomalous technical issues.”²⁵ These proposed DEP-PJM JOA revisions are needed for consistency with the nearly identical language and calculations to effectuate five-minute settlements proposed by PJM in the 2017 Compliance Filing²⁶ and accepted by the Commission.²⁷

D. Removal of Criterion Required for Hourly Settlement Process

Under the currently-effective DEP-PJM JOA, DEP is determined to be following PJM’s dispatch signal for an hour, compensated as following PJM’s dispatch signal during for the hour, and compensated for any required make-whole payments if the DEP dynamic schedule is determined to be following PJM dispatch for at least eight five-minute periods in an hour.²⁸ This criterion will not be necessary with five-minute settlements because DEP will be compensated for each five-minute interval, not hourly intervals, obviating the need to determine whether DEP should be compensated for a particular hour. Therefore, the Parties propose to eliminate the “eight five-minute”

²⁵ See 2017 Compliance Filing at p. 9, n.25.

²⁶ See *id.* at p. 9 & n.25 (“To implement this restructuring of PJM’s settlement processes, PJM is making several general changes to its market rules related to accounting and billing for real-time energy and ancillary services. In particular, PJM is:…adding language explaining that where dollar-per-MW hour is used in a calculation the resulting value must be converted into dollar-per-MW interval….See Proposed Operating Agreement, Schedule 1, sections 3.2, 5.1.1, 5.4.2. While there will almost always be twelve Real-time Settlement Intervals within an hour, PJM is proposing to divide the dollar-per-MW-hour value by the amount of Real-time Settlement Intervals in an hour in the event that there are fewer than twelve Real-time Settlement Intervals within an hour, which can occur if there are anomalous technical issues. This approach is similar to ISO-NE’s recently approved approach.” (citation omitted)).

²⁷ See February 21, 2018 Order at P 49 & n.60 (accepting PJM’s proposal to divide the dollar-per-MW-hour value by the amount of Real-time Settlement Intervals in an hour in the event that there are fewer than twelve Real-time Settlement Intervals within an hour and finding “that PJM’s proposed revisions sufficiently specify the division by the number of intervals in the hour.”).

²⁸ DEP-PJM JOA, §§ 14.5.3.

criterion and specify that DEP will be compensated for each real-time settlement interval (i.e., five-minute interval) that DEP's dynamic schedule follows PJM's dispatch signal.²⁹

E. Corporate Name Change and Other Ministerial Revisions

The Parties also propose to revise the DEP-PJM JOA to effectuate a change in DEP's corporate designation and other ministerial revisions. On August 1, 2015, Duke Energy Progress, Inc. converted from a corporation to a limited liability company.³⁰ Therefore, the Parties propose to replace each instance of Duke Energy Progress, Inc. with Duke Energy Progress, LLC in the DEP-PJM JOA.

PJM and DEP also propose the following ministerial revisions:

- i. revisions to DEP's address in the introductory paragraphs;
- ii. revisions to the second recital to specify the two balancing authorities for which DEP is the balancing authority in accordance with 2.1.7 and 2.1.8 of the DEP-PJM JOA; and
- iii. a revision to the sixth recital and the addition of the fifth recital to provide information regarding history of the DEP-PJM JOA, such as prior amendments and FERC Electric Tariff designations;
- iv. replacement of one instance of *operating day* to *calendar day* in section 14.5.3 of the DEP-PJM JOA for consistency with the references to *calendar day* throughout the DEP-PJM JOA;

²⁹ Proposed DEP-PJM JOA, §§ 14.5.3 (*Energy Settlement Process, Make Whole Evaluation*).

³⁰ See, e.g., Order on Rehearing and Clarification, *Duke Energy Progress, Inc.*, 153 FERC ¶ 61,056, fn. 10 (2018) ("...On August 1, 2015, Duke became the limited liability company, Duke Energy Progress, LLC....").

- v. changes to the titles and contact information of the DEP and PJM representatives receiving notice under section 20.11 and executing the agreement; and
- vi. revisions to Appendix B (*Description of Interconnection Facilities*) of the DEP-PJM JOA to revise the list of interconnection facilities.

III. EFFECTIVE DATE AND REQUEST FOR WAIVER OF PRIOR NOTICE REQUIREMENTS

The Parties request a waiver of the Commission's 60-day prior notice requirement to permit an April 1, 2018 effective date for the DEP-PJM JOA revisions proposed in this filing.³¹ In *Central Hudson*, the Commission held that it "...will grant waiver of notice if good cause is shown and the agreement is filed prior to the commencement of service."³²

Waiver is appropriate because the Parties have shown good cause exists to grant the requested waiver (i.e., to avoid a conflict between the five-minute settlement revisions to the PJM Tariffs, which will be effective on April 1, 2018 and the hourly settlement provisions in the currently-effective DEP-PJM JOA) and the filing was made before the commencement of service. Moreover, the revisions proposed herein are predominantly changes that mirror and align with the five-minute revisions to the PJM Tariffs accepted by the Commission in the February 21, 2018 Order.³³

³¹ 18 C.F.R. § 35.3.

³² *Central Hudson Gas & Electric Co.*, 60 FERC ¶ 61,106 (1992), 61,338, reh'g denied, 61 FERC ¶ 61,089 (1992) ("*Central Hudson*").

³³ See §§ II.A-D *supra*.

In addition to avoid a conflict between the settlement provisions in the PJM Tariffs and DEP-PJM JOA, good cause exists because the Parties were required to agree upon and file the DEP-PJM JOA changes on expedited basis and timeframe that made it difficult for the Parties to satisfy the Commission's 60-day prior notice requirements. As discussed above, in the 2017 Compliance Filing, PJM requested that the Commission issue an order approximately ten months prior to the proposed effective date of the proposed tariff revisions in the 2017 Compliance Filing to provide PJM with sufficient time to make system changes, coordinate with DEP on proposed revisions to the DEP-PJM JOA, and file with the Commission any proposed revisions to the DEP-PJM JOA required to effectuate the settlement interval reform.³⁴ However, the Commission issued the order accepting the five-minute interval revisions to the PJM Tariffs on February 21, 2018 with an effective date of April 1, 2018, which provided the Parties approximately one month to agree on and file the revisions to the DEP-PJM JOA.

IV. DOCUMENTS ENCLOSED

The Parties enclose the following documents with this transmittal letter:

1. a redlined version of the Parties' proposed revisions to the DEP-PJM JOA (Attachment A);
2. a clean version of the Parties' proposed revisions to the DEP-PJM JOA (Attachment B) and;
3. a copy of the original signature sheet for the agreement (Attachment C).

³⁴ 2017 Compliance Filing at pp. 32-33.

V. CORRESPONDENCE AND COMMUNICATIONS

Correspondence and communications with respect to this filing should be sent to the following individuals:

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VI. SERVICE

F. DEP Service

DEP has served a copy of this filing on the entities below:

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G. PJM Service

PJM has served a copy of this filing on all PJM Members and on the affected state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,³⁵ 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 Region³⁶ alerting them that this filing has been made by PJM and is available by following such link. If the document is not immediately available by using the referenced link, the document will be available through the referenced link within twenty-four hours of the filing. Also, a copy of this filing will be available on the Commission'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.

³⁵ See 18C.F.R §§ 35.2(e) and 385.2010(f)(3).

³⁶ PJM already maintains, updates, and regularly uses e-mail lists for all PJM members and affected state commissions.

Kimberly D. Bose, Secretary

March 26, 2018

Page 13

VII. CONCLUSION

Wherefore, for the foregoing reasons, the Parties respectfully request that the Commission accept the attached DEP-PJM JOA revisions for filing.

