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January 20, 2023

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

Re: *PJM Interconnection, L.L.C.*, Docket No. ER23-918-000
      Proposed Amendment to the Transmission Constraint Penalty Factor Rules

Dear Secretary Bose:

PJM Interconnection, L.L.C. ("PJM"), pursuant to section 205 of the Federal Power Act ("FPA"), 16 U.S.C. § 824d, and section 35.13 of the regulations of the Federal Energy Regulatory Commission ("FERC" or the "Commission"), 18 C.F.R. part 35, hereby submits revisions to the PJM Open Access Transmission Tariff ("Tariff"), Attachment K-Appendix, section 5.6.3 and the parallel provisions of the Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. ("Operating Agreement"), Schedule 1, section 5.6.3.[1] This proposal would allow PJM to lower the Transmission Constraint Penalty Factor[2] in discrete and limited circumstances where localized transmission congestion is caused by a transmission upgrade associated with PJM's Regional Transmission Expansion Plan ("RTEP") process or a transmission upgrade necessitated by a generator interconnection. In such instances where the transmission upgrade will increase the transmission capability, the application of the full $2,000/MWh Transmission Constraint

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[1] All subsequent references to Tariff, Attachment K-Appendix, section 5.6 in this filing letter also includes the parallel provisions of the Operating Agreement, Schedule 1, section 5.6.

[2] Capitalized terms not otherwise defined herein shall have the meaning ascribed to them in the Tariff or Operating Agreement.

Penalty is not necessary in the localized area and results in price formation outcomes that are not necessarily just and reasonable.

This proposal is consistent with the Commission's prior encouragement for "PJM to work with its stakeholders to develop . . . a generally applicable solution"[3] that would lower the Transmission Constraint Penalty Factor where congestion is caused by a transmission outage necessary to effectuate an upgrade on the transmission capabilities of a localized area – similar to the rules that the Commission recently considered and accepted in the Northern Neck peninsula context.[4] In direct response to the Commission's encouragement, PJM stakeholders developed this consensus-based proposal through the Energy Price Formation Senior Task Force ("EPFSTF"), where it received support from 91% of PJM's stakeholders. Thereafter, at the November 16, 2022 Market and Reliability Committee ("MRC"), PJM stakeholders endorsed the proposal by acclamation with no objections and one abstention.[5] The proposal was subsequently approved by acclamation with no objections and one abstention at the December 21, 2022 Members Committee meeting.[6] PJM respectfully requests that the Commission issue an order accepting the proposed revisions by March 21, 2023 (60 days from the date of this filing, with an effective date of March 22, 2023).

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[3] *PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,104, at P 73.

[4] *Id.*

[5] The minutes from the November 16, 2022 MRC are available at https://www.pjm.com/-/media/committees-groups/committees/mrc/2022/20221221/consent-agenda-a---draft-mrc-minutes-11162022.ashx.

[6] The minutes from the December 21, 2022 MC meeting are available at https://www.pjm.com/-/media/committees-groups/committees/mc/2023/20230125/consent-agenda-a---draft-mc-minutes-12212022.ashx.

I.   BACKGROUND

A. *The Transmission Constraint Penalty Factor is Designed to Provide Efficient Price Signals in Determining Where Additional Transmission And Generation Investments Are Needed.*

A transmission constraint results when a physical limitation of a Transmission Facility is reached during normal or contingency system operations. This occurs when the most economic generation cannot be delivered to the load due to physical limitations on the Transmission Facility. When there is a transmission constraint, more expensive generation that is closer to the load is dispatched to maintain flows on Transmission Facilities within their operating limits. The Transmission Constraint Penalty Factor is applied when insufficient resources are available to be dispatched in a localized area with transmission constraints.

The goal of reflecting the Transmission Constraint Penalty Factor in Locational Marginal Prices ("LMPs") is to provide market signals that incentivize supply and/or demand to react by way of short-term or long-term investments that would resolve a local scarcity condition caused by a transmission constraint.[7] PJM's real-time market clearing engine, the security-constrained economic dispatch application ("SCED"), uses an optimization algorithm that incorporates the Transmission Constraint Penalty Factor to arrive at reasonable dispatch solutions. More specifically, PJM determines the least costly means of serving load and meeting reserve requirements at different locations in the PJM region based on, among other things, energy offers of Market Sellers and the actual operating conditions of the system, including any binding transmission constraints.[8] PJM

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[7] Affidavit of Philip D'Antonio at P 8 ("D'Antonio Affidavit").

[8] Operating Agreement, Schedule 1, sec 2.2.

uses SCED to re-dispatch resources that can relieve a transmission constraint. To that end, SCED is allowed to exhaust all available controlling actions to economically relieve a transmission constraint up to the relevant Transmission Constraint Penalty Factor, which is administratively capped at $2,000/MWh in the Real-time Energy Market.[9] When a transmission constraint cannot be managed within the binding transmission limit in a dispatch interval in the real-time energy market, PJM applies a Transmission Constraint Penalty Factor to determine the Marginal Value for a transmission constraint.

The Transmission Constraint Penalty Factor is used to determine the Marginal Value of a transmission constraint. In turn, the Marginal Value is a factor used in determining Congestion Price. More particularly, the Congestion Price at any location is equal to the sum of the product of the transmission constraint's Marginal Value and the distribution factor[10] of that location on that constraint for all binding constraints in a given dispatch interval.[11] Since the components of LMP are System Energy Price, Congestion Price, and Loss Price,[12] the Transmission Constraint Penalty Factor affects LMP by increasing the value of the Congestion Price when there are insufficient resources available to control the constraint. In such instances, the Marginal Value of the constraint is set at the Transmission Constraint Penalty Factor. The Transmission Constraint Penalty Factor can also act as a cap in reflecting such congestion when there are resources available to control the constraint that would cost more than that the administratively set value of

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[9] Tariff, Attachment K-Appendix, section 5.6.2.

[10] The distribution factor represents the change (or sensitivity) of an active power flow in a reference direction on a transmission line with respect to a change in injection at the generator bus and a corresponding change in withdrawal at the reference bus (calculated with a DC power flow).

[11] *See* Tariff, Attachment K – Appendix, section 5.1

[12] *See* Tariff, Attachment K – Appendix, sections 2.5 and 2.6 and parallel provisions of Operating Agreement, Schedule 1, sections 2.5 and 2.6.

$2,000/MWh. In either case, the Transmission Constraint Penalty Factor is ultimately reflected in PJM's energy market through LMPs. Ultimately, the higher Congestion Price when sufficient resources are not available to control a constraint serves as an administratively set price signal for short- and long-term investments to alleviate a transmission constraint.

