

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Improvements to Generator)	Docket No. RM22-14-000
Interconnection Procedures and)	
Agreements)	

**REPLY COMMENTS OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION TO COMMENTS
OF THE ELECTRIC POWER RESEARCH INSTITUTE**

On June 16, 2022, the Federal Energy Regulatory Commission (“FERC” or the “Commission”) issued a Notice of Proposed Rulemaking (“NOPR”) proposing to reform its *pro forma* large and small generator interconnection procedures and agreements (together, the “Interconnection Procedures and Agreements”) (“Interconnection NOPR”).¹ On October 13, 2022, the North American Electric Reliability Corporation (“NERC”) and Regional Entities² (collectively, the “ERO Enterprise”) filed initial comments on the Interconnection NOPR.³ The ERO Enterprise supported the Interconnection NOPR and requested that the Commission modify its Interconnection Procedures and Agreements to incorporate: (i) model validation; (ii) electromagnetic transient (“EMT”) studies; (iii) elements of NERC Reliability Guidelines and IEEE 2800-2022 non-mandatory standards; and (iv) efficiency and effectiveness of interconnection queues.⁴ The ERO Enterprise also described the complementary regulatory

¹ *Improvements to Generator Interconnection Procedures and Agreements*, 179 FERC ¶ 61,194 (2022) [hereinafter *Interconnection NOPR*].

² The Regional Entities are (i) Midwest Reliability Organization (“MRO”); (ii) Northeast Power Coordinating Council, Inc. (“NPCC”); (iii) ReliabilityFirst Corporation (“ReliabilityFirst”); (iv) SERC Reliability Corporation (“SERC”); (v) Texas Reliability Entity, Inc. (“Texas RE”); and (vi) Western Electricity Coordinating Council (“WECC”). NERC and the Regional Entities comprise the ERO Enterprise.

³ *Comments of the North American Electric Reliability Corporation, Midwest Reliability Organization, Northeast Power Coordinating Council, Inc., ReliabilityFirst Corporation, SERC Reliability Corporation, Texas Reliability Entity, Inc., and Western Electricity Coordinating Council on the Notice of Proposed Rulemaking*, Docket No. RM22-14-000 (Oct. 13, 2022) [hereinafter *Initial ERO Enterprise Comments*].

⁴ *Comments of Electric Power Research Institute on Improvements to Generator Interconnection Procedures and Agreements Notice of Proposed Rulemaking*, Docket No. RM22-14-000 (Oct. 13, 2022) [hereinafter *EPRI’s Comments*].

program under section 215 of the Federal Power Act (“FPA”) with mandatory and enforceable NERC Reliability Standards that operate in tandem with Commission rules and regulations regarding the interconnection process. NERC also described projects to enhance Reliability Standards in light of the transforming grid, such as Project 2022-04 (evaluating potential modifications to Reliability Standards FAC-002, MOD-032, and TPL-001 for EMT modeling).

While strongly reiterating the requests made in Initial ERO Enterprise Comments, NERC appreciates the opportunity to submit reply comments to clarify the differences between mandatory NERC Reliability Standards, non-mandatory NERC Reliability Guidelines, and non-mandatory IEEE 2800-2022 standards. These reply comments also highlight aspects of IEEE 2800-2022, in the context of NERC Reliability Guidelines and other NERC activities that NERC believes are particularly worth Commission consideration for integration within the *pro forma* Interconnection Agreements and Procedures. These reply comments also provide some clarifying technical points and more detail regarding Project 2020-02 revising Reliability Standard PRC-024 (Generator Ride-Through). These reply comments seek to clarify any confusion regarding NERC perspectives on these matters in light of comments submitted October 13, 2022 by the Electric Power Research Institute (“EPRI”) which underscored advantages of certain recommendations in IEEE 2800-2022.

I. COMMENTS

A. NERC clarifies the distinction between mandatory NERC Reliability Standards, non-mandatory NERC Reliability Guidelines, and non-mandatory IEEE 2800-2022

NERC Reliability Standards, NERC Reliability Guidelines, and IEEE 2800-2022 reflect a continuum of increasingly sophisticated mandatory and non-mandatory measures to address potential risks to reliability of the Bulk Power System (“BPS”). As stated in the Initial ERO Enterprise Comments, under section 215 of the FPA, the ERO Enterprise develops mandatory and

enforceable Reliability Standards to ensure an adequate level of reliability for the Bulk Electric System (“BES”).⁵ These Reliability Standards are developed with industry using a results-based approach focusing on performance, risk management, and entity capability to meet the requirements. After Commission approval, publicly posted Reliability Standards apply to entities registered with NERC pursuant to the NERC Rules of Procedure (“ROP”). NERC Reliability Standards specify mandatory and clear reliability objectives so that responsible entities can develop suitable processes, procedures, or practices that meet stated performance requirements.

Non-mandatory Reliability Guidelines are distinct from and do not replace, mandatory and enforceable Reliability Standards. Reliability Guidelines are developed together with industry stakeholders under a public notice and comment process that provides stakeholders an opportunity to actively support their development and to provide feedback on detailed approaches and methods to address a particular reliability concern based on technically sound, diverse, subject matter expertise.

IEEE standards are inherently not mandatory unless a governing authority with jurisdiction adopts and enforces the IEEE standard and its associated requirements. Furthermore, IEEE 2800-2022 includes many recommended practices that could be deemed “informational.” Therefore, IEEE 2800-2022 operates similar to NERC Reliability Guidelines, although unlike NERC Reliability Standards and Reliability Guidelines, IEEE 2800-2022 standards are only available upon purchase. NERC staff and industry participated in the development of IEEE 2800-2022, and IEEE 2800-2022 is intended to be a useful tool for industry as inverter-based resources connect to the BPS. NERC Reliability Guidelines and IEEE 2800-2022 recommendations provide significant guidance on reliable integration of inverter-based resources, even as Commission Interconnection

⁵ Initial ERO Enterprise Comments at Section III.B.

