UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Transmission Planning Reliability Standards TPL-001-5	))))	Docket No. RM19-10-000

COMMENTS OF THE EDISON ELECTRIC INSTITUTE, THE AMERICAN PUBLIC POWER ASSOCIATION, THE LARGE PUBLIC POWER COUNCIL, AND THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

I. INTRODUCTION

The Edison Electric Institute ("EEI"), the American Public Power Association ("APPA"), the Large Public Power Council ("LPPC"), and the National Rural Electric Cooperative Association ("NRECA"), on behalf of their respective members (collectively, the "Trade Associations"), hereby respectfully submit comments in response to the Notice of Proposed Rulemaking ("NOPR") issued by the Federal Energy Regulatory Commission ("the Commission" or "FERC") on June 20, 2019, in the above-captioned docket.[1]

EEI is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for about 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. EEI's members are committed to providing affordable and reliable electricity to customers now and in the future. EEI's members include Generator Owners and Operators, Transmission Owners and Operators, Load-Serving Entities, and other entities that are subject to the mandatory Reliability Standards developed by the North American

[1] *Transmission Planning Reliability Standard TPL-001-5*, 167 FERC ¶ 61,249 (2019) ("NOPR").

Electric Reliability Corporation ("NERC") and enforced by NERC, the Regional Entities, and the Commission. Accordingly, EEI members are directly affected by the NOPR.

APPA is the national service organization representing the interests of the nation's 2,000 not-for-profit, community-owned electric utilities. Public power utilities account for 15percent of all sales of electric energy (kilowatt-hours) to ultimate customers and collectively serve over 49 million people in every state except Hawaii. Approximately 261 public power utilities are registered entities subject to compliance with NERC mandatory reliability standards.

LPPC is an association of the 27 largest state-owned and municipal utilities in the nation and represents the larger, asset-owning members of the public power sector. Eight LPPC members are also members of APPA and own approximately 90percent of the transmission assets owned by non-federal public power entities.

NRECA is the national trade association representing nearly 900 local electric cooperatives operating in 48 states. America's electric cooperatives power over 20 million businesses, homes, schools, and farms across 56 percent of the nation's landmass and serve one in eight (42 million) consumers. NRECA's member cooperatives include 62 generation and transmission ("G&T") cooperatives and 831 distribution cooperatives. The G&T cooperatives generate and transmit power to distribution cooperatives that provide it to the end-of-the-line co-op consumer-members. Collectively, G&T cooperatives provide power to nearly 80 percent of the nation's distribution cooperatives. The remaining distribution cooperatives receive power from other generation sources within the electric sector. Both distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable, and affordable electric service. NRECA's member cooperatives include cooperatives that are registered entities with

compliance obligations under Reliability Standards established by NERC. Therefore, the outcome of this proceeding may affect NRECA's member cooperatives and their consumer-members.

The Trade Associations support approval of TPL-001-5 without additional modifications. Reliability Standard TPL-001-5, as proposed, addresses all Commission concerns and directives in Order Nos. 754 and 786. In Order No. 754, the Commission directed NERC to study the Commission's concern related to "the non-operation of non-redundant primary protection systems."[2] In Order No. 786, the Commission directed NERC to address planned maintenance outages and stability analysis for spare equipment strategy.[3] Proposed TPL-001-5 accomplishes these objectives.

The Trade Associations do not support the Commission's proposal to direct NERC to modify TPL-001-5 to require corrective action plans ("CAPs") for protection system single points of failure in combination with a three-phase fault if the planning studies indicate potential cascading. The proposed Reliability Standard provides targeted protections based on the level of risk posed without imposing unnecessary CAPs in circumstances in which such changes will yield few reliability benefits.

II. COMMENTS

In Order No. 786, the Commission directed NERC to modify TPL-001-4, Transmission System Planning Performance Requirements, to address concerns regarding studies of known outages of less than six months duration.[4] On December 7, 2018, in response to Order No. 786,

[2] *Interpretation of Transmission Planning Reliability Standard*, 136 FERC ¶ 61,186, at P 19 (2011) ("Order No. 754").

