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NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

NERC Inverter-Based Resource (IBR) Webinar Ten:

IBR Registration and Reliability Standards Enhancements

July 12, 2023

Parts of the Webinar 10 recording and FAQ pertain to modifications of the NERC Rules of Procedure (ROP) that would address owners and operators of inverter-based resources that are outside of the Bulk Electric System definition but connected to the bulk power system. As a result, Webinar 10 resources will be published in full when NERC posts draft ROP revisions on the NERC website for 45-day public comment, which is currently planned for the first week of September.

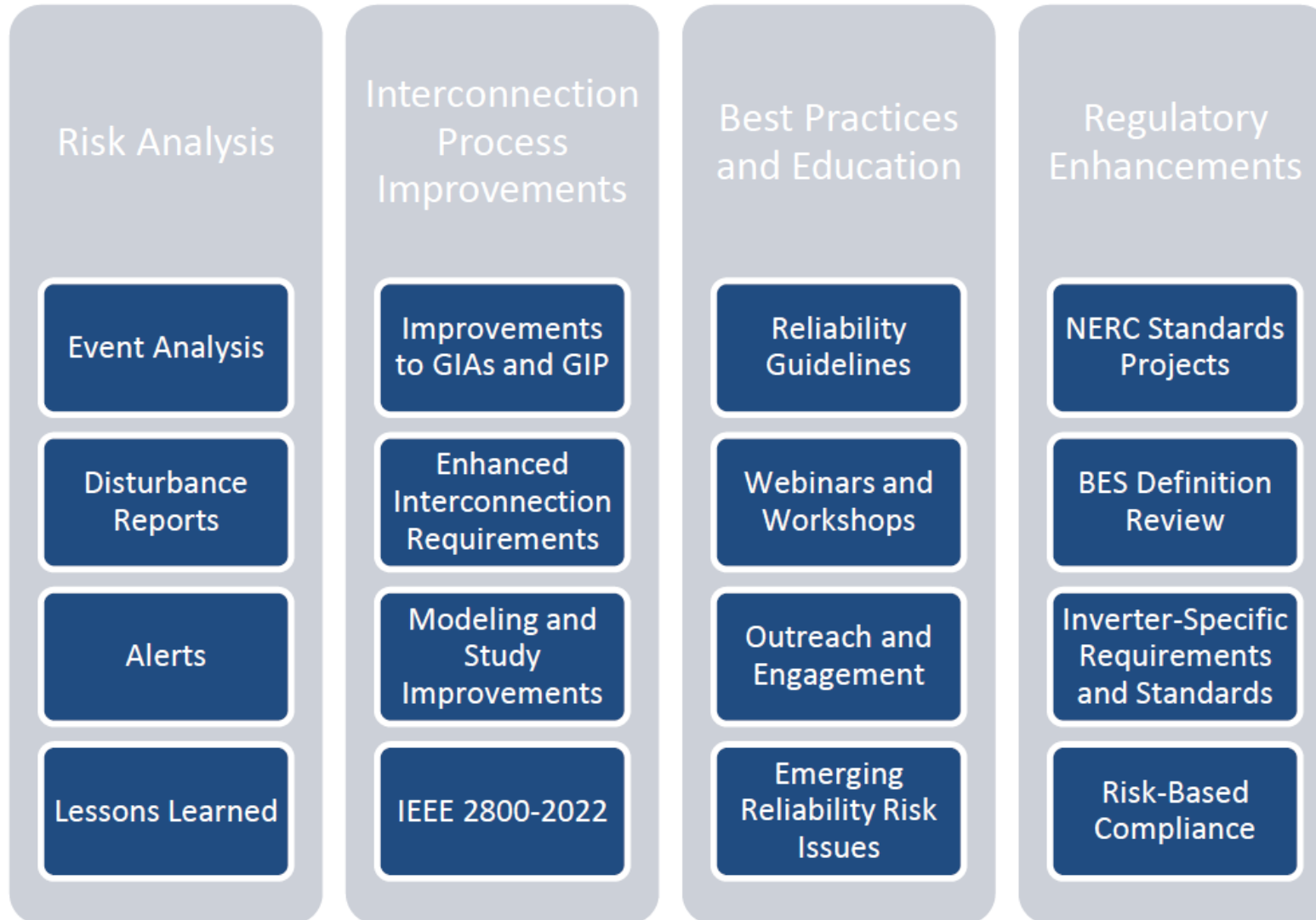
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NERC Standards Enhancements:

IBR-Related Standards Projects Underway

July 12, 2023



Planned Upcoming Reports:

- BESS-Related Events in California in 2022
- Texas Wind Event in 2022
- Solar PV-Related Event in Utah in 2023