Respectfully submitted,

/s/ Ann L. Warren

Ann L. Warren

Associate General Counsel

Duke Energy Corporation

/s/ James M. Burlew

James M. Burlew

Senior Counsel

PJM Interconnection, L.L.C.

Attachment A

Revisions to the Amended and Restated
Joint Operating Agreement Among and Between
PJM Interconnection, L.L.C. and
Duke Energy Progress, LLC

(Marked / Redline Format)

**AMENDED AND RESTATED
JOINT OPERATING AGREEMENT
AMONG AND BETWEEN
PJM INTERCONNECTION, L.L.C., AND
DUKE ENERGY PROGRESS ~~INC.~~ LLC**

Effective Date: ~~December 3, 2014~~ April 1, 2018

~~Duke Energy Progress, Inc.
FERC Electric Tariff, First Revised Rate Schedule No. 188~~

~~PJM Interconnection, L.L.C.
FERC Electric Tariff, First Revised Rate Schedule No. 50~~

TABLE OF CONTENTS

ARTICLE ONE – RECITALS

ARTICLE TWO – ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

- 2.1 Abbreviations and Acronyms
- 2.2 Definitions
- 2.3 Rules of Construction

ARTICLE THREE – OVERVIEW, ADMINISTRATION, AND RELATIONSHIP WITH OTHER AGREEMENTS

- 3.1 Overview and Scope of this Agreement
- 3.2 Functions of Operating Committee
- 3.3 Ongoing Review and Revisions

ARTICLE FOUR – EXCHANGE OF INFORMATION AND DATA

- 4.1 Exchange of Operating Data
- 4.2 Cost of Data and Information Exchange
- 4.3 Exchange of Information
- 4.4 No Duty to Disclose Confidential Information

ARTICLE FIVE – TTC/ATC/AFT CALCULATIONS

- 5.1 TCC/ATC/AFC Protocols

ARTICLE SIX – [RESERVED]

ARTICLE SEVEN – COORDINATION OF SCHEDULED OUTAGES

- 7.1 Operating Protocols for Coordinating Scheduled Outages

ARTICLE EIGHT – PRINCIPLES CONCERNING JOINT OPERATIONS IN EMERGENCIES

- 8.1 Emergency Operating Principles
- 8.2 Power System Restoration
- 8.3 Operating the Most Conservative Result
- 8.4 Emergency Energy
- 8.5 Costs of Compliance with Emergency Operating Principles and Procedures

ARTICLE NINE – COORDINATED TRANSMISSION PLANNING STUDIES

- 9.1 Scope of Activities
- 9.2 Data and Information Exchange

ARTICLE TEN – JOINT CHECKOUT PROCEDURES

- 10.1 Interchange Scheduling Protocols

ARTICLE ELEVEN – VOLTAGE CONTROL AND REACTIVE POWER COORDINATION

ARTICLE TWELVE – MANAGING PARALLEL FLOW ON THE VACAR/PJM INTERFACE

- 12.1 Schedule of Parties Adopting Local Transmission Loading Relief Procedures
- 12.2 Calculate ATC Value on VACAR/PJM Interface

ARTICLE THIRTEEN – LOSS COMPENSATION PROCESS FOR NON-FIRM POWER FLOWS

ARTICLE FOURTEEN – MANAGING REAL-TIME CONGESTION

- 14.1 Purpose
- 14.2 Dynamic Schedule
- 14.3 Data Exchange
- 14.4 Transmission Reservations
- 14.5 Energy Settlement Process

ARTICLE FIFTEEN – ACCOUNTING AND BILLING

- 15.1 Revenue Distribution
- 15.2 Billing and Invoicing Procedures
- 15.3 Access to Information by the Parties

ARTICLE SIXTEEN – DISPUTE RESOLUTION PROCEDURES

- 16.1 Dispute Resolution Procedures

ARTICLE SEVENTEEN – RETAINED RIGHTS OF PARTIES

- 17.1 Parties Entitled to Act Separately

ARTICLE EIGHTEEN – EFFECTIVE DATE, IMPLEMENTATION, TERM AND TERMINATION

- 18.1 Effective Date; Implementation
- 18.2 Term
- 18.3 Right of a Party to Terminate
- 18.4 Survival
- 18.5 Post-Termination Cooperation

ARTICLE NINETEEN – CONFIDENTIAL INFORMATION

- 19.1 Definition
- 19.2 Protection
- 19.3 Scope
- 19.4 Standard of Care
- 19.5 Required Disclosure
- 19.6 Return of Confidential Information

19.7 Equitable Relief

ARTICLE TWENTY – ADDITIONAL PROVISIONS

- 20.1 Unauthorized Transfer of Third-Party Intellectual Property
- 20.2 Intellectual Property Developed Under This Agreement
- 20.3 Indemnification
- 20.4 Limitation of Liability
- 20.5 Permitted Assignments
- 20.6 Liability to Non-Parties
- 20.7 Force Majeure
- 20.8 Amendment
- 20.9 Headings
- 20.10 Counterparts
- 20.11 Notices
- 20.12 Governing Law
- 20.13 Prior Agreements; Entire Agreement

APPENDIX A – TRANSMISSION LOADING RELIEF AGREEMENT

APPENDIX B – DESCRIPTION OF INTERCONNECTION FACILITIES

AMENDED AND RESTATED
JOINT OPERATING AGREEMENT
AMONG AND BETWEEN
PJM INTERCONNECTION, L.L.C., AND
DUKE ENERGY PROGRESS ~~INC.~~ LLC

This Amended and Restated Joint Operating Agreement (“Agreement”) dated this ~~1st~~^{3rd} day of ~~April~~^{October}, 2014~~18~~, is entered into among and between the following parties:

PJM Interconnection, L.L.C. (“PJM”) a Delaware limited liability company having a place of business at 2750 Monroe Blvd., Audubon, Pennsylvania 19403

Duke Energy Progress-, ~~Inc.~~ LLC (“DEP”), a ~~corporate entity of the state of~~ North Carolina limited liability company having a place of business at ~~411 Fayetteville~~ 410 South Wilmington Street, Raleigh, North Carolina 27601.

ARTICLE ONE - RECITALS

1. PJM is the regional transmission organization that provides operating and reliability functions in portions of the mid-Atlantic and Midwest States. PJM also administers an open access tariff for transmission and related services on its transmission grid, and independently operates markets for day-ahead and real-time energy, and financially firm transmission rights;

2. DEP is a transmission provider that provides operating and reliability functions in the DEPCPLE and CPLW Balancing Authority Areas, and administers its Joint Open Access Transmission Service Guidelines Tariff for open access transmission and related services on its system.

3. PJM and DEP agreed in a settlement agreement entered in a proceeding before the North Carolina Utilities Commission (Docket E-22, sub 418) that the parties would negotiate and conclude a Joint Operating Agreement to address loop flows, Mega Volt-Amperes Reactive (“MVARs”), and other operational matters that materially impact DEP’s system that arise as a consequence of Dominion’s membership with PJM.

4. PJM and DEP entered into a Joint Operating Agreement (“Original JOA”) dated July 27, 2005. The Original JOA was designated as DEP FERC Electric Tariff, Rate Schedule No. 171 and PJM FERC Electric Tariff, Rate Schedule No. 40.

5. PJM and DEP subsequently entered into a revised JOA dated February 2, 2010 (“First Revised JOA”), and thereafter entered in a further revised JOA dated December 3, 2014, which was designated by DEP as DEP Rate Schedule No. 188 and by PJM as PJM Rate Schedule No. 50, DEP-PJM JOA filed in its Interregional Agreements database of its FERC FPA Electric Tariff (“Second Revised JOA”).