[3] *Transmission Planning Reliability Standards*, 145 FERC ¶ 61,051, at P 40 (2013) ("Order No. 786").

[4] *Id.* at P 40.

NERC submitted proposed Reliability Standard TPL-001-5 for approval. The modified standard addressed the Commission's directive and included additional modifications that "improves upon currently effective Reliability Standard TPL-001-4 by providing for more comprehensive and robust planning studies, thereby improving reliability."[5]

On June 20, 2019, the Commission proposed to approve Reliability Standard TPL-001-5.[6] However, the Commission also proposed to direct NERC to modify the standard to require CAPs for Protection Systems where non-redundant elements fail in combination with a three-phase fault if planning studies indicate potential cascading.[7] The NOPR states that the Commission's concerns with the proposed Reliability Standard are related to the potential for a "reliability gap" because the standard, as proposed, would not require entities to develop CAPs for the revised Table 1, Stability 2.e-h (three-phase fault) extreme event scenario if their studies indicate potential cascading.[8]

A. Three-phase Faults are Rare Extreme Events That Should be Addressed on a Case-by-Case Basis.

The Trade Associations do not support the Commission's proposal to require CAPs for protection system single points of failure in combination with a three-phase fault if the planning studies indicate potential cascading. Single points of failure in combination with three-phase faults are rare and appropriately classified as Extreme Events and the uniform application of CAPs may not be the most efficient method to mitigate those issues. Allowing registered entities the discretion to manage this issue through targeted mitigation and system improvements based

[5] North American Elec. Reliability Corp., Petition for Approval of Proposed Reliability Standard TPL-001-05, p. 1, Docket No. RM19-10-000 (filed Dec. 7, 2018) ("NERC Petition").

[6] NOPR.

[7] *Id.* at P 27.

[8] *Id.* at P 26.

on assessed risk, as provided in the proposed TPL-001-5 Reliability Standard, is the appropriate approach to addressing this concern.

NERC stated that it reviewed over 12,000 protection system misoperations since 2011, finding that only 28 of those misoperations involved three-phase faults.[9] This represents a mere 0.23 percent of all misoperations over a seven-year period.[10] Moreover, of that number, only 10 misoperations involved breakers that failed to operate, which represents only 0.08 percent of all misoperations over that period, including all misoperations across the entire ERO footprint. Additionally, of that 0.08 percent of misoperations that involved breakers that failed to operate, not a single misoperation rose to the level of a reportable event under NERC Reliability Standard EOP-004.[11] Although this analysis acknowledges the possibility that such events can occur, it does indicate that such events are rare and, therefore, appropriately classified as Extreme Events.

The burdens that the proposed CAP requirement would impose are greater than the expected benefits and known risks. The Commission's proposed directive will obligate registered entities to apply CAPs without balancing the limited reliability risks to the Bulk Electric System ("BES"), when less costly mitigation may be available.

It is also important to recognize that "cascading can occur on a system, which may or may not be widespread."[12] This, coupled with regional differences that often impact how transmission planners characterize cascading events, would result in the identification of a greater number of overall issues for which CAPs would be required. Many of these identified

[9] NERC Petition, p. 26.

[10] *Id.*, p. 27.

[11] *Id.*

[12] NERC, *Methods for Establishing IROLs*, p. 74, https://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Reliability_Guideline_Methods_for_Establishing_IROLs.pdf (Sept. 2018) ("NERC Report").

issues may not represent a level of BES risk that warrants a CAP. From the NERC Report, if there is a "loss of one transmission circuit that causes an overload and successive tripping of another transmission circuit, that is generally characterized as cascading."[13] However, the impact on the BES in such circumstances is limited because these events are considered bounded.[14] In such instances, a CAP would not be warranted or necessary to preserve and protect reliability. Yet the proposed directive would afford no latitude to registered entities for these events, even where little reliability benefit would be achieved.

