

Implementation Plan

Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues Reliability Standard PRC-030-1

Applicable Standard(s)

- PRC-030-1 Unexpected Inverter-Based Resource Event Mitigation

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definitions must be approved before the Applicable Standard becomes effective:

- PRC-029-1 Frequency and Voltage Ride Through Requirements for Inverter-Based Resources
- Ride-through
- Inverter-Based Resource (IBR)

Applicable Entities

- Generator Owner (GO)

Background

Multiple NERC disturbance reports,¹ including the Odessa disturbance report,² identified the undesired performance of Bulk Power System (BPS)-connected Inverter-Based Resources (IBR) during grid faults and have elaborated on the systemic and significant BPS reliability risks that this undesired performance can pose. IBRs may trip for many different reasons, may cease current injection due to inverter controls, or may have unwanted plant-level controller interactions. These types of issues have been extensively documented in the NERC reports. The resulting unexpected and unwarranted loss of generation poses a significant risk to BPS reliability. Project 2023-02 was initiated to address the reliability-related need and benefit by requiring analysis and mitigation of unexpected or unwarranted protection and control operations from Inverter-Based Resources (IBR) following the identification of such a performance issue.

¹ <https://www.nerc.com/pa/rrm/ea/Pages/Major-Event-Reports.aspx>

² <https://www.nerc.com/pa/rrm/ea/Pages/May-June-2021-Odessa-Disturbance.aspx>

In October 2023, FERC issued Order No. 901,³ which directs the development of new or modified reliability standards, including 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. 901⁴. Within the work plan, NERC identified three active Standards Development Projects that would need to be filed for regulatory approval with FERC November 4, 2024. These projects include 2020-02 Modifications to PRC-024 (Generation Ride Through),⁵ 2021-04 Modifications to PRC-002-2,⁶ and 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues.⁷

Project 2023-02

Proposed Reliability Standard PRC-030-1 is a new Reliability Standard that requires the Generator Owner to identify, analyze, and mitigate IBR performance issues. The scope of this project was adjusted to align with associated regulatory directives from FERC Order No. 901 and the scope of other projects related to “Milestone 2” of the NERC work plan. Specifically, Reliability Standard PRC-030-1 includes four (4) Requirements that require Generator Owners to: (1) define how events are to be identified, along with exceptions that should not be identified; (2) analyze identified events; (3) create a Corrective Action Plan (CAP) or technical justification when corrective actions are needed; and (4) mitigate performance risk through CAP implementation.

Proposed Reliability Standard PRC-030-1 includes the analytics and CAPs that complement Project 2020-02, which proposes new Reliability Standard PRC-029-1 addressing Ride-through and performance requirements for IBRs. The corresponding new data recording requirements are covered in Project 2021-04 and the new PRC-028-1 Reliability Standard.

General Considerations

This implementation plan recognizes the urgent need for Reliability Standards to address IBR CAPs to reduce disturbances, as demonstrated by multiple event reports of the last decade, while providing a reasonable period for entities to develop the necessary procedures and change their protection and control settings to meet the new requirements. The Electric Reliability Organization (ERO) Enterprise acknowledges that while there are IBR currently in operation, a standard is not in place that addresses CAPs for IBR.

³ *Reliability Standards to Address Inverter-Based Resources*, Order No.901, 185 FERC ¶ 61,042 (2023); https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20231019-3157&optimized=false

⁴ See *Informational Filing of the N. Am. Elec. Reliability Corp. Regarding the Development of Reliability Standards Responsive to Order No. 901.*, Docket No. RM22-12-000 (January 18, 2024).

⁵ See NERC Standards Development Project page for Project 2002-02; https://www.nerc.com/pa/Stand/Pages/Project_2020-02_Transmission-connected_Resources.aspx

⁶ 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>

⁷ See NERC Standards Development Project page for Project 2023-02; <https://www.nerc.com/pa/Stand/Pages/Project-2023-02-Performance-of-IBRs.aspx>

The ERO Enterprise acknowledges that Generator Owners and Generator Operators owning or operating BPS connected IBRs that do not meet NERC’s current definition of Bulk Electric System (BES) will be registered no later than May 2026 in accordance with the IBR Registration proceeding in FERC Docket No. RR24-2. To ensure an orderly registration and compliance process for these entities, as well as fairness and consistency in the standard’s application among similar asset types, this implementation plan provides additional time for both new and existing registered entities to come into compliance with Reliability Standard PRC-030-1’s requirements for their applicable IBRs not meeting the BES definition. In so doing, this implementation plan advances an orderly process for new registrants while allowing existing entities to focus their immediate efforts on their assets posing the highest risk to the reliable operation of the BPS.

This implementation plan requires that all BES IBRs fully comply with the requirements by the effective date. It requires that applicable non-BES IBRs⁸ comply by the later of: (1) January 1, 2027; or (2) the effective date of the standard.

Effective Date

The effective date for the proposed Reliability Standard is provided below.

Standard PRC-030-1

Where approval by an applicable governmental authority is required, Reliability Standard PRC-030-1 shall become effective on the later of 1) the first day of the first calendar quarter that is twelve (12) months after the effective date of the applicable governmental authority’s order approving the standard; or 2) the first day of the first calendar quarter that is twelve (12) months after the effective date of the applicable governmental authority’s order approving Reliability Standard PRC-029-1, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, Reliability Standard PRC-030-1 shall become effective on the later of 1) the first day of the first calendar quarter that is twelve (12) months after the date the standard is adopted by the NERC Board of Trustees; or 2) the first day of the first calendar quarter that is twelve (12) months after the date Reliability Standard PRC-029-1 is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

⁸ The facilities section of the standard applies to “Non-BES Inverter-Based Resources that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.”

PRC-030-1 Phased-in Compliance Dates

Requirements R1, R2, R3, and R4

Bulk Electric System IBRs

Bulk Electric System IBRs shall initially comply with all Requirements by the effective date of the standard.

Applicable Non-BES IBRs

Applicable Non-BES Inverter-Based Resources shall initially comply with Requirements R1, R2, R3, and R4 by the later of: (1) January 1, 2027; or (2) the effective date of the standard. Applicable Non-BES Inverter-Based Resources include non-BES Inverter-Based Resources that either have, or contribute to, an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.