NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda
Standards Committee (SC) Meeting

November 13, 2024 | 1:00 – 3:00 p.m. Eastern

Virtual Meeting

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NERC Antitrust Compliance Guidelines, Public Announcement, and Participant Conduct Policy

Introduction and Chair's Remarks

Agenda Items

1. **Review November 13, 2024 Agenda - Approve -** Todd Bennett*, SC Chair*
   a. Waiver of the Five-Day Rule – Approve – Soo Jin Kim, *NERC Staff*
2. **Consent Agenda* - Approve -** Todd Bennett*, SC Chair*
   a. October 16, 2024 Standards Committee Meeting Minutes
3. **Revisions to FAC-001 and FAC-002 Standard Authorization Request* - Accept -** Alison Oswald*, NERC Staff*
   a. Revisions to FAC-001 and FAC-002 Standard Authorization Request*
4. **Project 2022-03 Energy Assurance with Energy-Constrained Resources* – Approve** – Mike Knowland, ISO-NE
   a. TOP-003-7*
   b. Implementation Plan*
5. **FERC Order No. 901 Milestone Project Update - Informational** - Jamie Calderon*, NERC Staff*
6. **Project 2022-02 Uniform Modeling Framework for IBR*- Authorize –** Alison Oswald*, NERC Staff*
   a. Project 2022-02 Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements Standard Authorization Request*
7. **Project 2020-06 Verifications of Models and Data for Generators* - Authorize –** Jamie Calderon*, NERC Staff*
   a. Project 2020-06 Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation Standard Authorization Request*
8. **Project 2021-01 System Model Validation with IBRs* - Authorize –** Jamie Calderon*, NERC Staff*
   a. Project 2021-01 Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs Standard Authorization Request*

9. **Project 2021-01 System Model Validation with IBRs* NON-PUBLIC - Appoint -** Alison Oswald*, NERC Staff*
10. **Project 2024-02 Planning Energy Assurance - Motion to Reconsider –** Charlie Cook*, SC Member*
11. **2025 Standards Committee Meeting Schedule* - Informational -** Dominique Love*, NERC Staff*
    a. 2025 Standards Committee Meeting Schedule Draft*
12. **Standards Committee 2025-2026 Term Elections and Segment 6 Special Election - Informational -** Dominique Love*, NERC Staff*
13. **Projects Under Review - Review**
    a. Project Tracking Spreadsheet - Mike Brytowski*, PMOS Chair*
    b. Projected Posting Schedule & Three-Month Outlook - Nasheema Santos*, NERC Staff*
14. **Legal Update and Upcoming Standards Filings - Review -** Alain-Christian Rigaud*, NERC Staff*
15. **Informational Items* - Enclosed**
    a. Standards Committee Expectations
    b. 2024 SC Meeting Schedule
    c. 2024 Standards Committee Roster
    d. Highlights of Parliamentary Procedure
16. **Adjournment**

*Background materials included.

Waiver of the Five-Day Rule

Action

Approve waiver of the five-business day notice to stakeholders, consistent with Chapter 9 of the Standards Committee Charter.

Background

Under Chapter 9 of the Standards Committee Charter, "[t]he secretary shall provide an agenda with a written notice (letter, facsimile, or e-mail) for Committee meetings no less than five business days before a proposed meeting." "Items not in the agenda that require a vote cannot be added at a meeting without the unanimous consent of the members present. If such a matter arises [. . .]."

The third comment and ballot period for BAL-007-1 along with the initial comment and ballot period for TOP-003-7 concluded on November 4, 2024. Both Reliability Standards, BAL-007-1 and TOP-003-7, passed ballots with 81.53% and 92.77%, respectively. Additionally, their associated Implementation Plans passed ballots with 83.72% and 76.3% approvals.

There were two errors identified during the third ballot of BAL-007-1 and initial ballot of TOP-003-7, with one error in the Implementation Plan and the other error in Requirement 1 in Reliability Standard TOP-003-7. Details of the items are contained in agenda item 4.

Approving the waiver will add Item 4 to today's agenda. If Item 4 is added, the SC will determine if the revisions to correct the errors are non-substantive revisions. If the revisions are substantive, BAL-007-1 and TOP-003-7 will need to be posted for an additional 45-day ballot. If the revisions are non-substantive, BAL-007-1 and TOP-003-7 can move forward with a 10-day final ballot.

Summary

NERC staff recommends that the SC approve waiver of the five-business day notice to stakeholders with respect to Agenda Item 4, Project 2022-03 Energy Assurance with Energy-Constrained Resources consistent with Chapter 9 of the Standards Committee Charter.