Retrofitting redundancy to address single points of failure to existing facilities is complex and likely to be very costly. The expectation is that a large outlay of resources should result in a commensurate improvement in reliability. This issue is further complicated if such resource expenditures require coordination with neighboring entities (*i.e.*, tie-lines). The empirical evidence, which shows 10 misoperations over seven years involving breakers that failed to operate but did not rise to the level of an EOP-004 reportable event, does not seem to support a meaningful improvement in reliability when considered against the anticipated costs that may be required under the proposed revisions.

In addition, the full scope of changes that may be required as a result of the proposed directive is not fully known at this time, and will not be until TPL 001-5 is implemented and additional studies completed. Accordingly, the record does not now support the proposed directive. There may be risks and unintended complications associated with the proposed directive, including difficulty in obtaining and coordinating necessary outages of BES Elements for modifications and the changeover to new protection systems. Taking equipment out of

[13] *Id.*, p. 74.

[14] *Id.*

service for this work, as well as the work required to facilitate these system modifications, can increase the risk of customer outages.

When imposing redundancy requirements, the Commission should consider that substation control houses are often built to accommodate existing needs and possible future expansion. If, at the time the station was built, it was not envisioned that redundant protective relays would be needed, there may be inadequate space to accommodate necessary expansion without replacing the entire control house. This situation could be further complicated at substations where a single set of batteries are installed if it is deemed necessary to install a fully redundant DC system. In these situations, a new or expanded control house would be necessary to accommodate this change. Single points of failure can also impact telecommunication systems and trip coils in circuit breakers. Each provide unique complications that can have significant impacts to the overall cost of redundancy without commensurate benefits to reliability. These factors, taken separately or in total, could result in substantial costs without commensurate benefits if mandated by revised compliance standards.

B. Proposed TPL-001-5 is an Appropriate Response to Identified Risks.

As proposed, TPL-001-5 reflects the consensus view of the industry that single line to ground ("SLG") faults are the most common types of faults affecting the BES. The proposed revisions to the planning standard effectively improve the requirements for the study of protection system single points of failure. Proposed Reliability Standard TPL-001-5 contains revisions to both the planning event (Category P5) and extreme events (Stability 2.a-h) - identified in Table 1 (Steady State and Stability Performance Planning Events and Steady State

and Stability Performance Extreme Events) and the associated footnote 13 - to provide for more comprehensive study of the potential impacts of protection system single points of failure.[15]

Under the standard as proposed, if it is determined through the development of an entity's annual Planning Assessment that the system is unable to meet the performance requirements identified in Category P5, including the ability to remain stable, then a CAP must be developed.[16] These Planning Assessments, which are conducted pursuant to Requirement R2, go beyond cascading alone. With the proposed changes made to Category P5, the primary risks to the BES associated with single points of failure (*i.e.*, single line to ground faults) have been fully addressed. In contrast, atypical three-phase faults are appropriately classified as Extreme Events, allowing entities to mitigate these issues based on their impact to the BES. Not all instances of cascading have the same impact on the BES. Accordingly, the Commission's concerns stated in the NOPR have been addressed in the standard in a manner that permits registered entities to tailor their responses to the particular facts, risks and circumstances of these events, without imposing a burdensome CAP requirement that may not provide commensurate reliability benefits.

C. Single Point of Failure Protection Systems Present Risks That Are Addressed in Proposed Reliability Standard TPL-001-5.

There are risks associated with transmission systems that have embedded single points of failure within Protection Systems and those risks can be exacerbated when three-phase faults occur. Nevertheless, as discussed above, it is well understood that three-phase faults are rare events on transmission systems. NERC studied this issue, and its analysis presented in the Petition to approve the TPL-001-5 Reliability Standard effectively addresses the Commission's

[15] Proposed Reliability Standard TPL-001-5, Requirement 2, Subpart 2.7

[16] NOPR at P 12.

concerns, which have been carefully considered throughout the development of the standard as described below.