6. PJM and DEP mutually desire to amend and restate the Second Revised JOA in order to improve reliability and efficiency of system operations by adding provisions addressing the mitigation and management of congestion on facilities that are impacted by both systems.

7. In accordance with Good Utility Practice, NERC and Regional Reliability Standards, the Parties seek to establish or confirm other arrangements and protocols in furtherance of the reliability of their systems, and in compliance with all applicable reliability standards, as provided under the terms and conditions of this Agreement.

NOW, THEREFORE, for good and valuable consideration including the Parties’ mutual reliance upon the covenants contained herein, the Parties agree as follows:

2.2 Definitions.

Any undefined, capitalized term used in this Agreement that is not defined in this Section shall have the meaning given in the preamble of this Agreement, and if not defined in the preamble, shall have the meaning given under industry custom, and where applicable, in accordance with Good Utility Practice.

2.2.1 – a & b multipliers

“a & b multipliers” shall mean the multipliers that are applied to TRM in the planning horizon and in the operating horizon to determine non-firm AFC/ATC. The “a” multiplier is applied to TRM in the planning horizon to determine non-firm AFC/ATC. The “b” multiplier is applied to TRM in the operating horizon to determine non-firm AFC/ATC. The “a & b” multipliers can vary between 0 and 1, inclusive. They are determined by individual transmission providers based on network reliability considerations.

2.2.2 – Agreement

“Agreement” shall have the meaning stated in the preamble.

2.2.3 – Available Flowgate Capability

“Available Flowgate Capability” shall have the meaning stated in Section 5.1.7.1.

2.2.4 – Available Flowgate Rating

“Available Flowgate Rating” shall mean the maximum amount of power that can flow across the applicable interface without overloading (either on an actual or contingency basis) any element of the Flowgate. The Flowgate rating is in units of megawatts. If the Flowgate is voltage or stability limited, a megawatt proxy is determined to ensure adequate voltages and stability condition.

2.2.5 – Available Transfer Capability

“Available Transfer Capability” shall mean the Total Transfer Capability less the projected loading across the interface, less TRM and CBM.

2.2.5a – Balancing Authority

“Balancing Authority” shall refer to the responsible entity that integrates resources plans ahead of time, maintain load-interchange –generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time. The term “Balancing Authority” as used herein is intended to be consistent with the definition as set forth in the NERC Glossary of Terms Used in Reliability Standards published on February 12, 2008.

2.2.5b – Balancing Authority Area

“Balancing Authority Area” shall mean the collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The term “Balancing Authority Area” as used herein is intended to be consistent with the definition as set forth in the NERC Glossary of Terms Used in Reliability Standards published on February 12, 2008.

2.2.6 – Balancing Operating Reserves

"Balancing Operating Reserves" shall mean the charges and credits to resources operating at the direction of PJM in real time as described in Section 3.2.3 of Schedule 1 of the PJM Operating Agreement.

2.2.7 – Confidential Information

“Confidential Information” shall have the meaning stated in Section 19.1.

2.2.8 – Congestion Management Process

“Congestion Management Process” means a Congestion Management Process mutually agreed upon by both Parties that may be amended, revised, or restated from time to time.

2.2.9 – [Reserved]

[Reserved]

2.2.10 – Coordinated Operations

“Coordinated Operations” means all activities that will be undertaken by the Parties pursuant to this Agreement.

2.2.11 – Designated Network Resource

“Designated Network Resource” shall mean a firm MW resource delivered over a firm transmission path designated for serving network/ native load.

2.2.12 – Duke

"Duke" shall mean the system of the Duke Energy Carolinas, [LLC](#).

2.2.13 – Dynamic Interchange Schedule Tag

"Dynamic Interchange Schedule Tag" shall mean the tag associated with the dynamic interchange schedule that is adjusted to the actual hourly integrated energy.

2.2.14 – Dynamic Schedule

"Dynamic Schedule" shall mean an interchange transaction for which the megawatt quantity of exchanged energy has the potential to be adjusted on a greater frequency than the standard quarter-hour intervals and for which the MW Quantity is typically transmitted electronically.

2.2.15 – Effective Date

"Effective Date" shall have the meaning stated in Section 18.1.

2.2.16 – Existing Business

"Existing Business" shall mean the transmission commitments on a respective transmission provider's system at the time an ATC calculation is conducted.

2.2.17- - Flowgate

"Flowgate" shall mean a representative modeling of facilities or groups of facilities that may act as potential constraint points on the regional system.

2.2.18 – Flow Percentages

"Flow Percentages" shall have the meaning Section 12.3 of the Agreement.

2.2.19 – Good Utility Practice

"Good Utility Practice" shall mean any of the practices, methods, and acts engaged in or approved of by a majority of the electric utility industry during the relevant time period, or any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, and acts generally accepted in the region.

2.2.20 – Governmental Authority

"Governmental Authority" shall mean any federal, state, regional, local, or foreign court, tribunal, government, governmental agency, military, governmental or regulatory body (including any stock exchange, automated quotation system, or

self-regulatory body), or authority over the transmission and/or generation facilities of a Party or the Parties.

2.2.21 – Intellectual Property

“Intellectual Property” shall mean (i) ideas, designs, concepts, techniques, inventions, discoveries, or improvements, regardless of patentability, including without limitation patents, patent applications, mask works, trade secrets, and know-how; (ii) works of authorship, regardless of copyright ability, including copyrights, and any moral rights recognized by law; and (iii) any other similar rights, in each case on a worldwide basis.

2.2.22 – Interconnected Reliability Operating Limit

“Interconnected Reliability Operating Limit” shall mean the value (such as MW, MVAR, Amperes, Frequency, or Volts) derived from, or a subset of, the System Operating Limits, which if exceeded, could expose a widespread area of the bulk electrical system to instability, uncontrolled separation(s) or cascading outages.

2.2.23 – Market Based Operating Entity

“Market-Based Operating Entity” shall mean an Operating Entity that operates a security constrained, bid-based economic dispatch bounded by a clearly defined market area.

2.2.24 – Market Flows

“Market Flows” shall mean the calculated energy flows on a specified Flowgate as a result of dispatch of generating resources within a Market Based Operating Entity’s market (excluding tagged transactions).

2.2.25 – NERC and Regional Reliability Standards

“NERC and Regional Reliability Standards” shall refer to the reliability standards developed by NERC and the applicable Regional Reliability Organization, and adopted by the Federal Energy Regulatory Commission as mandatory and enforceable.

2.2.26 – Network Upgrades

“Network Upgrades” shall mean those facilities located beyond the point of interconnection of a generating facility to the transmission grid.

2.2.27 – Notice

“Notice” shall have the meaning stated in Section 20.11.

2.2.28 – Operating Committee

“Operating Committee” shall have the meaning stated in Article 3.

2.2.29 – Operating Entity

“Operating Entity” shall mean an entity that operates and controls a portion of the bulk transmission system with the goal of ensuring reliable energy interchange between generators, loads, and other operating entities.

2.2.30 – Party or Parties

“Party” or “Parties” refers to each party to this Agreement or all, as applicable.

2.2.31 – PJM Mid-Atlantic

"PJM Mid-Atlantic" shall mean the mid-Atlantic region of PJM that consists of the systems of the original members of the PJM power pool.

2.2.32 – ~~Reserved~~ Real-time Settlement Interval

~~Reserved~~ “Real-time Settlement Interval” shall mean the interval used by settlements, which shall be every five minutes.

2.2.33 – RCF Base Usage

“RCF Base Usage” shall mean the long-term firm and network service usage of RCFs.