Meeting Minutes
Standards Committee Meeting

T. Bennett, chair, called to order the meeting of the Standards Committee (SC or the Committee) on October 16, 2024, at 1:03 p.m. Eastern. D. Love called roll and determined the meeting had a quorum. The SC member attendance and proxy sheets are attached as Attachment 1.

NERC Antitrust Compliance Guidelines and Public Announcement
D. Love called attention to the NERC Antitrust Compliance Guidelines and the public meeting notice and directed questions to NERC's General Counsel, Sonia C. Rocha.

Introduction and Chair's Remarks
T. Bennett welcomed the Committee, guests, and proxies to the meeting.

Review October 16, 2024 Agenda (agenda item 1)
The Committee approved the October 16, 2024, meeting agenda.

Consent Agenda (agenda item 2)
The Committee approved the September 18, 2024, Standards Committee Meeting Minutes. The Committee approved the Standards Committee Process Subcommittee Technical Rationale for Reliability Standards.

S. Kelly provided remarks and highlighted the recent success of the FERC Order No. 901 Milestone 2 projects.

Project 2020-02 Modifications to PRC-024 Errata (agenda item 3)
J. Calderon provided an overview. C. Fritz commented that there should be enough time allotted for quality control to catch grammatical mistakes. T. Bennett commented that there is an active lesson-learned document that will be available in the near future which would help strengthen the standards development process in regard to situations that are similar. W. Chambliss made a motion to approve errata to proposed Reliability Standard PRC-029-1 and the associated Implementation Plan, consistent with Section 12.0 of the Standard Processes Manual (SPM).

The committee approved the motion with no oppositions and no abstentions.

Revisions to Project Management Oversight Subcommittee Scope (agenda item 4)
J. Snider provided an overview. C. Cook asked if the SC delegated the approval of project schedules to the Project Management Oversight Subcommittee (PMOS). T. Bennett responded that the PMOS has oversight of project scheduling. C. Cook commented on not seeing schedules come forth to the PMOS for approval. S. Rueckert made a motion to approve the updated PMOS Scope Document.

The committee approved the motion with no oppositions and no abstentions.

Project 2024-02 Planning Energy Assurance (agenda item 5)
A. Oswald provided an overview and highlighted the overlap of Project 2022-03 drafting team (DT) members. T. Bennett provided support for having Project 2022-03 DT members being selected by NERC. P. MacDonald made a motion to appoint chair, vice chair, and members to the Project 2024-02 Planning Energy Assurance DT, as recommended by NERC staff.

The committee approved the motion with no oppositions and no abstentions.

Project 2024-03 Revisions to EOP-012-2 (agenda item 6)
A. Oswald provided an overview and highlighted the project's scheduling. C. Cook inquired about the expected postings of the project. A. Oswald responded that the schedule allows for three commenting and balloting periods and that the schedule can be found on the project page. C. Yeung encouraged an industry workshop for this project. P. MacDonald made a motion to Authorize initial posting of proposed Reliability Standard EOP-012-3 and the associated implementation plan for a 20-day formal comment period, with ballot pools will be formed in the first 10 days and parallel initial ballots and non-binding polls for the associated Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs), conducted during the last 5 days of the comment period.

The committee approved the motion with no oppositions and no abstentions.

2025 Standards Committee Meeting Schedule (agenda item 7)
D. Love provided an overview of the 2025 SC meeting schedule and highlighted that the Committee will meet at two ROAM co-working facilities in 2025**.**

Standards Committee 2025-2026 Term Elections and Segment 6 Special Election (agenda item 8)
D. Love provided an overview of the term and Segment 6 special elections. Both the term elections for 2025-2026 terms and Segment 6 special election will concur simultaneously. The candidate who receives the highest number of votes will be awarded the two-year seat, while the candidate with the second-highest number of votes will be awarded the one-year seat for Segment 6.

Standing Committee Self-Assessment (agenda item 9)
D. Love provided an update and reminded the Committee to submit their responses by October 31, 2024.

Reliability Standards Development Plan (agenda item 10)
A. Oswald provided an overview. P. MacDonald made a motion to endorse the 2025-2027 Reliability Standards Development Plan (RSDP).

The committee approved the motion with no oppositions and no abstentions.

FERC Order No. 901 Milestone Update (agenda item 11)
J. Calderon provided an update.

Projects Under Review (agenda item 12)
M. Brytowski reviewed the Project Tracking Spreadsheet. N. Santos reviewed the Project Posting Schedule and three-month outlook.

Update Legal Update and Upcoming Standards Filings (agenda item 13)
A. Rigaud provided an update.

Adjournment
The meeting adjourned at 2:43 p.m. Eastern.