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

- Located on the NERC website
 - Links to individual standards pages

The screenshot shows the NERC website's 'Reliability Standards Under Development' page. The page includes a navigation menu with links such as 'About NERC', 'Career Opportunities', 'Governance', 'Committees', 'Program Areas & Departments', 'Standards', 'Initiatives', 'Reports', 'Filings & Orders', and 'Newsroom'. A search bar is located in the top right corner. The main content area is titled 'Reliability Standards Under Development' and provides information about the RSUD page, including a link to participate in NERC's Quality Review (QR) program. Below this, there is a table titled 'Reliability Standards Under Development' with a sub-header 'Projects in Active Formal Development'. The table lists various projects, including modifications to CIP, PRC, and MOD standards, along with their effective dates and descriptions.

| Reliability Standards Under Development | |
|---|--|
| Projects in Active Formal Development | |
| 2016-02 | Modifications to CIP Standards - CIP-002, CIP-003, CIP-004, CIP-005, CIP-006, CIP-007, CIP-008, CIP-009, CIP-010, CIP-011, CIP-012-1 |
| 2017-01 | Modifications to BAL-003 Phase II |
| 2019-04 | Modifications to PRC-005-6 |
| 2020-02 | Modifications to PRC-024 (Generator Ride-through) |
| 2020-04 | Modifications to CIP-012 |
| 2020-06 | Verifications of Models and Data for Generators |
| 2021-01 | Modifications to MOD-025 and PRC-019 |
| 2021-02 | Modifications to VAR-002-4.1 |
| 2021-03 | CIP-002 |
| 2021-04 | Modifications to PRC-002-2 |
| 2021-06 | Modifications to IRO-010 and TOP-003 |
| 2021-07 | Extreme Cold Weather Grid Operations, Preparedness, and Coordination |
| 2021-08 | Modifications to FAC-008 |
| 2022-01 | Reporting ACE Definition and Associated Terms |
| 2022-02 | Modifications to TPL-001-5.1 and MOD-032-1 |
| 2022-03 | Energy Assurance with Energy-Constrained Resources |
| 2022-04 | EMT Modeling |
| 2022-05 | Modifications to CIP-008 Reporting Threshold |
| 2023-01 | EOP-004 IBR Event Reporting |
| 2023-02 | Performance of IBRs |
| 2023-03 | Internal Network Security Monitoring (INSM) |
| 2023-04 | Modifications to CIP-003 |

- The standard drafting process starts with a Standard Authorization Request (SAR).
 - SAR can be written by any person or organization by submitting a SAR form.
 - SAR define an Industry Need (what Bulk Electric System benefit does the proposed project provide).
 - SAR must be presented to, and accepted by the NERC Standards Committee.
- Once a SAR is accepted, drafting team members are nominated through the nomination form.
 - Drafting team members are selected from the nominees.
- Standards drafting process begins and the drafting team:
 - Responds to comments on the SAR.
 - Creates draft language.
 - Responds to comments that come from the balloting process.
- Standard is deemed complete after posting responses to all comments and conducting a final ballot. After a final ballot, Standards must be approved by the NERC Board and filed with FERC (or provincial government)

- **IBR Ride through**
- **Background:**
 - **Standard(s) affected:** PRC-024
 - Retire PRC-024-3 and replace it with a performance-based ride-through standard that ensures generators remain connected to the BPS during system disturbances.
 - Focus is on the generator protection and control systems that can result in the reduction of disconnection of generating resources.
- **Industry Need:**
 - Mitigate the ongoing and systemic performance issues identified across multiple Interconnections and across many disturbances analyzed by NERC and the Regions.
 - Issues have been identified in inverter-based resources as well as synchronous generators, with many causes of tripping entirely unrelated to voltage and frequency protection settings as dictated by the currently effective version of PRC-024.
- **Current Status:**
 - No Drafts

- **Verifications of Model and Data for Generators**
- **Background:**
 - **Standard(s) affected:** MOD-026 and MOD-027
 - Revisions needed to clarify the applicable requirements for synchronous generators and to require sufficient model verification to ensure accurate generator representation in dynamic simulations.
- **Industry Need:**
 - Accurate model response is required for engineers to adequately study system conditions and it is crucial that all parameters in a model be verified in some way.
 - Will help fill current gaps as a significant number of modeling parameters are not verified in the typical verification tests currently used to comply with MOD-026 and MOD-027
- **Current Status:**
 - MOD-026-2 Draft 3

