

Implementation Plan

Project 2020-02 Modifications to PRC-024 (Generator Ride-through) Reliability Standards PRC-024-4 and PRC-029-1

Applicable Standard(s)

- PRC-024-4 Frequency and Voltage Protection Settings for Synchronous Generators and Synchronous Condensers
- PRC-029-1 Frequency and Voltage Ride Through Requirements for Inverter-Based Generating Resources

Requested Retirement(s)

- PRC-024-3 Frequency and Voltage Protection Settings for Generating Resources

Prerequisite Standard(s)

- PRC-028-1 Disturbance Monitoring and Reporting Requirements for Inverter-Based Resources

Proposed Definition(s)

- None

Applicable Entities

- See subject Reliability Standards.

Background

The purpose of Project 2020-02 is to modify Reliability Standard PRC-024-3 or replace it with a performance-based ride-through standard that ensures generators remain connected to the Bulk-Power System (BPS) during system disturbances. Specifically, the project focuses on using disturbance monitoring data to substantiate inverter-based resource (IBR) ride-through performance during grid disturbances. The project also ensures associated generators that fail to ride-through system events are addressed with a corrective action plan (if possible) and reported to necessary entities for situational awareness.

The purpose for this project is based on the culmination of multiple analyses conducted by the ERO Enterprise regarding widespread inverter-based resource tripping events. Furthermore, the NERC Inverter-Based Resource Performance Subcommittee¹ has developed comprehensive

¹ See documents at the NERC IRPS website: <https://www.nerc.com/comm/RSTC/Pages/IRPS.aspx> and the previous Inverter-Based Resource Performance Working Group website <https://www.nerc.com/comm/RSTC/Pages/IRPWG.aspx>

recommendations for improved performance of inverter-based resources, including the recommendation to develop comprehensive ride-through requirements.

In October 2023, FERC issued Order No. 901² which directs the development of new or modified Reliability Standards that include new requirements for disturbance monitoring, data sharing, post-event performance validation, and correction of IBR performance. In January 2024, NERC submitted a filing to FERC outlining a comprehensive work plan to address the directives within Order No. 901.³ Within the work plan, NERC identified three active Standards Development projects that would need to be filed for regulatory approval with FERC by November 4, 2024. These projects include **2020-02 Modifications to PRC-024 (Generator Ride-through)**⁴, **2021-04 Modifications to PRC-002-2**⁵, and **2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues**⁶.

Project 2020-02

Proposed Reliability Standard PRC-029-1 is a new Reliability Standard that includes ride-through requirements and performance requirements for IBRs. The scope of this project was adjusted to align with associated regulatory directives from FERC Order No. 901 and the scope of the other projects related to “Milestone 2” of the NERC work plan. The components of this project’s Standard Authorization Request (SAR) that related to the inclusions of new data recording requirements are covered in Project 2021-04 and the proposed new PRC-028-1 Reliability Standard. Components of this project’s SAR that relate to analytics and corrective actions plans are covered in Project 2023-02 and the proposed new PRC-030-1 Reliability Standard.

PRC-029-1 includes requirements for Generator Owner and Transmission Owner IBR to continue to inject current and perform frequency support during a BPS disturbance. The standard also specifically requires Generator Owner and Transmission Owner IBR to prohibit momentary cessation in the no-trip zone during disturbances.

PRC-024-4 includes modifications to revise applicable facility types to remove IBR and to include synchronous condensers.