> B. *Application of the Transmission Constraint Penalty Factor is Inappropriate When Congestion is Caused by a Transmission Line Outage Due to an Upgrade Associated with the Regional Transmission Expansion Planning or Interconnection Process.*

While the Transmission Constraint Penalty Factor is generally designed to provide both short-term and long-term investment signals, in limited instances, it is unnecessary and unwarranted to apply the $2,000/MWh penalty factor in the Real-time Energy Market when there is no evidence that a local transmission constraint can be relieved by available generation or load response in the impacted area and such congestion is caused by a transmission upgrade as part of PJM's RTEP process or a transmission upgrade necessitated by a generator interconnection. In these limited scenarios, the application of the Transmission Constraint Penalty Factor would overstate the severity of a localized transmission shortage given that no additional economic incentive is needed where (1) a long-term solution to the transmission constraint is already underway by way of a transmission upgrade and (2) the likelihood of additional supply or load response that can resolve the congestion in the short-term is low. As Philip D'Antonio, PJM's Director of Energy Market Operations explains, "where a transmission facility is taken out of service altogether due to an RTEP or interconnection upgrade, however, long-term price signals reflecting the default ($2,000/MWh) Transmission Constraint Penalty Factor cap do not

serve the intended purpose given that the transmission upgrade currently under construction will mitigate these issues."[13]

Transmission upgrades are necessitated through RTEP, in part, because of expected load growth and associated congestion impacts, as well as the repeated application of the Transmission Constraint Penalty Factor.[14] Specifically, in situations where prior price signals from the application of the Transmission Constraint Penalty Factor do not result in sufficient resources entering the interconnection queue for development or adequate demand response at that location, the PJM planning process addresses the reliability and congestion issues at that location through a RTEP-planned upgrade.[15] Once the construction for the transmission upgrade is underway, the continued application of the $2,000/MWh Transmission Constraint Penalty Factor, in addition to the LMP of the location that is seeing constraints caused solely by outages associated with the RTEP-approved transmission upgrade or interconnection upgrades, becomes counter-productive to the goal of the Transmission Constraint Penalty Factor and is simply punitive to load at that location.

Under an identical circumstance that was present in the Northern Neck peninsula, the Commission previously agreed that the application of the Transmission Constraint Penalty Factor in such instances "will not produce the intended short-term or long-term responses and, instead, will only result in higher costs to ratepayers without a

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[13] D'Antonio Affidavit at P 12.

[14] D'Antonio Affidavit at P 9.

[15] Id.

commensurate benefit."[16] In other words when congestion is caused by an outage arising out of a transmission upgrade that is currently underway, "an investment signal is not needed to stimulate investment"[17] because, as previously explained by the Commission, the "price increases created by the Transmission Constraint Penalty Factor signal investment that would be redundant to the transmission line upgrade that is currently being constructed."[18]

While some may argue that the Transmission Constraint Penalty Factor may also incentivize investments in generation or load response to mitigate the transmission congestion in the short-term, it is important to recognize that in these limited circumstances, ***"it is the outage associated with the transmission solution that is driving the prices at issue***."[19] As a result, the underlying cause of the increased congestion is not due to a lack of generation or load response during normal conditions, but rather because taking a transmission line out of service for upgrades necessarily places increased strains on the remaining transmission line serving a localized area. Once that transmission facility is upgraded and placed back in service, the transmission capability for the localized area will be increased so no additional investments are necessary in such localized areas.[20]

C. *The Proposed Revisions Lower the Transmission Constraint Penalty Factor But Do Not Eliminate Congestion Prices.*

To be clear, the instant proposal does not eliminate the Congestion Price altogether. Rather, the Transmission Constraint Penalty Factor is simply reduced from the

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[16] *PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,104, at P 59.

[17] *Id.* at P 62.

[18] *Id.* at P 63.

[19] *Id.* (Emphasis added).

[20] D'Antonio Affidavit at 13.

$2,000/MWh level in the Real-time Energy Market to a level that ensures the offers of the resources being used to control the constraint are reflected in the Congestion Price, which is based on the existing Tariff methodology. It is appropriate to set the reduced Transmission Constraint Penalty Factor equal to the cost of the marginal unit controlling the constraint because all available units should continue to be incented to help alleviate the constraint. The "reduced Transmission Constraint Penalty Factor acts as an administratively set cap in this limited circumstance to provide short-term congestion pricing signals, which continues incentivizes short-term response in the form of potential demand side resources or acceleration of projects that may already be underway."[21]

In effect, there would still be a Congestion Price, which serves as a short-term investment signal that reflects congestion on the remaining transmission facilities. It is only that in these limited instances, the administratively set $2,000/MWh Transmission Constraint Penalty Factor is reduced for the Real-time Energy Market to reflect the fact that no long-term investment is needed in such area. The administratively reduced Transmission Constraint Penalty Factor continues to provide an investment signal for a short-term solution (either generation or load-side response) that can help alleviate or reduce congestion during a transmission outage necessary to complete an upgrade.

II.   **THE CURRENT PROVISIONS OF THE TRANSMISSION CONSTRAINT PENALTY FACTOR DOES NOT ALLOW PJM TO REDUCE THE TRANSMISSION CONSTRAINT PENALTY FACTOR IN THESE CIRCUMSTANCES.**

While the existing provisions of the Tariff and Operating Agreement allows PJM to adjust the Transmission Constraint Penalty Factor "when sufficient congestion relief on

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[21] D'Antonio Affidavit at 15.

the constraint can be provided by available resources at a cost below the $2,000/MWh

Transmission Constraint Penalty Factor in order to prevent a high cost resource that cannot

provide material congestion relief on the constraint from inappropriately setting price for

the constraint,"[22] it generally does not provide authority for PJM to lower the $2,000/MWh

Transmission Constraint Penalty Factor where no other available resources can relieve the

constraint. The one exception is the provision that allows PJM to lower the application of

the $2,000/MWh Transmission Constraint Penalty Factor "when there are insufficient

available resources to relieve a transmission constraint on the remaining transmission

facilities serving the Northern Neck peninsula caused by the Lanexa-Dunnsville-Northern

Neck line outage."[23] This rule was added specifically to address transmission constraints

on the Northern Neck peninsula caused by the ongoing Lanexa-Dunnsville-Northern Neck

line outage, which is currently being upgraded as part of PJM's RTEP process set forth in

Operating Agreement, Schedule 6. Outside of this limited and discrete provision, PJM

does not have the existing ability to lower the $2,000/MWh Transmission Constraint

Penalty Factor of $2,000/MWh for congestion caused by a transmission line upgrade and

where no generation or load response is available.

To address this limitation, PJM is proposing to replace the existing carve out that

allows for the reduction of the $2,000/MWh Transmission Constraint Penalty Factor

associated with the Lanexa-Dunnsville-Northern Neck line outage with a more generally

applicable provision that could be applied in other limited localized areas where a similar

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[22] Tariff, Attachment K – Appendix, section 5.6.3 and parallel provisions of Operating Agreement, Schedule 1, section 5.6.3.