2.2.34 – Region

“Region” shall mean the Balancing Authorities and transmission facilities with respect to which a Party serves as a transmission provider or Reliability Coordinator under NERC policies and procedures.

2.2.35 – Regional Reliability Organization

“Regional Reliability Organization” shall mean, with respect to a Balancing Authority, an entity approved by NERC to be responsible for reliability for one or more Balancing Authorities, and which has undertaken such responsibility for the applicable Balancing Authority.

2.2.36 – SCADA Data

“SCADA Data” shall mean the electric system security data that is used to monitor the electrical state of facilities, as specified in NERC policies and procedures.

2.2.37 – Scheduled Outages

“Scheduled Outages” shall mean the planned unavailability of transmission and/or generation facilities dispatched by a Party, as described in Article Seven of this Agreement, and do not include forced or other unplanned outages.

2.2.38 – SERC East RFC Working Group

"SERC East-RFC Working Group" shall mean the working group consisting of representatives from utilities located in the SERC reliability region and the eastern portion of the Reliability First Corporation reliability region.

2.2.39 – System Operating Limit

“System Operating Limit” shall mean the value (such as MW, MVAR, Amperes, Frequency, or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

2.2.40 Third Party

“Third Party” refers to any entity other than a Party to this Agreement.

2.2.41 – Total Transfer Capability

“Total Transfer Capability” shall mean the amount of electric energy that can be transferred over applicable transmission facilities in a reliable manner, generally the applicable rating of the applicable transmission facility.

2.2.42 – Transmission Reliability Margin

“Transmission Reliability Margin” shall mean that amount of transmission transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.

2.2.43 – VACAR/PJM Interface

"VACAR/PJM Interface" shall mean the transmission capability between PJM and the VACAR region of SERC.

2.2.44 – VACAR South

“VACAR South” shall mean the VACAR companies that are not located in the PJM BA area.

2.2.45 – Voltage and Reactive Power Coordination Procedures

“Voltage and Reactive Power Coordination Procedures” shall have the meaning given under Article Eleven.

14.5.3 Make Whole Evaluation.

~~Hours~~Real-time Settlement Intervals for which PJM determines that DEP is responding to the dynamic pricing signal will be included in a make-whole evaluation. All references in the following section to “all ~~hours~~ Real-time Settlement Intervals” of a calendar day refer to those ~~hours~~ Real-time Settlement Intervals for which PJM determines that DEP was responding to the dynamic pricing signal. The make-whole evaluation will be conducted separately for the ~~hourly-integrated~~ import and export transactions for each Real-time Settlement Interval, and each will be based on a total ~~of~~ all ~~hours~~ Real-time Settlement Intervals of the same calendar day. The make-whole evaluation shall be conducted in the following manner:

For each ~~hour~~ Real-time Settlement Interval of the ~~operating~~ calendar day, PJM will determine whether the DEP Dynamic Schedule is following PJM pricing signals and, therefore, whether that ~~hour~~ Real-time Settlement Interval should be included in the daily make-whole calculations. To make this determination, PJM will compare the real-time, 5-minute incremental cost for the DEP generation fleet to increase or decrease the applicable 5-minute real-time LMP as calculated by PJM, and the current and previous values of the DEP Dynamic Schedule and apply the explicit metrics detailed below for this determination. In general, PJM will validate that the value of the DEP Dynamic Schedule moves in accordance with the applicable 5-minute LMP prices and the real-time costs determined by DEP. If the LMP exceeds the incremental cost for DEP generation to increase, PJM will verify that the increase in the 5-minute value of the Dynamic Schedule for the period where the LMP exceeds the DEP cost to increase generation is at least 90% of the real-time capability for DEP generation to increase. If the LMP is less than the incremental costs for DEP generation to decrease, PJM will verify that the decrease in the 5-minute value of the Dynamic Schedule for the period where the LMP is less than the DEP cost to decrease generation is at least 90% of the real-time capability for DEP generation to decrease. If the 5-minute LMP is between the 5-minute incremental cost for DEP to increase or decrease generation, PJM will verify that the change in the Dynamic Schedule value did not exceed 10% of the previous 5-minute value.

The DEP Dynamic Schedule will be determined to be following dispatch for a 5-minute period if any of the following criteria are met:

- If $LMP_{t_0} > \text{DEP cost to increase}_{t_0}$ and $(\text{DEP dynamic schedule value}_{t+1} - \text{DEP dynamic schedule value}_{t_0}) \geq 90\% * \text{DEP real-time capability to increase generation}_{t_0}$, or,
- If $LMP_{t_0} < \text{DEP cost to decrease}_{t_0}$ and $(\text{DEP dynamic schedule value}_{t_0} - \text{DEP dynamic schedule value}_{t+1}) \geq 90\% * \text{DEP real-time capability to decrease generation}_{t_0}$, or,

- If **DEP cost to decrease**_{t0} <= **LMP**_{t0} <= **DEP cost to increase**_{t0} and **90% * DEP dynamic schedule value**_{t-1} <= **DEP dynamic schedule value**_{t0} <= **110% * DEP dynamic schedule value**_{t-1}.

Where,

*LMP*_{t0}: the applicable 5-minute Locational Marginal Price calculated by PJM at time t0

*DEP cost to increase*_{t0}: The 5-minute incremental cost for DEP generation to increase at time t0

*DEP cost to decrease*_{t0}: The 5-minute incremental cost for DEP generation to decrease at time t0

*DEP real-time capability to increase generation*_{t0}: The 5-minute capability for DEP to increase generation as telemetered from DEP to PJM at time t0.

*DEP real-time capability to decrease generation*_{t0}: The 5-minute capability for DEP to decrease generation as telemetered from DEP to PJM at time t0.

*DEP dynamic schedule value*_{t+1}: The 5-minute integrated DEP dynamic schedule value at time t+1

*DEP dynamic schedule value*_{t0}: The 5-minute integrated DEP dynamic schedule value at time t0

*DEP dynamic schedule value*_{t-1}: The 5-minute integrated DEP dynamic schedule value at time t-1

If the DEP dynamic schedule is determined to be following PJM dispatch for ~~at least eight 5 minute periods in an hour, it will be considered as following dispatch for the hour and the hour~~ Real-time Settlement Interval, the Real-time Settlement Interval will be included in the make-whole calculations for the calendar day.

14.5.4 Calculation of DEP Total Cost/Revenue.

If a dollar-per-MW hour value is applied in a calculation under this section 14.5.4 and 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.

14.5.4.1 Import Transaction (DEP to PJM). For the import transaction, PJM will calculate the total revenue earned by DEP by multiplying the ~~hourly integrated~~ value of the applicable Real-time Settlement Interval LMP by the ~~hourly integrated associated~~ MW value of the import transaction for each ~~hour~~ Real-time Settlement Interval and summing for all ~~all hours~~ Real-time Settlement Intervals of a calendar day. PJM will calculate the DEP cost of providing the import transaction by multiplying the ~~hourly integrated~~ value of the DEP incremental cost for each ~~hour by the hourly integrated~~ Real-time Settlement Interval by the associated MW value of the import transaction for each ~~hour~~ Real-time Settlement Interval and summing for all ~~hours~~ Real-time Settlement Intervals of the same calendar day. If the total cost for all ~~hours~~ Real-time Settlement Intervals exceeds the total revenue for all ~~all hours~~ Real-time Settlement Intervals, PJM will make DEP whole for the difference through Balancing Operating Reserves. The DEP cost is based on incremental cost (fuel plus O&M) of the units that provide the power to support the transaction plus the cost of delivering the power to the PJM interface.