- **Modifications to MOD-025 and PRC-019**
- **Background:**
 - **Standard(s) affected:** MOD-025 and PRC-019
 - MOD-025: To address issues regarding verification and data reporting of generator active and reactive power capability. Current time of work vs value of data is not sufficient.
 - PRC-019: Address numerous issues to make the standard inclusive of all generating resources.
- **Industry Need:**
 - MOD-025: To provide more useful data through verification activities performed by equipment owners.
 - PRC-019: Standard addresses important reliability need for protection coordination and clarity is needed to ensure requirements are inclusive of all generating resources.
- **Current Status:**
 - MOD-025-3 Draft 2
 - PRC-019-3 Draft 2

- **Modifications to VAR-002-4.1**
- **Background:**
 - **Standard(s) affected:** VAR-002
 - To address ambiguities of voltage and reactive resource Requirements concerning dispersed power producing resources.
- **Industry Need:**
 - Reactive support and voltage control are Essential Reliability Services and thus, clarity on the applicability of requirements to IBR is essential with the current grid transformation.
- **Current Status:**
 - VAR-002-5 Draft 2

- **Modifications to PRC-002 - Phase II**
- **Background:**
 - **Standard(s) affected:** PRC-002
 - To modify the requirements to ensure adequate data is available and periodically assessed to facilitate the analysis of BES disturbances, including in areas of the Bulk Power System (BPS) that may not be covered by the existing requirements.
- **Industry Need:**
 - Location requirements and associated periodic assessments need to be revised such that required data is available for the purposes of post-mortem event analysis and identifying root causes of large system disturbances.
- **Current Status:**
 - PRC-002-4 Final Draft

- **Modifications to TPL-001 and MOD-032**
- **Background:**
 - **Standard(s) affected:** TPL-001 and MOD-032
 - Clarifications needed “to address terminology throughout the standard that is unclear with regards to inverter-based resources“
 - Enhancements to MOD-032 to include “data requirements and reporting procedures” for Distributed Energy Resources
- **Industry Need:**
 - Transmission planning and modeling requirements are essential to the reliability of the BPS, thus clarity on the applicability of requirements to IBR is essential with the current grid transformation.
- **Current Status:**
 - MOD-032 Draft 2
 - TPL-001 No Drafts

- **EMT Modeling**
- **Background:**
 - **Standard(s) affected:** FAC-002, MOD-032, and TPL-001
 - To include Electromagnetic Transient (EMT) model and studies in planning-related NERC Standards to ensure reliable operation of the BPS moving forward.
- **Industry Need:**
 - Currently a reliability-related need and benefit by ensuring TPs and PCs have the models and tools necessary to adequately conduct reliability assessments under increasing levels of inverter-based resources. This requires the collection of EMT models by applicable entities and TPs and PCs to conduct EMT studies where needed.
- **Current Status:**
 - No Drafts

- **EOP-004 IBR Event Reporting**
- **Background:**
 - **Standard(s) affected:** EOP-004
 - Enhancements focused on ensuring timely reporting by industry to the Electric Reliability Organization (ERO) Enterprise through reporting of events involving inverter-based resources (IBRs)
- **Industry Need:**
 - Reporting of generation loss events, per the current EOP-004, uses relatively large size thresholds more suitable for synchronous generation; however, NERC and the Regional Entities have analyzed multiple widespread solar PV loss events (some also involving other generation losses as well) across a large number of resources that did not meet the current EOP-004 criteria.
- **Current Status:**
 - No Drafts

- **Performance of IBRs**
- **Background:**
 - **Standard(s) affected:** PRC-004
 - Multiple NERC disturbance reports have identified the undesired performance of bulk power system (BPS)-connected inverter-based resources (IBRs) during grid faults, and have elaborated on the systemic and significant BPS reliability risks that this undesired performance can pose.
- **Industry Need:**
 - Addresses the reliability-related need and benefit by requiring analysis and mitigation of unexpected or unwarranted protection and control operations from inverter-based resources following the identification of such a performance issue.
 - The location requirements and associated periodic assessments need to be revised. These revisions are necessary so that required data is available for the purposes of post-mortem event analysis and identifying root causes of large system disturbances.
- **Current Status:**
 - No Drafts

- For information on the Standards Development Process, refer to the [Standard Processes Manual](#) or visit <https://www.nerc.com/pa/Stand/Pages/default.aspx>
- To stay up to date on Standards news, updates to project statuses, and how to subscribe to weekly updates, please review NERC weekly Standards, Compliance, and Enforcement Bulletins ([Standards, Compliance, and Enforcement Bulletin Archive \(nerc.com\)](#))



Questions and Answers

*Feel free to reach out to us if
interested in participating in the NERC
IRPS or EMTTF!*