² See FERC Order 901, Docket No. RM22-12-000; https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20231019-3157&optimized=false; October 19, 2023

³ See INFORMATIONAL FILING OF THE NORTH AMERICAN RELIABILITY CORPORATION REGARDING THE DEVELOPMENT OF RELIABILITY STANDARDS RESPONSIVE TO ORDER NO. 901 https://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/NERC%20Compliance%20Filing%20Order%20No%200901%20Work%20Plan_packaged%20-%20public%20label.pdf; January 17, 2024

⁴ See NERC Standards Development Project page for Project 2002-02; https://www.nerc.com/pa/Stand/Pages/Project_2020-02_Transmission-connected_Resources.aspx

⁵ See NERC Standards Development Project page for Project 2021-04; <https://www.nerc.com/pa/Stand/Pages/Project-2021-04-Modifications-to-PRC-002-2.aspx>

⁶ See NERC Standards Development Project page for Project 2023-02; <https://www.nerc.com/pa/Stand/Pages/Project-2023-02-Performance-of-IBRs.aspx>

General Considerations

The ERO Enterprise acknowledges that there are IBRs currently in operation and unable to meet voltage ride-through requirements due to their inability to modify their coordinated protection and control settings. Consistent with FERC Order No. 901, a limited and documented exemption process for those IBR is appropriate and included within this Implementation Plan. Other NERC Standards Development projects will be pursued to address ongoing identification and mitigation of any potential reliability impacts to the BPS for such exemptions.

Effective Date and Phased-in Compliance Dates

The effective dates for the proposed Reliability Standards are provided below. Where the standard drafting team identified the need for a longer implementation period for compliance with a particular section of a proposed Reliability Standard (i.e., an entire Requirement or a portion thereof), the additional time for compliance with that section is specified below. The phased-in compliance dates for those particular sections represent the date that entities must begin to comply with that particular section of the Reliability Standard, even where the Reliability Standard goes into effect at an earlier date.

PRC-024-4

Where approval by an applicable governmental authority is required, Reliability Standard PRC-024-4 shall become effective on the first day of the first calendar quarter that is 6 months after the effective date of the applicable governmental authority's order approving the standard, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the Reliability Standard PRC-024-4 shall become effective on the first day of the first calendar quarter that is 6 months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

PRC-029-1

Where approval by an applicable governmental authority is required, Reliability Standard PRC-029-1 shall become effective on the first day of the first calendar quarter that is six months after the effective date of the applicable governmental authority's order approving the standard, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the Reliability Standard PRC-029-1 shall become effective on the first day of the first calendar quarter that is six months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

Compliance Date for PRC-029-1 - Requirement R6

Entities shall not be required to comply with Requirement R6 until six months after the effective date of Reliability Standard PRC-029-1. This compliance date is intended to assure equipment limitations have additional time to complete the equipment limitation process as outlined below.

Retirement Date

PRC-024-3

Reliability Standard PRC-024-3 shall be retired immediately prior to the effective date of Reliability Standards PRC-024-04 and PRC-029-1 in the particular jurisdiction in which the revised standard is becoming effective.

Equipment Limitations and Process for Requirement R6

Consistent with FERC Order No. 901, a limited and documented exemption for some legacy IBR with certain documented equipment limitations are acceptable. Per the Order, these IBRs are

“...typically older IBR technology with hardware that needs to be physically replaced and whose settings and configurations cannot be modified using software updates – may be unable to implement the voltage ride through performance requirements.”⁷

To assure compliance with Requirement R6 and alignment with FERC Order No. 901, only those IBR that are in operation as of the effective date of PRC-029-1 may be considered for potential exemption. Further, only those IBR that are unable to meet voltage ride-through requirements due to their inability to modify their coordinated protection and control settings may be considered for potential exemption.

Generator Owners with IBR that meet these criteria for equipment limitations must identify which of those IBR will be unable to meet voltage ride-through requirements, as described in Requirement R6. For each identified IBR, the associated Generator Owner must document:

- Identifying information of the IBR (name, facility #, other)
- Which aspects of voltage ride-through requirements that the IBR would be unable to meet
- Information regarding the limiting equipment
- Information regarding any plans to repair or replace the limiting equipment that would remove the limitation (such as estimated date of repair/replacement)

For each identified IBR, the associated Generator Owner must communicate the documented information listed above to the associated Planning Coordinator(s), Transmission Planner(s), and Reliability Coordinator(s), per the Requirement R6 no later than the effective date of Requirement R6.

⁷ Order No. 901 at p. 193.