14.5.4.2 Export Transaction (PJM to DEP). For the export transaction, PJM will calculate the total cost incurred by DEP by multiplying the ~~hourly integrated~~ value of the applicable Real-time Settlement Interval LMP by the ~~hourly integrated associated~~ MW value of the export transaction for each ~~hour~~ Real-time Settlement Interval and summing for all ~~24 hours~~ Real-time Settlement Intervals of a calendar day. PJM will calculate the DEP avoided cost of receiving the export transaction by multiplying the ~~hourly integrated~~ value of the DEP decremental cost for each ~~hour~~ Real-time Settlement Interval by the hourly integrated MW value of the export transaction for each hour and summing for all ~~24 hours~~ Real-time Settlement Intervals of the same calendar day. If the total cost incurred by DEP for all Real-time Settlement Intervals exceeds the total avoided cost for ~~the entire 24-hour period~~ all Real-time Settlement Intervals, PJM will make DEP whole for the difference through Balancing Operating Reserves. The DEP avoided cost is based on the decremental cost savings of the units that reduced generation to support the transaction minus any DEP cost to receive the transaction.

14.5.5 Re-evaluation of Make Whole Settlement.

The make-whole evaluation will be conducted based on the actual DEP cost, not on a market bid price. If the make-whole evaluation settlement is used for over 10% of the ~~hours~~ Real-time Settlement Intervals that DEP is responding correctly to relieve PJM congestion, the settlement process will be reevaluated to determine if changes to the process are required to provide equitable compensation for the congestion relief provided.

20.11 Notices.

A notice (“Notice”) shall be effective only if in writing and delivered by: hand; reputable overnight courier; United States mail; or ~~telefacsimile. Electronic mail is not effective Notice.~~ Notice shall be deemed to have been given: (a) when delivered to the recipient by hand, overnight courier, or ~~telefacsimile or email~~ (b) if delivered by United States mail, on the postmark date. Notice shall be addressed as follows:

PJM: ~~Michael J. Kormos~~ Frederick Bresler III
~~Executive Vice President, Operations~~ Senior Vice President,
Operations and Markets

PJM Interconnection, L.L.C.

2750 Monroe Blvd.

Audubon, PA 19403

Tel: (610) 666-~~4377~~8249

~~Fax: (610) 666-4281~~ Email: Stu.Bresler@pjm.com

DEP: ~~Caren Anders~~ V. Nelson Peeler

Senior Vice President and Chief Transmission Officer

Duke Energy Progress, ~~Inc.~~ LLC

~~411 Fayetteville Street~~ 526 S. Church Street (EC3XP)

~~Raleigh, NC 27601~~ Charlotte, NC 28202

Tel: (919) 546-7497 (704) 382-3851

~~Fax: (919) 546-7175~~ Email: nelson.peeler@duke-energy.com

A Party may change its designated recipient of Notices, or its address, from time to time, by giving Notice of such change.

20.13 Prior Agreements; Entire Agreement.

Except for the settlement agreement entered into by the Parties in North Carolina Utilities Commission Docket No. E-22, Sub 418, all prior agreements by or among all the Parties relating to the matters contemplated by this Agreement, whether written or oral, are superseded by this Agreement, and shall be of no further force or effect.

This Agreement shall not be interpreted or construed as affecting, rescinding or amending any existing agreement between Dominion Resources and DEP.

| DUKE ENERGY PROGRESS, ~~INC~~.LLC
By:

| /s/ ~~Caren Anders Nelson Peeler~~
Caren Anders Nelson Peeler
Senior Vice President and Chief Transmission Officer

PJM INTERCONNECTION, L.L.C.
By:

| /s/ ~~Michael J. Kormos~~Frederick Bresler III
Michael J. KormosFrederick Bresler III
ExecutiveSenior Vice President, Operations and Markets

APPENDIX B

Description of Interconnection Facilities

The DEP-PJM interconnection contains twelve (12) alternating current interconnection facilities, including one (1) alternating current pseudo-tie. These are tabulated below:

PJM Interconnection Facility	DEP Interconnection Facility	Transmission Line Identifier	Transmission Line Voltage (Kilovolts)	Common Meter Point
East Danville	Roxboro	Not Applicable	230	East Danville
East Danville	Concord	Not Applicable	230	East Danville
Nagel	Cane River	Not Applicable	230	Nagel
Sullivan Gardens	Walters	Not Applicable	138	Sullivan Gardens
Battleboro	Rocky Mount	123	115	Rocky Mount
Edgecombe <u>Hathaway West</u>	Rocky Mount	2058	230	Rocky Mount
Hornertown (Nash) <u>Hathaway East</u>	Rocky Mount	2056 <u>2181</u>	230	City of Rocky Mount POD #4
Carson <u>Heritage</u>	Wake	570	500	Carson <u>Heritage</u>
Halifax <u>Sedge Hill</u>	Person	296B	230	Halifax <u>Sedge Hill</u>
Kerr Dam	Henderson	45	115	Kerr Dam
Everetts	Greenville	218	230	Greenville
Littleton D.P. (Pseudo Tie)	Not Applicable	Not Applicable	115	Littleton D.P.
Not Applicable	Hamlet (Pseudo-Tie)	Not Applicable	230	Hamlet

Attachment B

Revisions to the Amended and Restated
Joint Operating Agreement Among and Between
PJM Interconnection, L.L.C. and
Duke Energy Progress, LLC

(Clean Format)

**AMENDED AND RESTATED
JOINT OPERATING AGREEMENT
AMONG AND BETWEEN
PJM INTERCONNECTION, L.L.C., AND
DUKE ENERGY PROGRESS , LLC**

Effective Date: April 1, 2018

TABLE OF CONTENTS

ARTICLE ONE – RECITALS

ARTICLE TWO – ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

- 2.1 Abbreviations and Acronyms
- 2.2 Definitions
- 2.3 Rules of Construction

ARTICLE THREE – OVERVIEW, ADMINISTRATION, AND RELATIONSHIP WITH OTHER AGREEMENTS

- 3.1 Overview and Scope of this Agreement
- 3.2 Functions of Operating Committee
- 3.3 Ongoing Review and Revisions

ARTICLE FOUR – EXCHANGE OF INFORMATION AND DATA

- 4.1 Exchange of Operating Data
- 4.2 Cost of Data and Information Exchange
- 4.3 Exchange of Information
- 4.4 No Duty to Disclose Confidential Information

ARTICLE FIVE – TTC/ATC/AFT CALCULATIONS

- 5.1 TCC/ATC/AFC Protocols

ARTICLE SIX – [RESERVED]

ARTICLE SEVEN – COORDINATION OF SCHEDULED OUTAGES

- 7.1 Operating Protocols for Coordinating Scheduled Outages

ARTICLE EIGHT – PRINCIPLES CONCERNING JOINT OPERATIONS IN EMERGENCIES

- 8.1 Emergency Operating Principles
- 8.2 Power System Restoration
- 8.3 Operating the Most Conservative Result
- 8.4 Emergency Energy
- 8.5 Costs of Compliance with Emergency Operating Principles and Procedures

ARTICLE NINE – COORDINATED TRANSMISSION PLANNING STUDIES

- 9.1 Scope of Activities
- 9.2 Data and Information Exchange

ARTICLE TEN – JOINT CHECKOUT PROCEDURES

- 10.1 Interchange Scheduling Protocols

ARTICLE ELEVEN – VOLTAGE CONTROL AND REACTIVE POWER COORDINATION

ARTICLE TWELVE – MANAGING PARALLEL FLOW ON THE VACAR/PJM INTERFACE

- 12.1 Schedule of Parties Adopting Local Transmission Loading Relief Procedures
- 12.2 Calculate ATC Value on VACAR/PJM Interface