[23] Tariff, Attachment K – Appendix, section 5.6.3(c) and parallel provisions of Operating Agreement, Schedule 1, section 5.6.3(c).

fact pattern may arise. More particularly, under the instant proposal, PJM would have the ability to lower the Transmission Constraint Penalty Factor when there is a transmission constraint that is caused by a transmission upgrade as part of PJM's RTEP process or a transmission upgrade necessitated by a generator interconnection and there are insufficient resources available in the localized area to alleviate this congestion. This approach is consistent with and directly responsive to the Commission's encouragement for "PJM to work with its stakeholders to develop such a generally applicable solution."[24]

It is acknowledged that the proposed rule allows for a reduction in the Transmission Constraint Penalty Factor once there are insufficient resources to relieve an available constraint without waiting for a period of time to see if additional resources or load may respond to the higher pricing. In developing this package, PJM considered specifying a period of time to wait and see whether there would be a short-term response to the pricing signal before lowering the penalty factor. However, waiting any specific period of time before triggering this proposal is arbitrary given that it is entirely speculative whether a resource or load would ever respond to the higher pricing signals. Moreover, conditions had already been met to stimulate the RTEP upgrade, and a sufficient response had not developed to obviate the need for the RTEP upgrade. As a result, any potential (and speculative) benefits of a short-term response by applying the full $2,000/MWh Transmission Constraint Penalty Factor is outweighed by the risk of overcharging load in the hopes of a short-term response to the elevated price signals.

Mr. D'Antonio explains that "the intended purpose of the Transmission Constraint Penalty Factor is to signal meaningfully high Congestion Prices in order to incentivize

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[24] *PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,104, at P 73.

supply and/or demand to react by way of short-term or long-term investments that would resolve a local scarcity condition caused by a transmission constraint."[25] Here, through the stakeholder process, PJM stakeholders indicated that in these unique circumstances in which the underlying cause of the congestion is necessitated by a transmission upgrade, which would ultimately enhance the transmission capability and eliminate the need for any short- or long-term response to the temporary congestion, the application of the administratively set $2,000/MWh Transmission Constraint Penalty Factor does not produce the intended outcome.[26] Instead, in these limited circumstances where no response to the application of the $2,000/MWh Transmission Constraint Penalty Factor is observed, a reduction in the Transmission Constraint Penalty Factor represents an overwhelmingly endorsed stakeholder solution (including representatives of load-side interests), which identifies that in the narrow instances when expansions of transmission capacity are in progress and forthcoming as a result of an interconnection or RTEP upgrade, Congestion Prices should not reflect the administratively set $2,000/MWh Transmission Constraint Penalty Factor given that the cause of the congestion is a transmission upgrade that will increase system capability in the impacted area. Thus, "the proposed revisions reflect the lower reduced value of avoiding temporary local scarcity conditions caused by an outage necessary to complete a long-term transmission upgrade project."[27] The instant proposal is nearly unanimously supported by PJM stakeholders representing various interests including loads, generators, and transmission owners.

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[25] D'Antonio Affidavit at P 8.

[26] *Id.* at P 16.

[27] *Id.* at P 16.

The reduction in the investment signal for a short-term response is appropriate given that transmission line outages caused by transmission upgrades generally last on average 211 days.[28] Based on PJM's interconnection experience, it is unlikely that entirely new generation resources could be sited, financed, constructed, and complete under the PJM interconnection process before the end of the transmission outage.[29] As a result, the only reasonably realistic response to any short-term price signal that could resolve a local scarcity caused by a transmission constraint would be limited to either demand-side response or expediting the development of a project that is already underway. Given this finite pool of possible short responses (which themselves are less costly than developing an entirely new resource outright), it is appropriate that the investment signal is reduced in these limited circumstances when there is no need to attract additional long-term investment.[30]

Of note, PJM has visibility into whether there are significant demand response resources registered in a particular location, as well as projects in the interconnection queue that are sufficiently advanced in the development phase. Thus, if there are sufficient resources that may realistically be incented to alleviate congestion as informed by the interconnection queue and demand response registrations in the area, PJM would not lower the Transmission Constraint Penalty Factor so as to maintain the $2,000/MWh price signal.[31] However, if there are not any such known resources in these limited

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[28] *Id.* at P 14.

[29] PJM's interconnection process requires feasibility, system impact, and facilities studies before an Interconnection Service Agreement can even be executed.

[30] D'Antonio Affidavit at P 15.

[31] *Id.* at P 20.

circumstances, PJM would lower the Transmission Constraint Penalty Factor from the $2,000/MWh level in the Real-time Energy Market to a level that reflects the offers of the resources being used to control the constraint in the Congestion Price. While this investment signal is reduced, the resultant pricing signals will still provide an economic incentive for demand-side response or the acceleration of a resource that is already under development.

III. PJM PROPOSES AN AMENDMENT TO THE EXISTING TRANSMISSION CONSTRAINT PENALTY FACTOR RULES SO THAT THE PENALTY FACTOR IS NOT APPLIED TO TRANSMISSION CONSTRAINTS CAUSED BY TRANSMISSION UPGRADES RELATED TO RTEP OR INTERCONNECTION REQUESTS.

To alleviate the potential harm to consumers caused by the unnecessary application of the Transmission Constraint Penalty Factor when there is congestion caused by transmission line outages related to RTEP or interconnection upgrades, PJM proposes a discrete amendment to the Transmission Constraint Penalty Factor provisions in the Tariff. Specifically, to remedy this limited issue, PJM proposes that it be allowed to lower the $2,000/MWh Transmission Constraint Penalty Factor in the limited circumstance described above.

The revised Transmission Constraint Penalty Factor would be calculated consistent with the existing Tariff and Operating Agreement methodology where PJM currently has discretion to lower the penalty factor. More particularly, to calculate the value of the reduced Transmission Constraint Penalty Factor, PJM takes into account the System Energy Price, Loss Price, Congestion Price (for all binding constraints), and Incremental Energy Offer (including start up and no load costs as applicable). When an adjustment is required, PJM dispatchers and Real-time Energy Market support engineers make real-time

evaluations of the appropriate penalty factor adjustments based on the effective cost

(expressed in $/MW) of the resources that are available to provide the necessary congestion

relief. The effective cost is approximated using the resource's incremental cost,

distribution factor[32] on the constraint, and the system energy cost. In other words, PJM

will lower the Transmission Constraint Penalty Factor from the $2,000/MWh level in the

Real-time Energy Market to a level that reflects the offers of the resources being used to

control the constraint in the Congestion Price based on the existing Tariff methodology.