Procedures and Agreements and mandatory NERC Reliability Standards are modified.⁶ As stated in the Initial ERO Enterprise Comments, Reliability Standard enhancement projects can consider IEEE standards. Through activities such as those highlighted in Initial ERO Enterprise Comments and flagged in the Commission’s pending notice of proposed rulemaking for inverter-based resource Reliability Standards, NERC is developing modifications to NERC Reliability Standards to address issues raised by increasing levels of inverter-based resources.⁷

B. Clarifications regarding the importance of ride-through requirements and advantages of IEEE 2800-2022 as NERC Reliability Standards are being revised.

Consistent with the Initial ERO Enterprise Comments, NERC requests that the Commission adopt interconnection requirements that ensure comprehensive ride-through performance for newly interconnecting inverter-based resources to the BPS. Conventional grid-following inverter-based resources are current-limited devices and their active power output is voltage-dependent; therefore, maintaining 100% pre-disturbance active power while providing reactive power to support the BPS is not always feasible during the fault period. For this reason, it is more suitable to refer to inverter performance using active and reactive current rather than active and reactive power. NERC recommends referring to “controls that maintain pre-disturbance active current (I_p)” in addition to the provision of reactive current (I_q) (i.e., reactive power support) rather than referring to “power.”

EPRI’s Comments suggest that IEEE 2800 has “significant improvements in IEEE 2800 over the NERC reliability guidelines that FERC should consider” with respect to ride-through requirements.⁸ While NERC does not agree with all of the statements made in EPRI’s Comments, NERC agrees that opportunities exist for improved ride-through performance requirements.

⁶ *Id.* at Section IV.D.

⁷ *Id.* at Section III.B.

⁸ EPRI’s Comments at P 12.

NERC Project 2020-02 Modifications to PRC-024 (Generator Ride-through) is in progress and underway. In particular, the pending project seeks to replace PRC-024 with a performance-based comprehensive ride-through standard that would help ensure generators remain connected to the BPS during system disturbances. The Standard Authorization Request (“SAR”) focuses on the generator protection and control systems that can result in power reduction or disconnection of generating resources during disturbance events. The standard drafting team supporting Project 2020-02 would, among other considerations, take into account the recommendations reflected in IEEE 2800-2022. The SAR excludes generator auxiliary systems; however, it does include all generator and plant level protections and controls that can affect the electrical output of a facility. NERC believes that momentary cessation should be disallowed for all newly connected inverter-based resources (which is addressed in PRC-024-3). The standard drafting team can align with industry activities such as IEEE 2800-2022, and industry is welcome to provide input throughout the drafting process.

NERC Reliability Standards, non-mandatory NERC Reliability Guidelines, and non-mandatory IEEE standards can operate as a feedback loop to improve reliability. The Interconnection NOPR proposes “to require newly interconnecting non-synchronous generating facilities to continue current injection inside the ‘no trip zone’ of the frequency and voltage ride-through curves of Reliability Standard PRC-024-3 or its successor standards, ...”⁹ This recognizes the manner in which mandatory, publicly available, and Commission-approved NERC Reliability Standards may evolve as non-mandatory guidelines and recommendations are developed together with industry stakeholders at NERC and IEEE.

⁹ Interconnection NOPR at P 336.

C. The Commission should consider certain IEEE 2800-2022 recommendations during interconnection reform.

As stated in Initial ERO Enterprise Comments, NERC recommends that the Commission consider certain IEEE 2800-2022 recommendations for Interconnection Procedures and Agreements, in addition to NERC Reliability Standards, and NERC Reliability Guidelines into Interconnection Procedures and Agreements. NERC agrees with much of the recommendations set forth in IEEE 2800-2022 as this IEEE standard was initiated based on numerous NERC Reliability Guidelines. NERC Reliability Guidelines, NERC Reliability Standards, and IEEE 2800-2022 all align to support BPS reliability, with IEEE 2800-2022 representing the growth and development of the ideas set forth originally in NERC Reliability Guidelines. NERC recommends that the Commission's interconnection reforms explicitly integrate the requirements and recommendations from IEEE 2800-2022 into *pro forma* interconnection agreement. There are, nonetheless, grid conditions that may require inverter control modes, settings, or protections that will not conform to IEEE 2800-2022 region-wide expectations. Transmission service providers should be permitted to establish additional performance requirements for those specific locations and instances beyond those region-wide requirements established under *pro forma* provisions subject to transparency and public notice. NERC requests that the Commission modify its Interconnection Procedures and Agreements as outlined above to include IEEE 2800-2022 provisions. NERC recommends prioritizing the following items from IEEE 2800-2022: (i) disturbance ride-through, (ii) active power–frequency control, (iii) reactive power–voltage control, (iv) data sharing, and (v) modeling.

II. CONCLUSION

NERC respectfully requests that the Commission consider these comments to help clarify the record. NERC also reiterates the request made in Initial ERO Enterprise Comments that the Commission’s revised Interconnection Procedures and Agreements for small and large generators incorporate: (i) model validation; (ii) electromagnetic transient (“EMT”) studies; (iii) elements of NERC Reliability Guidelines and IEEE 2800-2022 non-mandatory standards; and (iv) efficiency and effectiveness of interconnection queues.

Respectfully submitted,

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