ARTICLE THIRTEEN – LOSS COMPENSATION PROCESS FOR NON-FIRM POWER FLOWS

ARTICLE FOURTEEN – MANAGING REAL-TIME CONGESTION

- 14.1 Purpose
- 14.2 Dynamic Schedule
- 14.3 Data Exchange
- 14.4 Transmission Reservations
- 14.5 Energy Settlement Process

ARTICLE FIFTEEN – ACCOUNTING AND BILLING

- 15.1 Revenue Distribution
- 15.2 Billing and Invoicing Procedures
- 15.3 Access to Information by the Parties

ARTICLE SIXTEEN – DISPUTE RESOLUTION PROCEDURES

- 16.1 Dispute Resolution Procedures

ARTICLE SEVENTEEN – RETAINED RIGHTS OF PARTIES

- 17.1 Parties Entitled to Act Separately

ARTICLE EIGHTEEN – EFFECTIVE DATE, IMPLEMENTATION, TERM AND TERMINATION

- 18.1 Effective Date; Implementation
- 18.2 Term
- 18.3 Right of a Party to Terminate
- 18.4 Survival
- 18.5 Post-Termination Cooperation

ARTICLE NINETEEN – CONFIDENTIAL INFORMATION

- 19.1 Definition
- 19.2 Protection
- 19.3 Scope
- 19.4 Standard of Care
- 19.5 Required Disclosure
- 19.6 Return of Confidential Information
- 19.7 Equitable Relief

ARTICLE TWENTY – ADDITIONAL PROVISIONS

- 20.1 Unauthorized Transfer of Third-Party Intellectual Property
- 20.2 Intellectual Property Developed Under This Agreement

- 20.3 Indemnification
- 20.4 Limitation of Liability
- 20.5 Permitted Assignments
- 20.6 Liability to Non-Parties
- 20.7 Force Majeure
- 20.8 Amendment
- 20.9 Headings
- 20.10 Counterparts
- 20.11 Notices
- 20.12 Governing Law
- 20.13 Prior Agreements; Entire Agreement

APPENDIX A – TRANSMISSION LOADING RELIEF AGREEMENT

APPENDIX B – DESCRIPTION OF INTERCONNECTION FACILITIES

**AMENDED AND RESTATED
JOINT OPERATING AGREEMENT
AMONG AND BETWEEN
PJM INTERCONNECTION, L.L.C., AND
DUKE ENERGY PROGRESS, LLC**

This Amended and Restated Joint Operating Agreement (“Agreement”) dated this 1st day of April, 2018, is entered into among and between the following parties:

PJM Interconnection, L.L.C. (“PJM”) a Delaware limited liability company having a place of business at 2750 Monroe Blvd., Audubon, Pennsylvania 19403

Duke Energy Progress, LLC (“DEP”), a North Carolina limited liability company having a place of business at 410 South Wilmington Street, Raleigh, North Carolina 27601.

**ARTICLE ONE -
RECITALS**

1. PJM is the regional transmission organization that provides operating and reliability functions in portions of the mid-Atlantic and Midwest States. PJM also administers an open access tariff for transmission and related services on its transmission grid, and independently operates markets for day-ahead and real-time energy, and financially firm transmission rights;

2. DEP is a transmission provider that provides operating and reliability functions in the CPLE and CPLW Balancing Authority Areas, and administers its Joint Open Access Transmission Tariff for open access transmission and related services on its system.

3. PJM and DEP agreed in a settlement agreement entered in a proceeding before the North Carolina Utilities Commission (Docket E-22, sub 418) that the parties would negotiate and conclude a Joint Operating Agreement to address loop flows, Mega Volt-Amperes Reactive (“MVARs”), and other operational matters that materially impact DEP’s system that arise as a consequence of Dominion’s membership with PJM.

4. PJM and DEP entered into a Joint Operating Agreement (“Original JOA”) dated July 27, 2005. The Original JOA was designated as DEP FERC Electric Tariff, Rate Schedule No. 171 and PJM FERC Electric Tariff, Rate Schedule No. 40.

5. PJM and DEP subsequently entered into a revised JOA dated February 2, 2010 (“First Revised JOA”), and thereafter entered in a further revised JOA dated December 3, 2014, which was designated by DEP as DEP Rate Schedule No. 188 and by PJM as PJM Rate Schedule No. 50, DEP-PJM JOA filed in its Interregional Agreements database of its FERC FPA Electric Tariff (“Second Revised JOA”).

6. PJM and DEP mutually desire to amend and restate the Second Revised JOA in order to improve reliability and efficiency of system operations by adding provisions addressing the mitigation and management of congestion on facilities that are impacted by both systems.

7. In accordance with Good Utility Practice, NERC and Regional Reliability Standards, the Parties seek to establish or confirm other arrangements and protocols in furtherance of the reliability of their systems, and in compliance with all applicable reliability standards, as provided under the terms and conditions of this Agreement.

NOW, THEREFORE, for good and valuable consideration including the Parties’ mutual reliance upon the covenants contained herein, the Parties agree as follows:

2.2 Definitions.

Any undefined, capitalized term used in this Agreement that is not defined in this Section shall have the meaning given in the preamble of this Agreement, and if not defined in the preamble, shall have the meaning given under industry custom, and where applicable, in accordance with Good Utility Practice.

2.2.1 – a & b multipliers

“a & b multipliers” shall mean the multipliers that are applied to TRM in the planning horizon and in the operating horizon to determine non-firm AFC/ATC. The “a” multiplier is applied to TRM in the planning horizon to determine non-firm AFC/ATC. The “b” multiplier is applied to TRM in the operating horizon to determine non-firm AFC/ATC. The “a & b” multipliers can vary between 0 and 1, inclusive. They are determined by individual transmission providers based on network reliability considerations.

2.2.2 – Agreement

“Agreement” shall have the meaning stated in the preamble.

2.2.3 – Available Flowgate Capability

“Available Flowgate Capability” shall have the meaning stated in Section 5.1.7.1.

2.2.4 – Available Flowgate Rating

“Available Flowgate Rating” shall mean the maximum amount of power that can flow across the applicable interface without overloading (either on an actual or contingency basis) any element of the Flowgate. The Flowgate rating is in units of megawatts. If the Flowgate is voltage or stability limited, a megawatt proxy is determined to ensure adequate voltages and stability condition.

2.2.5 – Available Transfer Capability

“Available Transfer Capability” shall mean the Total Transfer Capability less the projected loading across the interface, less TRM and CBM.

2.2.5a – Balancing Authority

“Balancing Authority” shall refer to the responsible entity that integrates resources plans ahead of time, maintain load-interchange –generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time. The term “Balancing Authority” as used herein is intended to be consistent with the definition as set forth in the NERC Glossary of Terms Used in Reliability Standards published on February 12, 2008.

2.2.5b – Balancing Authority Area

“Balancing Authority Area” shall mean the collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The term “Balancing Authority Area” as used herein is intended to be consistent with the definition as set forth in the NERC Glossary of Terms Used in Reliability Standards published on February 12, 2008.

2.2.6 – Balancing Operating Reserves

"Balancing Operating Reserves" shall mean the charges and credits to resources operating at the direction of PJM in real time as described in Section 3.2.3 of Schedule 1 of the PJM Operating Agreement.

2.2.7 – Confidential Information

“Confidential Information” shall have the meaning stated in Section 19.1.

2.2.8 – Congestion Management Process

“Congestion Management Process” means a Congestion Management Process mutually agreed upon by both Parties that may be amended, revised, or restated from time to time.