Based on the foregoing, PJM proposes to add the following language to Tariff,

Attachment K-Appendix, section 5.6.3 and the parallel provisions of Operating Agreement,

Schedule 1, section 5.6.3, as shown in blackline below:

(a) The Office of the Interconnection may modify the default Transmission
Constraint Penalty Factor values used in the Real-time Energy Market
or Day-ahead Energy Market for individual transmission constraints to:
(1) ensure the market clearing solution is feasible, (2) reflect changes to
the operating practices which are mutually agreed upon with the
neighboring RTO for managing such constraints for market-to-market
coordinated constraints, or (3) reflect persistent system operational or
reliability needs and the cost of the resources available to effectively
relieve congestion on the constraint. When such conditions occur, the
Office of the Interconnection may raise the Transmission Constraint
Penalty Factor when sufficient congestion relief on the constraint cannot
be provided by available resources at a cost below the default
Transmission Constraint Penalty Factor. The Office of the
Interconnection may lower the Transmission Constraint Penalty Factor
when sufficient congestion relief on the constraint can be provided by
available resources at a cost below the default Transmission Constraint
Penalty Factor in order to prevent a high cost resource that cannot
provide material congestion relief on the constraint from inappropriately
setting price for the constraint or when congestion relief on the
constraint can be provided by available resources at a cost below the
default Transmission Constraint Penalty Factor but resources are not
available for congestion relief between the marginal value of the

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[32] Distribution factor represents the change (or sensitivity) of active power flow in a reference direction on a transmission line with respect to a change in injection at the generator bus and a corresponding change in withdrawal at the reference bus.

appreciable resource and the default Transmission Constraint Penalty Factor if the congestion results from a transmission outage needed to address Regional Transmission Expansion Plan criteria or interconnection requests in the impacted area designed to improve system reliability. In either instance, to effectively relieve congestion on the constraint, the revised Transmission Constraint Penalty Factor value may be determined using the following formula, while accounting for the ability for such inputs to vary as system conditions change throughout the operating day:

$$\text{Revised Transmission Constraint Penalty Factor (\$/MW)} = \frac{\begin{array}{c}\text{System Energy Price + Loss Price + Congestion Price} \\ \text{(all binding constraints) – Incremental Energy Offer*}\end{array}}{D_{fax}}$$

To be clear, PJM does not expect to lower the Transmission Constraint Penalty Factor in many instances under this proposal. First, the transmission constraint must be caused by a transmission facility outage as a direct result of a transmission upgrade through a RTEP project or an upgrade that is necessitated by a generator interconnection. Second, congestion in the localized area cannot be relieved by available resources. These criteria mean that the scope of the proposed changes are limited, because only localized areas with insufficient resources available to serve loads when there is congestion on a transmission facility that would be impacted. In short, the proposed amendment is expected to apply only in limited circumstances where it is inappropriate to apply the full $2,000/MWh Transmission Constraint Penalty Factor, such as the case in the Northern Neck peninsula, because it results in unnecessarily high costs that are ultimately harmful to consumers with no corresponding benefit since no additional investments are necessary in this area.

IV. STAKEHOLDER PROCESS

This filing stems from PJM's commitment to submit a future FPA section 205 filing that would more generally address similar circumstances that is currently faced by the

Northern Neck peninsula,[33] as well as the Commission's encouragement for "PJM to work with its stakeholders to develop such a generally applicable solution."[34] As a result, this filing is the culmination of a nearly one year stakeholder process. This topic was first reviewed at the April 5, 2022 EPFSTF meeting. Thereafter, after several meetings, PJM and its stakeholders developed and endorsed the proposed revisions at the EPFSTF with 91% in favor.[35] Thereafter, at the November 16, 2022 Market and Reliability Committee ("MRC"), PJM stakeholders endorsed the proposal by acclamation with no objections and one abstention.[36] The proposal was subsequently approved by acclamation with no objections or and one abstention at the December 21, 2022 Members Committee meeting.[37]

V.   EFFECTIVE DATE

PJM requests an effective date of March 22, 2023 for the proposed revisions. PJM therefore requests that the Commission issue an order on this filing on or before March 21 2023, 60 days from the date of this filing.

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[33] *See PJM Interconnection, L.L.C.*, Proposed Amendment to the Transmission Constraint Penalty Factor Filed Pursuant to section 205 of the Federal Power Act, Docket Nos. ER22-957-000 and EL22-26-000 (Jan. 31, 2022).

[34] *PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,104, at P 73.

[35] EPSTF Update: Transmission Constraint Penalty Factor, slide 4, https://www.pjm.com/-/media/committees-groups/committees/mrc/2022/20221116/item-01---1-epfstf-tcpf-update---presentation.ashx.

[36] The minutes from the November 16, 2022 MRC are available at https://www.pjm.com/-/media/committees-groups/committees/mrc/2022/20221221/consent-agenda-a---draft-mrc-minutes-11162022.ashx.

[37] The minutes from the December 21, 2022 MC meeting are available at https://www.pjm.com/-/media/committees-groups/committees/mc/2023/20230125/consent-agenda-a---draft-mc-minutes-12212022.ashx.

VI. CORRESPONDENCE

The following individuals are designated for inclusion on the official service list in this proceeding and for receipt of any communications regarding this filing:

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VII. DOCUMENTS ENCLOSED

This filing consists of the following:

1. This transmittal letter;

2. Revisions to the Tariff and Operating Agreement in redlined and clean format (as Attachments A and B, respectively) and in electronic tariff filing format as required by Order No. 714);[38] and

3. Affidavit of Philip D'Antonio in support of this filing

VIII. SERVICE

PJM has served a copy of this filing on all PJM members and on all state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,[39] 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 email on the same date as this filing to all PJM

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[38] *Electronic Tariff Filings*, Order No. 714, 2008–2013 FERC Stats. & Regs., Regs. Preambles ¶ 31,276 (2008), *final rule*, Order No. 714-A, III FERC Stats. & Regs., Regs. Preambles ¶ 31,356 (2014).

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

members and all state utility regulatory commissions in the PJM Region[40] alerting them

that this filing has been made by PJM and is available by following such link. PJM also

serves the parties listed on the Commission's official service list for this docket. If the

document is not immediately available by using the referenced link, the document will be

available through the referenced link within 24 hours of the filing. Also, a copy of this

filing will be available on FERC's eLibrary website located at the following link:

http://www.ferc.gov/docs-filing/elibrary.asp in accordance with the Commission's

regulations and Order No. 714.

VIII. CONCLUSION

For the reasons set forth herein, PJM requests that the Commission accept the

proposed Tariff revisions described in this filing effective March 22, 2023.

Respectfully submitted,

 /s/ Chenchao Lu

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*Counsel for
PJM Interconnection, L.L.C.*

January 20, 2023

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[40] PJM already maintains, updates, and regularly uses email lists for all PJM members and affected state commissions.