On October 24 – 25, 2011, FERC held a technical discussion regarding concerns related to single points of failure and their potential risk to the reliability of the BES.[17] At that conference, the discussion recognized that more data was needed to assess the risks associated with single points of failure with Protection Systems. As a result, NERC Staff worked with the System Protection and Control Subcommittee ("SPCS") and System Analysis and Modeling Subcommittee ("SAMS") to develop a Section 1600 Data Request[18] to gather needed data. SPCS and SAMS used the data collected from the Section 1600 Data Request to assess all inherent risks and submit recommendations for addressing those risks. The SPC/SAMS Report[19] and its recommendations, along with the Order No. 786 directives, became the guidance for work conducted by the Standards Drafting Team ("SDT") for Project 2015 (Single Points of Failure TPL-001).

The SDT initially interpreted the statement in the SPC/SAMS Report Conclusions, which stated "[a]nalysis of the data demonstrates the existence of a reliability risk associated with single points of failure in protection systems that warrants further action,"[20] to mean a CAP was necessary. However, the SPC/SAMS Report's conclusions indicates that the "analysis shows that the risk from single point of failure is not an endemic problem."[21] The SPC/SAMS Report

[17] *Mandatory Reliability Standards for the Bulk-Power System*, Notice of Staff Meeting, Docket No. RM10-6-000 (Oct. 7, 2011).

[18] NERC, Order 754, https://www.nerc.com/pa/Stand/Pages/order_754.aspx.

[19] NERC, *Order No. 754 Assessment of Protection System Single Points of Failure Based on the Section 1600 Data Request Report*, https://www.nerc.com/comm/PC/System%20Protection%20and%20Control%20Subcommittee%20SPCS%2020/FERC%20Order%20754%20Final%20Report%20-%20SPCS-SAMS.pdf (Sept. 2015) ("SPC/SAMS Report").

[13] *Id*., Conclusions, page 11.

[21] *Id*.

also states that "[n]ot all failures adversely affect reliable operation of the bulk power system" and, most importantly and appropriately, concludes that three-phase faults of non-redundant parts of a protection system should be classified as Extreme Events, which do not require CAPs.[22] For this reason, CAPs were removed from the earlier version of TPL-001-5, allowing entities to address all other Extreme Events without imposition of a CAP. However, TPL-001-5 does provide adequate protections through Requirement R4, subpart 4.2 that obligates entities to evaluate "possible actions designed to reduce the likelihood or mitigate the consequences and adverse impacts" of Extreme Events where the "analysis concludes there is cascading caused by the occurrence of extreme events."[23]

In making this change, the SDT recognized that a regulatory directive for CAPs for an Extreme Event was unnecessary and disproportionately costly, yielding few reliability benefits. Similarly, the Commission also should consider the financial burden that would result from requiring CAPs for all protection system single points of failure if planning studies indicate potential cascading. Given the rarity of these types of events and the efforts companies undertake to mitigate the impact of these misoperations discussed above, resources spent to address this concern may be better allocated to other improvements that might provide substantially greater benefits to reliability.

D. Cost Estimates for Corrective Action Plans Associated with Single Points of Failure in Combination with a Three-Phase Fault are not Readily Available.

The NOPR seeks comments on how many CAPs might be required to address the reliability concerns associated with mitigating protection system single points of failure in

[22] *Id.*

[23] *Id.*

combination with a three-phase fault if planning study results indicate cascading.[24] Unfortunately, such data is not currently available and cannot readily be estimated at this time. Additionally, the planning studies required in the TPL-001-5 Reliability Standard represent substantial work for the industry well beyond anything currently required in the existing TPL-001-4 Reliability Standard. For this reason, the Trade Associations are not aware of any data that could be provided that would be responsive to the Commission's request.

III. CONCLUSION

The Trade Associations appreciates the opportunity to submit comments. For the foregoing reasons, the Trade Associations urge the Commission to approve the proposed TPL-001-5 Reliability Standard without further modifications.

Respectfully submitted,

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[24] NOPR at P 29.

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