Standards Committee
2024 Segment Representatives

Segment and Terms	Representative	Organization	Proxy	Present (Member or Proxy)
Chair 2024-25	Todd Bennett* Managing Director, Reliability Compliance & Audit Services	Associated Electric Cooperative, Inc.		y
Vice Chair 2024-25	Troy Brumfield* Regulatory Compliance Manager	American Transmission Company		y
Segment 1-2024-25	Charlie Cook Lead Compliance Analyst	Duke Energy		y
Segment 1-2023-24	Amy Casuscelli Manager, Reliability Assurance & Risk Management	Xcel Energy	Hannah Crites	y
Segment 2-2024-25	Jamie Johnson Infrastructure Compliance Manager	California ISO		y
Segment 2-2023-24	Charles Yeung Executive Director Interregional Affairs	Southwest Power Pool		y
Segment 3-2024-25	Claudine Fritz Principal Compliance Specialist	Exelon Corporation		y
Segment 3-2023-24	Vicki O' Leary Director – Reliability, Compliance, and Implementation	Eversource Energy		y
Segment 4-2024-25	Marty Hostler Reliability Compliance Manager	Northern California Power Agency		y
Segment 4-2023-24	Patti Metro* Senior Grid Operations & Reliability Director	National Rural Electric Cooperative Associate		y
Segment 5-2024-25	Terri Pyle* Utility Operational Compliance and NERC Compliance Office	Oklahoma Gas and Electric		y
Segment 5-2023-24	Jim Howell Sr Director, Strategy	Treaty Oak Clean Energy		n

Segment and Terms	Representative	Organization	Proxy	Present (Member or Proxy)
Segment 6-2024-25	N/A	none		n/a
Segment 6-2023-24	Justin Welty Senior Manager, NERC Reliability Standards	NextEra Energy		y
Segment 7-2024-25	Maggy Powell Principal Security Industry Specialist, Energy & Utilities	Amazon Web Services		y
Segment 7-2023-24	Venona Greaff* Senior Energy Analyst	Occidental Chemical Corporation		y
Segment 8-2024-25	Robert Blohm[1] Managing Director	Keen Resources Ltd.		y
Segment 8-2023-24	Philip Winston Retired	Independent		n
Segment 9-2024-25	Paul MacDonald[1] Director Reliability Standards, Compliance and Enforcement	New Brunswick Energy and Utilities Board		y
Segment 9-2023-24	William Chambliss General Counsel	Virginia State Corporation Commission		y
Segment 10-2024-25	Dave Krueger Senior Program Manager, Operations	SERC Reliability Corporation		y
Segment 10-2023-24	Steven Rueckert Director of Standards	WECC		y

[1] Serving as Canadian Representative
*Denotes SC Executive Committee Member

Revisions to FAC-001 and FAC-002 Standard Authorization Request

Action

- Accept the Revisions to the FAC-001 and FAC-002 Standard Authorization Request (SAR);
- Authorize posting of the SAR for a 30-day informal comment period per Section 4.2 of the SPM; and
- Assign the SAR to NERC Project 2022-04 EMT Modeling.

Background

The project will address the reliability risks to the bulk power system (BPS) due to observed systemic deficiencies in Inverter-based Resource (IBR) performance and modeling that were observed by North American Electric Reliability Corporation (NERC) in numerous disturbance reports and other NERC publications. Additionally, enhancements to generator interconnection study processes, including conformity assessment processes for IBRs connecting to the BPS (i.e., all registered IBRs), are paramount to ensure reliable IBR operation and to prevent large disturbance events during normally cleared BPS events.

This SAR intends to enhance FAC-001 to require that Transmission Owners (TOs) coordinate with their associated Transmission Planners (TP) and Planning Coordinators (PC) to establish IBR performance requirements. This project will also enhance the latest FAC-001 or FAC-002 Standard, in complement with Federal Energy Regulatory Commission (FERC) Order No. 2023 and FERC Generator Interconnection Agreements/Generator Interconnection Procedures, to require TPs and PCs to enhance their generation interconnection study processes to assess in more detail IBR plant capability and performance conformity, and require applicable entities (TOs, Transmission Operators, Balancing Authorities) to enhance existing generator interconnection requirements and study practices. This project will remain a medium priority as it aligns with the current prioritization criteria of “tandem projects to a high-priority project”. The project will not have any Milestone 3 projects directives assigned.

This SAR was developed by the NERC Inverter-Based Resource Performance Subcommittee, which is a consensus building stakeholder group under the Reliability and Technical Security Committee (RSTC). The SAR was endorsed by the RSTC on September 11, 2024.

Summary

NERC Staff recommends that the Standards Committee (SC) accept the SAR, authorize posting for a 30-day informal comment period, and assign the SAR to NERC Project 2022-04 EMT Modeling.