Attachment A

Revisions to the
PJM Open Access Transmission Tariff

(Marked / Redline Format)

5.6   Transmission Constraint Penalty Factors

5.6.1   Application of Transmission Constraint Penalty Factors in the Day-ahead and Real-time Energy Markets

In the Day-ahead Energy Market, the Transmission Constraint Penalty Factors shall be used to ensure a feasible market clearing solution but not used to determine the Marginal Value of a transmission constraint. In the Real-time Energy Market, the Office of the Interconnection shall use Transmission Constraint Penalty Factors to determine the Marginal Value for a transmission constraint when that transmission constraint cannot be managed within the binding transmission limit in a dispatch interval. The Marginal Value of the transmission constraint shall be used in the determination of the Congestion Price component of Locational Marginal Price as referenced in Tariff, Attachment K-Appendix, section 2.5 through Tariff, Attachment K-Appendix, section 2.6, and the parallel provisions of Operating Agreement, Schedule 1, section 2.5 through Operating Agreement, Schedule 1, section 2.6. The Transmission Constraint Penalty Factor may set the Marginal Value of the transmission constraint during any dispatch interval in the Real-time Energy Market depending on the following:

        (a)   If the market clearing software that clears the Real-time Energy Market cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval at a cost less than or equal to the Transmission Constraint Penalty Factor, the Transmission Constraint Penalty Factor shall set the Marginal Value of the transmission constraint. In such instances, to manage the flow over the constraint, the Office of the Interconnection may adjust the Transmission Constraint Penalty Factor as set forth in Tariff, Attachment K-Appendix, section 5.6.3 and the parallel provisions of Operating Agreement, Schedule 1, section 5.6.3.

        (b)   If the Real-time Energy Market constraints are subject to market-to-market congestion management protocols with an adjacent Regional Transmission Organization and the market clearing software cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval, the Office of the Interconnection may coordinate with such Regional Transmission Organization to either allow the Transmission Constraint Penalty Factor to set the Marginal Value of the transmission constraint or to apply the Constraint Relaxation Logic upon mutual agreement in accordance with applicable Joint Operating Agreements.

5.6.2   Default Transmission Constraint Penalty Factor Values

Transmission constraints located within the metered boundaries of the PJM Region, including market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $30,000/MWh Transmission Constraint Penalty Factor in the Day-ahead Energy Market when determining the day-ahead security constrained economic dispatch, known as the dispatch run, and $2,000/MWh in the determination of Day-ahead Prices in the pricing run. Constraints located within the metered boundaries of the PJM Region, excluding market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $2,000/MWh Transmission Constraint Penalty Factor in the Real-time Energy Market. Market-to-market coordinated

constraints in the Real-time Energy Market, located within the metered boundaries of the PJM Region, will use a default Transmission Constraint Penalty Factor of $1,000/MWh or a value agreed upon by PJM and the relevant Regional Transmission Organization in accordance with applicable Joint Operating Agreements.

5.6.3   Modifications to Transmission Constraint Penalty Factor Values

(a)   The Office of the Interconnection may modify the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market or Day-ahead Energy Market for individual transmission constraints to: (1) ensure the market clearing solution is feasible, (2) reflect changes to the operating practices which are mutually agreed upon with the neighboring RTO for managing such constraints for market-to-market coordinated constraints, or (3) reflect persistent system operational or reliability needs and the cost of the resources available to effectively relieve congestion on the constraint. When such conditions occur, the Office of the Interconnection may raise the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint cannot be provided by available resources at a cost below the default Transmission Constraint Penalty Factor. The Office of the Interconnection may lower the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor in order to prevent a high cost resource that cannot provide material congestion relief on the constraint from inappropriately setting price for the constraint or when congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor but resources are not available for congestion relief between the marginal value of the appreciable resource and the default Transmission Constraint Penalty Factor if the congestion results from a transmission outage needed to address Regional Transmission Expansion Plan criteria or interconnection requests in the impacted area designed to improve system reliability. In either instance, to effectively relieve congestion on the constraint, the revised Transmission Constraint Penalty Factor value may be determined using the following formula, while accounting for the ability for such inputs to vary as system conditions change throughout the operating day:

$$\text{Revised Transmission Constraint Penalty Factor (\$/MW)} = \frac{\begin{array}{c}\text{System Energy Price + Loss Price + Congestion Price}\\\text{(all binding constraints) – Incremental Energy Offer*}\end{array}}{D_{fax}}$$

Where D_{fax} equals the distribution factor of the resource for the transmission constraint

*For purposes of this equation only, Incremental Energy Offer includes start up and no load costs where appropriate.

(b)   The Office of the Interconnection shall post, as soon as practicable, on its website any changes to the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market and/or the Day-ahead Energy Market.

(c)   Notwithstanding the provisions of this section 5.6, and until such time the rebuild of the Lanexa-Dunnsville-Northern Neck line in the Dominion Transmission Zone is complete

(as confirmed with the Transmission Owner and subsequently reported on the transmission facilities outage list posted on the Office of the Interconnection's website), the Office of the Interconnection shall set the transmission line limit in its Security Constrained Economic Dispatch program at a level that ensures the offers of the resources being used to control the constraint are reflected in the Congestion Price in lieu of applying a Transmission Constraint Penalty Factor when there are insufficient available resources to relieve a transmission constraint on the remaining transmission facilities serving the Northern Neck peninsula caused by the Lanexa-Dunnsville Northern Neck line outage.

Revisions to the
PJM Operating Agreement

(Marked / Redline Format)

5.6   Transmission Constraint Penalty Factors

5.6.1   Application of Transmission Constraint Penalty Factors in the Day-ahead and Real-time Energy Markets

In the Day-ahead Energy Market, the Transmission Constraint Penalty Factors shall be used to ensure a feasible market clearing solution but not used to determine the Marginal Value of a transmission constraint. In the Real-time Energy Market, the Office of the Interconnection shall use Transmission Constraint Penalty Factors to determine the Marginal Value for a transmission constraint when that transmission constraint cannot be managed within the binding transmission limit in a dispatch interval. The Marginal Value of the transmission constraint shall be used in the determination of the Congestion Price component of Locational Marginal Price as referenced in Tariff, Attachment K-Appendix, section 2.5 through Tariff, Attachment K-Appendix, section 2.6, and the parallel provisions of Operating Agreement, Schedule 1, section 2.5 through Operating Agreement, Schedule 1, section 2.6. The Transmission Constraint Penalty Factor may set the Marginal Value of the transmission constraint during any dispatch interval in the Real-time Energy Market depending on the following:

        (a)   If the market clearing software that clears the Real-time Energy Market cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval at a cost less than or equal to the Transmission Constraint Penalty Factor, the Transmission Constraint Penalty Factor shall set the Marginal Value of the transmission constraint. In such instances, to manage the flow over the constraint, the Office of the Interconnection may adjust the Transmission Constraint Penalty Factor as set forth in Tariff, Attachment K-Appendix, section 5.6.3 and the parallel provisions of Operating Agreement, Schedule 1, section 5.6.3.

        (b)   If the Real-time Energy Market constraints are subject to market-to-market congestion management protocols with an adjacent Regional Transmission Organization and the market clearing software cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval, the Office of the Interconnection may coordinate with such Regional Transmission Organization to either allow the Transmission Constraint Penalty Factor to set the Marginal Value of the transmission constraint or to apply the Constraint Relaxation Logic upon mutual agreement in accordance with applicable Joint Operating Agreements.