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[Reserved]

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"Duke" shall mean the system of the Duke Energy Carolinas, LLC.

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"Effective Date" shall have the meaning stated in Section 18.1.

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"Existing Business" shall mean the transmission commitments on a respective transmission provider's system at the time an ATC calculation is conducted.

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"Flowgate" shall mean a representative modeling of facilities or groups of facilities that may act as potential constraint points on the regional system.

2.2.18 – Flow Percentages

"Flow Percentages" shall have the meaning Section 12.3 of the Agreement.

2.2.19 – Good Utility Practice

"Good Utility Practice" shall mean any of the practices, methods, and acts engaged in or approved of by a majority of the electric utility industry during the relevant time period, or any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety, and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, and acts generally accepted in the region.

2.2.20 – Governmental Authority

"Governmental Authority" shall mean any federal, state, regional, local, or foreign court, tribunal, government, governmental agency, military, governmental or regulatory body (including any stock exchange, automated quotation system, or

self-regulatory body), or authority over the transmission and/or generation facilities of a Party or the Parties.

2.2.21 – Intellectual Property

“Intellectual Property” shall mean (i) ideas, designs, concepts, techniques, inventions, discoveries, or improvements, regardless of patentability, including without limitation patents, patent applications, mask works, trade secrets, and know-how; (ii) works of authorship, regardless of copyright ability, including copyrights, and any moral rights recognized by law; and (iii) any other similar rights, in each case on a worldwide basis.

2.2.22 – Interconnected Reliability Operating Limit

“Interconnected Reliability Operating Limit” shall mean the value (such as MW, MVAR, Amperes, Frequency, or Volts) derived from, or a subset of, the System Operating Limits, which if exceeded, could expose a widespread area of the bulk electrical system to instability, uncontrolled separation(s) or cascading outages.

2.2.23 – Market Based Operating Entity

“Market-Based Operating Entity” shall mean an Operating Entity that operates a security constrained, bid-based economic dispatch bounded by a clearly defined market area.

2.2.24 – Market Flows

“Market Flows” shall mean the calculated energy flows on a specified Flowgate as a result of dispatch of generating resources within a Market Based Operating Entity’s market (excluding tagged transactions).

2.2.25 – NERC and Regional Reliability Standards

“NERC and Regional Reliability Standards” shall refer to the reliability standards developed by NERC and the applicable Regional Reliability Organization, and adopted by the Federal Energy Regulatory Commission as mandatory and enforceable.

2.2.26 – Network Upgrades

“Network Upgrades” shall mean those facilities located beyond the point of interconnection of a generating facility to the transmission grid.

2.2.27 – Notice

“Notice” shall have the meaning stated in Section 20.11.

2.2.28 – Operating Committee

“Operating Committee” shall have the meaning stated in Article 3.

2.2.29 – Operating Entity

“Operating Entity” shall mean an entity that operates and controls a portion of the bulk transmission system with the goal of ensuring reliable energy interchange between generators, loads, and other operating entities.

2.2.30 – Party or Parties

“Party” or “Parties” refers to each party to this Agreement or all, as applicable.

2.2.31 – PJM Mid-Atlantic

"PJM Mid-Atlantic" shall mean the mid-Atlantic region of PJM that consists of the systems of the original members of the PJM power pool.

2.2.32 – Real-time Settlement Interval

”Real-time Settlement Interval” shall mean the interval used by settlements, which shall be every five minutes.

2.2.33 – RCF Base Usage

“RCF Base Usage” shall mean the long-term firm and network service usage of RCFs.

2.2.34 – Region

“Region” shall mean the Balancing Authorities and transmission facilities with respect to which a Party serves as a transmission provider or Reliability Coordinator under NERC policies and procedures.

2.2.35 – Regional Reliability Organization

“Regional Reliability Organization” shall mean, with respect to a Balancing Authority, an entity approved by NERC to be responsible for reliability for one or more Balancing Authorities, and which has undertaken such responsibility for the applicable Balancing Authority.

2.2.36 – SCADA Data

“SCADA Data” shall mean the electric system security data that is used to monitor the electrical state of facilities, as specified in NERC policies and procedures.

2.2.37 – Scheduled Outages

“Scheduled Outages” shall mean the planned unavailability of transmission and/or generation facilities dispatched by a Party, as described in Article Seven of this Agreement, and do not include forced or other unplanned outages.

2.2.38 – SERC East RFC Working Group

"SERC East-RFC Working Group" shall mean the working group consisting of representatives from utilities located in the SERC reliability region and the eastern portion of the Reliability First Corporation reliability region.

2.2.39 – System Operating Limit

“System Operating Limit” shall mean the value (such as MW, MVAR, Amperes, Frequency, or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

2.2.40 Third Party

“Third Party” refers to any entity other than a Party to this Agreement.

2.2.41 – Total Transfer Capability

“Total Transfer Capability” shall mean the amount of electric energy that can be transferred over applicable transmission facilities in a reliable manner, generally the applicable rating of the applicable transmission facility.

2.2.42 – Transmission Reliability Margin

“Transmission Reliability Margin” shall mean that amount of transmission transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.

2.2.43 – VACAR/PJM Interface

"VACAR/PJM Interface" shall mean the transmission capability between PJM and the VACAR region of SERC.

2.2.44 – VACAR South

“VACAR South” shall mean the VACAR companies that are not located in the PJM BA area.

2.2.45 – Voltage and Reactive Power Coordination Procedures

“Voltage and Reactive Power Coordination Procedures” shall have the meaning given under Article Eleven.

14.5.3 Make Whole Evaluation.

Real-time Settlement Intervals for which PJM determines that DEP is responding to the dynamic pricing signal will be included in a make-whole evaluation. All references in the following section to “all Real-time Settlement Intervals” of a calendar day refer to those Real-time Settlement Intervals for which PJM determines that DEP was responding to the dynamic pricing signal. The make-whole evaluation will be conducted separately for the import and export transactions for each Real-time Settlement Interval, and each will be based on a total of all Real-time Settlement Intervals of the same calendar day. The make-whole evaluation shall be conducted in the following manner:

For each Real-time Settlement Interval of the calendar day, PJM will determine whether the DEP Dynamic Schedule is following PJM pricing signals and, therefore, whether that Real-time Settlement Interval should be included in the daily make-whole calculations. To make this determination, PJM will compare the real-time, 5-minute incremental cost for the DEP generation fleet to increase or decrease the applicable 5-minute real-time LMP as calculated by PJM, and the current and previous values of the DEP Dynamic Schedule and apply the explicit metrics detailed below for this determination. In general, PJM will validate that the value of the DEP Dynamic Schedule moves in accordance with the applicable 5-minute LMP prices and the real-time costs determined by DEP. If the LMP exceeds the incremental cost for DEP generation to increase, PJM will verify that the increase in the 5-minute value of the Dynamic Schedule for the period where the LMP exceeds the DEP cost to increase generation is at least 90% of the real-time capability for DEP generation to increase. If the LMP is less than the incremental costs for DEP generation to decrease, PJM will verify that the decrease in the 5-minute value of the Dynamic Schedule for the period where the LMP is less than the DEP cost to decrease generation is at least 90% of the real-time capability for DEP generation to decrease. If the 5-minute LMP is between the 5-minute incremental cost for DEP to increase or decrease generation, PJM will verify that the change in the Dynamic Schedule value did not exceed 10% of the previous 5-minute value.