5.6.2   Default Transmission Constraint Penalty Factor Values

Transmission constraints located within the metered boundaries of the PJM Region, including market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $30,000/MWh Transmission Constraint Penalty Factor in the Day-ahead Energy Market when determining the day-ahead security constrained economic dispatch, known as the dispatch run, and $2,000/MWh in the determination of Day-ahead Prices in the pricing run. Constraints located within the metered boundaries of the PJM Region, excluding market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $2,000/MWh Transmission Constraint Penalty Factor in the Real-time Energy Market. Market-to-market coordinated

constraints in the Real-time Energy Market, located within the metered boundaries of the PJM Region, will use a default Transmission Constraint Penalty Factor of $1,000/MWh or a value agreed upon by PJM and the relevant Regional Transmission Organization in accordance with applicable Joint Operating Agreements.

5.6.3 Modifications to Transmission Constraint Penalty Factor Values

(a)   The Office of the Interconnection may modify the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market or Day-ahead Energy Market for individual transmission constraints to: (1) ensure the market clearing solution is feasible, (2) reflect changes to the operating practices which are mutually agreed upon with the neighboring RTO for managing such constraints for market-to-market coordinated constraints, or (3) reflect persistent system operational or reliability needs and the cost of the resources available to effectively relieve congestion on the constraint. When such conditions occur, the Office of the Interconnection may raise the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint cannot be provided by available resources at a cost below the default Transmission Constraint Penalty Factor. The Office of the Interconnection may lower the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor in order to prevent a high cost resource that cannot provide material congestion relief on the constraint from inappropriately setting price for the constraint or when congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor but resources are not available for congestion relief between the marginal value of the appreciable resource and the default Transmission Constraint Penalty Factor if the congestion results from a transmission outage needed to address Regional Transmission Expansion Plan criteria or interconnection requests in the impacted area designed to improve system reliability. In either instance, to effectively relieve congestion on the constraint, the revised Transmission Constraint Penalty Factor value may be determined using the following formula, while accounting for the ability for such inputs to vary as system conditions change throughout the operating day:

$$\text{Revised Transmission Constraint Penalty Factor (\$/MW)} = \frac{\substack{\text{System Energy Price + Loss Price + Congestion Price} \\ \text{(all binding constraints) – Incremental Energy Offer*}}}{D_{fax}}$$

Where D_{fax} equals the distribution factor of the resource for the transmission constraint

*For purposes of this equation only, Incremental Energy Offer includes start up and no load costs where appropriate.

(b)   The Office of the Interconnection shall post, as soon as practicable, on its website any changes to the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market and/or the Day-ahead Energy Market.

(c)   Notwithstanding the provisions of this section 5.6, and until such time the rebuild of the Lanexa-Dunnsville-Northern Neck line in the Dominion Transmission Zone is complete (as confirmed with the Transmission Owner and subsequently reported on the transmission

facilities outage list posted on the Office of the Interconnection's website), the Office of the Interconnection shall set the transmission line limit in its Security Constrained Economic Dispatch program at a level that ensures the offers of the resources being used to control the constraint are reflected in the Congestion Price in lieu of applying a Transmission Constraint Penalty Factor when there are insufficient available resources to relieve a transmission constraint on the remaining transmission facilities serving the Northern Neck peninsula caused by the Lanexa-Dunnsville-Northern Neck line outage.

Attachment B

Revisions to the
PJM Open Access Transmission Tariff

(Clean Format)

5.6   Transmission Constraint Penalty Factors

5.6.1   Application of Transmission Constraint Penalty Factors in the Day-ahead and Real-time Energy Markets

In the Day-ahead Energy Market, the Transmission Constraint Penalty Factors shall be used to ensure a feasible market clearing solution but not used to determine the Marginal Value of a transmission constraint. In the Real-time Energy Market, the Office of the Interconnection shall use Transmission Constraint Penalty Factors to determine the Marginal Value for a transmission constraint when that transmission constraint cannot be managed within the binding transmission limit in a dispatch interval. The Marginal Value of the transmission constraint shall be used in the determination of the Congestion Price component of Locational Marginal Price as referenced in Tariff, Attachment K-Appendix, section 2.5 through Tariff, Attachment K-Appendix, section 2.6, and the parallel provisions of Operating Agreement, Schedule 1, section 2.5 through Operating Agreement, Schedule 1, section 2.6. The Transmission Constraint Penalty Factor may set the Marginal Value of the transmission constraint during any dispatch interval in the Real-time Energy Market depending on the following:

(a)   If the market clearing software that clears the Real-time Energy Market cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval at a cost less than or equal to the Transmission Constraint Penalty Factor, the Transmission Constraint Penalty Factor shall set the Marginal Value of the transmission constraint. In such instances, to manage the flow over the constraint, the Office of the Interconnection may adjust the Transmission Constraint Penalty Factor as set forth in Tariff, Attachment K-Appendix, section 5.6.3 and the parallel provisions of Operating Agreement, Schedule 1, section 5.6.3.

(b)   If the Real-time Energy Market constraints are subject to market-to-market congestion management protocols with an adjacent Regional Transmission Organization and the market clearing software cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval, the Office of the Interconnection may coordinate with such Regional Transmission Organization to either allow the Transmission Constraint Penalty Factor to set the Marginal Value of the transmission constraint or to apply the Constraint Relaxation Logic upon mutual agreement in accordance with applicable Joint Operating Agreements.

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Transmission constraints located within the metered boundaries of the PJM Region, including market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $30,000/MWh Transmission Constraint Penalty Factor in the Day-ahead Energy Market when determining the day-ahead security constrained economic dispatch, known as the dispatch run, and $2,000/MWh in the determination of Day-ahead Prices in the pricing run. Constraints located within the metered boundaries of the PJM Region, excluding market-to-market coordinated constraints, regardless of voltage level, are defaulted to a $2,000/MWh Transmission Constraint Penalty Factor in the Real-time Energy Market. Market-to-market coordinated

constraints in the Real-time Energy Market, located within the metered boundaries of the PJM Region, will use a default Transmission Constraint Penalty Factor of $1,000/MWh or a value agreed upon by PJM and the relevant Regional Transmission Organization in accordance with applicable Joint Operating Agreements.

5.6.3 Modifications to Transmission Constraint Penalty Factor Values

(a)   The Office of the Interconnection may modify the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market or Day-ahead Energy Market for individual transmission constraints to: (1) ensure the market clearing solution is feasible, (2) reflect changes to the operating practices which are mutually agreed upon with the neighboring RTO for managing such constraints for market-to-market coordinated constraints, or (3) reflect persistent system operational or reliability needs and the cost of the resources available to effectively relieve congestion on the constraint. When such conditions occur, the Office of the Interconnection may raise the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint cannot be provided by available resources at a cost below the default Transmission Constraint Penalty Factor. The Office of the Interconnection may lower the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor in order to prevent a high cost resource that cannot provide material congestion relief on the constraint from inappropriately setting price for the constraint or when congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor but resources are not available for congestion relief between the marginal value of the appreciable resource and the default Transmission Constraint Penalty Factor if the congestion results from a transmission outage needed to address Regional Transmission Expansion Plan criteria or interconnection requests in the impacted area designed to improve system reliability. In either instance, to effectively relieve congestion on the constraint, the revised Transmission Constraint Penalty Factor value may be determined using the following formula, while accounting for the ability for such inputs to vary as system conditions change throughout the operating day:

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Where D_{fax} equals the distribution factor of the resource for the transmission constraint

*For purposes of this equation only, Incremental Energy Offer includes start up and no load costs where appropriate.