The DEP Dynamic Schedule will be determined to be following dispatch for a 5-minute period if any of the following criteria are met:

- If $LMP_{t_0} > DEP \text{ cost to increase}_{t_0}$ and $(DEP \text{ dynamic schedule value}_{t+1} - DEP \text{ dynamic schedule value}_{t_0}) \geq 90\% * DEP \text{ real-time capability to increase generation}_{t_0}$, or,
- If $LMP_{t_0} < DEP \text{ cost to decrease}_{t_0}$ and $(DEP \text{ dynamic schedule value}_{t_0} - DEP \text{ dynamic schedule value}_{t+1}) \geq 90\% * DEP \text{ real-time capability to decrease generation}_{t_0}$, or,

- If **DEP cost to decrease_{t0} <= LMP_{t0} <= DEP cost to increase_{t0}** and **90% * DEP dynamic schedule value_{t-1} <= DEP dynamic schedule value_{t0} <= 110% * DEP dynamic schedule value_{t-1}**.

Where,

LMP_{t0}: the applicable 5-minute Locational Marginal Price calculated by PJM at time t0

DEP cost to increase_{t0}: The 5-minute incremental cost for DEP generation to increase at time t0

DEP cost to decrease_{t0}: The 5-minute incremental cost for DEP generation to decrease at time t0

DEP real-time capability to increase generation_{t0}: The 5-minute capability for DEP to increase generation as telemetered from DEP to PJM at time t0.

DEP real-time capability to decrease generation_{t0}: The 5-minute capability for DEP to decrease generation as telemetered from DEP to PJM at time t0.

DEP dynamic schedule value_{t+1}: The 5-minute integrated DEP dynamic schedule value at time t+1

DEP dynamic schedule value_{t0}: The 5-minute integrated DEP dynamic schedule value at time t0

DEP dynamic schedule value_{t-1}: The 5-minute integrated DEP dynamic schedule value at time t-1

If the DEP dynamic schedule is determined to be following PJM dispatch for a Real-time Settlement Interval, the Real-time Settlement Interval will be included in the make-whole calculations for the calendar day.

14.5.4 Calculation of DEP Total Cost/Revenue.

If a dollar-per-MW hour value is applied in a calculation under this section 14.5.4 and 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.

14.5.4.1 Import Transaction (DEP to PJM). For the import transaction, PJM will calculate the total revenue earned by DEP by multiplying the value of the applicable Real-time Settlement Interval LMP by the associated MW value of the import transaction for each Real-time Settlement Interval and summing for all Real-time Settlement Intervals of a calendar day. PJM will calculate the DEP cost of providing the import transaction by multiplying the value of the DEP incremental cost for each Real-time Settlement Interval by the associated MW value of the import transaction for each Real-time Settlement Interval and summing for all Real-time Settlement Intervals of the same calendar day. If the total cost for all Real-time Settlement Intervals exceeds the total revenue for all Real-time Settlement Intervals, PJM will make DEP whole for the difference through Balancing Operating Reserves. The DEP cost is based on incremental cost (fuel plus O&M) of the units that provide the power to support the transaction plus the cost of delivering the power to the PJM interface.

14.5.4.2 Export Transaction (PJM to DEP). For the export transaction, PJM will calculate the total cost incurred by DEP by multiplying the value of the applicable Real-time Settlement Interval LMP by the associated MW value of the export transaction for each Real-time Settlement Interval and summing for all Real-time Settlement Intervals of a calendar day. PJM will calculate the DEP avoided cost of receiving the export transaction by multiplying the value of the DEP decremental cost for each Real-time Settlement Interval by the hourly integrated MW value of the export transaction for each hour and summing for all Real-time Settlement Intervals of the same calendar day. If the total cost incurred by DEP for all Real-time Settlement Intervals exceeds the total avoided cost for all Real-time Settlement Intervals, PJM will make DEP whole for the difference through Balancing Operating Reserves. The DEP avoided cost is based on the decremental cost savings of the units that reduced generation to support the transaction minus any DEP cost to receive the transaction.

14.5.5 Re-evaluation of Make Whole Settlement.

The make-whole evaluation will be conducted based on the actual DEP cost, not on a market bid price. If the make-whole evaluation settlement is used for over 10% of the Real-time Settlement Intervals that DEP is responding correctly to relieve PJM congestion, the settlement process will be reevaluated to determine if changes to the process are required to provide equitable compensation for the congestion relief provided.

20.11 Notices.

A notice (“Notice”) shall be effective only if in writing and delivered by: hand; reputable overnight courier; United States mail; or electronic mail. Notice shall be deemed to have been given: (a) when delivered to the recipient by hand, overnight courier, or email (b) if delivered by United States mail, on the postmark date. Notice shall be addressed as follows:

PJM: Frederick Bresler III
Senior Vice President, Operations and Markets
PJM Interconnection, L.L.C.
2750 Monroe Blvd.
Audubon, PA 19403
Tel: (610) 666-8249
Email: Stu.Bresler@pjm.com

DEP: V. Nelson Peeler
Senior Vice President and Chief Transmission Officer
Duke Energy Progress, LLC
526 S. Church Street (EC3XP)
Charlotte, NC 28202
Tel: (704) 382-3851
Email: nelson.peeler@duke-energy.com

A Party may change its designated recipient of Notices, or its address, from time to time, by giving Notice of such change.

20.13 Prior Agreements; Entire Agreement.

Except for the settlement agreement entered into by the Parties in North Carolina Utilities Commission Docket No. E-22, Sub 418, all prior agreements by or among all the Parties relating to the matters contemplated by this Agreement, whether written or oral, are superseded by this Agreement, and shall be of no further force or effect.

This Agreement shall not be interpreted or construed as affecting, rescinding or amending any existing agreement between Dominion Resources and DEP.

DUKE ENERGY PROGRESS, LLC

By:

/s/Nelson Peeler

Nelson Peeler

Senior Vice President and Chief Transmission Officer

PJM INTERCONNECTION, L.L.C.

By:

/s/ Frederick Bresler III

Frederick Bresler III

Senior Vice President, Operations and Markets

APPENDIX B

Description of Interconnection Facilities

The DEP-PJM interconnection contains twelve (12) alternating current interconnection facilities, including one (1) alternating current pseudo-tie. These are tabulated below:

PJM Interconnection Facility	DEP Interconnection Facility	Transmission Line Identifier	Transmission Line Voltage (Kilovolts)	Common Meter Point
East Danville	Roxboro	Not Applicable	230	East Danville
East Danville	Concord	Not Applicable	230	East Danville
Nagel	Cane River	Not Applicable	230	Nagel
Sullivan Gardens	Walters	Not Applicable	138	Sullivan Gardens
Battleboro	Rocky Mount	123	115	Rocky Mount
Hathaway West	Rocky Mount	2058	230	Rocky Mount
Hathaway East	Rocky Mount	2181	230	City of Rocky Mount POD #4
Heritage	Wake	570	500	Heritage
Sedge Hill	Person	296B	230	Sedge Hill
Kerr Dam	Henderson	45	115	Kerr Dam
Everetts	Greenville	218	230	Greenville
Littleton D.P. (Pseudo Tie)	Not Applicable	Not Applicable	115	Littleton D.P.
Not Applicable	Hamlet (Pseudo-Tie)	Not Applicable	230	Hamlet

Attachment C

Copy of Original Signatures

20.13 Prior Agreements; Entire Agreement.

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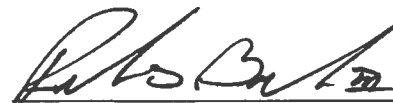
DUKE ENERGY PROGRESS, LLC

By:

V. Nelson Peeler
Senior Vice President and Chief Transmission Officer

PJM INTERCONNECTION, L.L.C.

By:



Frederick Bresler III
Senior Vice President, Operations and Markets