(b)   The Office of the Interconnection shall post, as soon as practicable, on its website any changes to the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market and/or the Day-ahead Energy Market.

Revisions to the
PJM Operating Agreement

(Clean Format)

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(b)   If the Real-time Energy Market constraints are subject to market-to-market congestion management protocols with an adjacent Regional Transmission Organization and the market clearing software cannot produce a solution that manages the flow on a constraint within the binding limit in a dispatch interval, the Office of the Interconnection may coordinate with such Regional Transmission Organization to either allow the Transmission Constraint Penalty Factor to set the Marginal Value of the transmission constraint or to apply the Constraint Relaxation Logic upon mutual agreement in accordance with applicable Joint Operating Agreements.

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5.6.3 Modifications to Transmission Constraint Penalty Factor Values

(a)   The Office of the Interconnection may modify the default Transmission Constraint Penalty Factor values used in the Real-time Energy Market or Day-ahead Energy Market for individual transmission constraints to: (1) ensure the market clearing solution is feasible, (2) reflect changes to the operating practices which are mutually agreed upon with the neighboring RTO for managing such constraints for market-to-market coordinated constraints, or (3) reflect persistent system operational or reliability needs and the cost of the resources available to effectively relieve congestion on the constraint. When such conditions occur, the Office of the Interconnection may raise the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint cannot be provided by available resources at a cost below the default Transmission Constraint Penalty Factor. The Office of the Interconnection may lower the Transmission Constraint Penalty Factor when sufficient congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor in order to prevent a high cost resource that cannot provide material congestion relief on the constraint from inappropriately setting price for the constraint or when congestion relief on the constraint can be provided by available resources at a cost below the default Transmission Constraint Penalty Factor but resources are not available for congestion relief between the marginal value of the appreciable resource and the default Transmission Constraint Penalty Factor if the congestion results from a transmission outage needed to address Regional Transmission Expansion Plan criteria or interconnection requests in the impacted area designed to improve system reliability. In either instance, to effectively relieve congestion on the constraint, the revised Transmission Constraint Penalty Factor value may be determined using the following formula, while accounting for the ability for such inputs to vary as system conditions change throughout the operating day:

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Where D_{fax} equals the distribution factor of the resource for the transmission constraint

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	)	
PJM Interconnection, L.L.C.	)	**Docket No. ER23-918-000**
	)	

AFFIDAVIT OF PHILIP D'ANTONIO
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

I.   QUALIFICATIONS

1.   My name is Philip D'Antonio. I am the Director of Energy Market Operations for PJM Interconnection, L.L.C. ("PJM"). My business address is 2750 Monroe Blvd, Audubon, PA 19403.

2.   My duties include responsibility for the conduct of day-to-day operations of the various PJM electricity markets including the Interregional Energy Markets, the Day-Ahead and Real Time Energy Markets, and Ancillary Service Markets. I am responsible for the administration of PJM markets and changes to existing market rules, as well as implementing the required technical software changes to ensure complete, accurate and timely execution of the PJM markets.

3.   I hold a Bachelor's degree in Applied Science from Dickinson State University.

II.   PURPOSE AND OVERVIEW OF AFFIDAVIT

4.   The purpose of my affidavit is to support PJM's filing to address certain limited instances where the application of the default ($2,000/MWh in the Real-time Energy Market) Transmission Constraint Penalty Factor is inappropriate. In particular, this affidavit supports PJM's proposed amendment that would allow PJM, under limited

circumstances, to reduce the Transmission Constraint Penalty Factor when there are insufficient available resources to relieve a transmission constraint caused by a transmission line upgrade associated with an interconnection request or a Regional Transmission Expansion Plan ("RTEP").

III. DISCUSSION

A. The Transmission Constraint Penalty Factor is Designed to Provide Efficient Price Signals in Determining Where Additional Transmission, Generation, and/or Demand Response Investments are Needed.

5.   A transmission constraint occurs when a physical limitation of a transmission facility is reached during normal or contingency system operations. When this occurs, the most economic generation cannot be delivered to the load due to physical limitations on transmission facilities. As a result, when there is a transmission constraint, more expensive generation that is electrically closer to the load must be dispatched in order to ensure that flows on transmission facilities are maintained within their operating limits.

6.   To internalize transmission constraints in the market, PJM utilizes Transmission Constraint Penalty Factors to reflect congestion on transmission facilities. The Transmission Constraint Penalty Factor (set at a default rate of $2,000/MWh in the Real-time Energy Market) is one of the parameters used to represent the cost of violating a transmission constraint in dollars per megawatt of violation (megawatt flow exceeding the applicable limit). Functionally, it also places an upper bound on the per megawatt hour cost that may be incurred to control a transmission constraint.

7.   Under the existing market rules, the Transmission Constraint Penalty Factor is used to determine the Marginal Value of a transmission constraint when

sufficient controlling actions do not exist to control the constraint at or below the applicable limit. The Marginal Value is a factor used in determining Congestion Price. Since the components of Locational Marginal Pricing ("LMP") are System Energy Price, Congestion Price, and Loss Price, the Transmission Constraint Penalty Factor ultimately affects LMP by impacting the value of the Congestion Price.

8.   The intended purpose of the Transmission Constraint Penalty Factor is to signal meaningfully high Congestion Prices in order to incentivize supply or demand to react by way of short-term or long-term investments that would resolve a local scarcity condition caused by a transmission constraint. The application of the Transmission Constraint Penalty Factor, therefore, generally results in prices that signal short-term responses and longer-term investment that would be beneficial to the reliability of the transmission system and therefore have the intended impact.

B.   The Application of the Default Transmission Constraint Penalty Factor is Inappropriate When the Transmission Outage is Caused by an RTEP or Interconnection Upgrade.

9.   Transmission upgrades are necessitated through RTEP, in part, because of expected load growth and associated congestion impacts, as well as the repeated application of the Transmission Constraint Penalty Factor. In situations where prior price signals from the application of the Transmission Constraint Penalty Factor do not result in sufficient resources entering the interconnection queue for development or adequate demand response at that location, the PJM planning process addresses the reliability and congestion issues at that location through an RTEP-planned upgrade.

10.   When a transmission facility is taken out of service to be upgraded because of a RTEP or interconnection upgrade, the remaining transmission facilities that serve the particular region can sometimes become constrained. If there is congestion on

the remaining transmission facilities in a localized area that could not be relieved by available resources, PJM would be required to impose the Transmission Constraint Penalty Factor for those constrained facilities.

11.   Locational price signals provided through the PJM markets are critical to incentivizing both short-term response and long-term investment. In the short-term, high energy prices signal the need for additional supply or reduced demand in a given area. In fact, allowing prices to increase to high levels when needed for *short* periods of time improves pricing signals and generally improves investment signals for flexible resources that are best able to capitalize on those more volatile prices.

12.   In circumstances where a transmission facility is taken out of service altogether due to a RTEP or interconnection upgrade, however, long-term price signals reflecting the default ($2,000/MWh) Transmission Constraint Penalty Factor cap do not serve the intended purpose given that the transmission upgrade currently under construction will mitigate these issues.

13.   In the long-term, while high prices signal the need for investment for additional supply or transmission capability into an area, investment in additional supply or transmission investment in the long-term is not necessary, because investments are already being made to strengthen the transmission capabilities and any transmission line outage is occurring only to accommodate the construction of the associated project. Once the upgrade to a transmission facility is complete, no additional transmission would be needed in this area and any potential additional transmission enhancements would be duplicative and unnecessary.

14.   In the short-term, it is unlikely that a resource could be developed prior to the completion of a transmission upgrade given that the historical average of a

transmission outage necessary to complete a RTEP upgrade is 211 days. Based on PJM's interconnection experience, it is unlikely that a resource could be financed, sited, and built within this timeframe. Even if a resource could be developed in the short-term prior to the completion of a transmission upgrade, it is unlikely that investors would attempt such a feat, because alleviating the transmission constraint would also eliminate the need to apply the Transmission Constraint Penalty Factor, undercutting their potential revenues. As a result, it is difficult to hypothesize how it would be a prudent investment decision to develop a new resource to address a short-term transmission constraint, because such a resource would likely not be able to recover its costs once the congestion is resolved.

15.   As a result, the only reasonably realistic response to any short-term price signal that could resolve a local scarcity caused by a transmission constraint would be limited to either demand-side response or expediting the development of a project that is already underway. Given this finite pool of possible short responses (which themselves are less costly than developing an entirely new resource outright), it is appropriate that the investment signal is reduced in these limited circumstances when there is no need to attract additional long-term investment. Specifically, the Transmission Constraint Penalty Factor will be reduced (not eliminated) to a value reflecting the highest cost resource deployed for constraint control. It is appropriate to set the reduced Transmission Constraint Penalty Factor based on the cost of the marginal unit controlling the constraint because all available units should continue to be incented to help alleviate the constraint. This reduced Transmission Constraint Penalty Factor effectively acts as the administratively set cap in these limited circumstances to provide short-term congestion pricing signals, which continues to incentivize short-term response in the form of

potential demand side resources or acceleration of projects that may already be underway. These short-term pricing signals are appropriate under limited circumstances where a RTEP or interconnection upgrade is driving the outage and resultant congestion is in a localized area with all resources available to control the congestion exhausted.

16.   Here, the proposed Transmission Constraint Penalty Factor revisions, which are the result of stakeholder discussion and approval, represent a reduction in the administratively set $2,000/MWh amount when the underlying cause of the congestion is necessitated by a transmission outage necessary to complete a RTEP upgrade or interconnection upgrade, which would ultimately enhance the transmission capability and eliminate the need for any short- or long-term response to the temporary congestion. In these limited circumstances, the application of the $2,000/MWh Transmission Constraint Penalty Factor does not produce the intended outcome. In effect, the proposed revisions reflect the lower reduced value of avoiding temporary local scarcity conditions caused by an outage necessary to complete a long-term transmission upgrade project.

C.   It is Appropriate to Not Apply the Transmission Constraint Penalty Factor in These Circumstances.

17.   The market rules should be updated so that the Transmission Constraint Penalty Factor is not applied for constraints that result when a transmission facility is taken out of service for purposes of a RTEP or interconnection upgrade because:

- load's wiliness to pay to resolve a transmission constraint, despite the potential reliability and other implications of such congestion, is reduced when expansions of transmission capacity are in progress and forthcoming;

- consumers, and the market, are harmed by the application of a high penalty factor when no supply or demand responds to high prices for an extended period of time;

- increased prices occurring over a substantial period of time are unlikely to incent useful, economic responses, particularly given the long-term solution already underway; and

- the full $2,000/MWh Transmission Constraint Penalty Factor should not be applied to signal locational scarcity in these instances, because the very cause of the congestion is an outage that is necessary to increase transmission system capability and therefore eliminate any local shortage.

18.   When the application of the full default $2,000/MWh Transmission Constraint Penalty Factor increases costs to consumers, no long-term investment signal is needed given that the congestion occurs solely because of an outage necessary to complete a long-term transmission upgrade.

19.   To address the potential harm to consumers caused by the unnecessary application of the Transmission Constraint Penalty Factor due to a transmission line outage associated with a RTEP or interconnection upgrade, it is appropriate to allow PJM to lower the Transmission Constraint Penalty Factor when there are insufficient available resources to relieve a transmission constraint on the remaining transmission facilities serving the local area.

20.   PJM has visibility into whether there are significant demand response resources registered in a particular location, as well as projects in the interconnection queue that are sufficiently advanced in the development phase. Thus, if there are sufficient resources that may realistically be incented to alleviate congestion as informed by the interconnection queue and demand response registrations in the area, PJM would not lower the Transmission Constraint Penalty Factor so as to maintain the $2,000/MWh price signal.

21.   On the other hand, if there are not any such known resources in these limited circumstances, PJM would lower the Transmission Constraint Penalty Factor, which still provides a short-term price signal for load to respond or for developers to expedite the completion of a project that may already be underway.

22.   Given that it is unlikely for a new resource to be sited, financed, and built within the average historical time to complete RTEP upgrades (211 days), only demand response or projects that may already be underway can be realistically developed in response to any short-term price signal. Therefore, it is appropriate to lower the price signal through a reduced Transmission Constraint Penalty Factor in these limited circumstances, because the pool of possible responses in the short-term are limited, while an additional long-term solution is unnecessary and undesired.

IV.   SUMMARY AND CONCLUSION

23.   The application of the existing Transmission Constraint Penalty Factor rules in the above described circumstances would not have the desired impact when congestion is caused by a transmission facility outage necessary to allow for a RTEP or interconnection upgrade.   The proposed amendment to the application of the Transmission Constraint Penalty Factor described above will ensure that consumers will not continue to be harmed by high costs with little, if any, commensurate benefit.

24.   This concludes my Affidavit.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
	)	
PJM Interconnection, L.L.C.,	)	**Docket No. ER23-918-000**
	)	
	)	

VERIFICATION

      Philip D'Antonio, being first duly sworn, deposes and says that he has read the foregoing "Affidavit of Philip D'Antonio on behalf of PJM Interconnection, L.L.C.," that he is familiar with the contents thereof, and that the matters and things set forth therein are true and correct to the best of his knowledge, information, and belief.

/s/ Philip D'Antonio
Philip D'Antonio
Director, Energy Market Operations
PJM Interconnection, L.L.C.

Dated: January 20, 2023