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Revisions to FAC-001-4 and FAC-002-4		
Date Submitted:	October 29, 2024		
SAR Requester			
Name:	Julia Matevosyan, ESIG (NERC IRPS Chair) Rajat Majumder, Invenergy (NERC IRPS Vice Chair)		
Organization:	NERC Inverter-Based Resource Performance Subcommittee (IRPS)		
Telephone:	Julia – 512-994-7917 Rajat – 4077612549	Email:	julia@esig.energy RMajumder@invenergy.com
SAR Type (Check as many as apply)			
☐ New Standard ☒ Revision to Existing Standard ☐ Add, Modify or Retire a Glossary Term ☐ Withdraw/retire an Existing Standard		☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)	
Justification for this proposed Standard development project (Check all that apply to help NERC prioritize development)			
☐ Regulatory Initiation ☐ Emerging Risk (Reliability Issues Steering Committee) Identified ☐ Reliability Standard Development Plan		☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☒ Industry Stakeholder Identified	
What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
The bulk power system (BPS) in North America is undergoing a rapid transformation towards high penetrations of inverter-based resources. This grid transformation adds significant complexity and a changing risk landscape that requires inverter-based resource- (IBR) specific Standards requirements. Recent North American Electric Reliability Corporation (NERC) disturbance reports such as San Fernando, Odessa I and II, Southwest Utah, etc.[1] as well as the November 2023 *NERC Inverter-Based Resource (IBR) Performance Issues Report Findings from Level 2 Alert*[2] show evidence of systemic deficiencies in both IBR performance and modeling that create numerous:			

[1] https://www.nerc.com/pa/rrm/ea/Pages/Major-Event-Reports.aspx
[2] https://www.nerc.com/comm/RSTC_Reliability_Guidelines/NERC_Inverter-Based_Resource_Performance_Issues_Public_Report_2023.pdf

Requested information
• Opportunities for improvement to ensure consistent practices in implementation of Federal Energy Regulatory Commission ("FERC") Generator Interconnection requirements under the Large and Small Generator Interconnection Agreements and Procedures (LGIA/LGIP/SGIA/SGIP also referred to herein as the GIA and GIP for convenience). Failures in the voluntary adoption of NERC recommendations and guidance to enhance generator interconnection requirements and ensure reliable connection IBRs. • Opportunities to enhance current practices for assessing IBR plant capability and performance against applicable generator interconnection requirements as created according to FAC-001. (i.e., conformance testing) • Opportunities to enhance generator interconnection study processes as created according to FAC-002 to help ensure the reliable commissioning of IBR facilities during the generator interconnection process, due to gaps in current IBR commissioning practices. ▪ Lack of adequate or sufficient performance tests during commissioning. ▪ Lack of verification of the as-built models as part of feedback loop. ▪ Lack of adequate benchmarking of models (e.g. positive sequence phasor domain (PSPD) and electromagnetic transient (EMT) models) against each other and real product performance. Without taking advantage of the opportunities for improvement summarized above to enhance NERC reliability standards in complement with the FERC GIA/GIP, large disturbances involving non-consequential tripping of many IBRs or other abnormal power changes from IBRs will continue with increased frequency and likelihood, subsequently increasing risks to BPS reliability. NERC continues to highlight the increased risk profile of IBRs due to the rapidly changing resource mix.
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System being addressed, and how does this proposed project provide the reliability-related benefit described above?):
A series of NERC disturbance reports highlight systemic performance issues that have led to unexpected IBR plant reductions during normal grid faults. For instance, phase jump or phase lock loop (PLL) synchronization issues were described as one cause of IBR plant tripping in three reports.[3,4,5] Similarly,

[3] *Odessa Disturbance,* NERC. September 2021.https://www.nerc.com/pa/rrm/ea/Documents/Odessa_Disturbance_Report.pdf
[4] *2022 Odessa Disturbance,* NERC. Atlanta, GA: December 2022. https://www.nerc.com/comm/RSTC_Reliability_Guidelines/NERC_2022_Odessa_Disturbance_Report%20%281%29.pdf
[5] *900 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report*, NERC. Atlanta, GA: February 2018. https://www.nerc.com/pa/rrm/ea/October%209%202017%20Canyon%202%20Fire%20Disturbance%20Report/900%20MW%20Solar%20Photovoltaic%20Resource%20Interruption%20Disturbance%20Report.pdf

Requested information

other reports describe tripping causes that include overvoltage,[6] undervoltage,[7] frequency protection,[8] momentary cessation,[9] and slow active power recovery,[10] among other causes.

The purpose of this Standards project is to address the reliability risks presented to the BPS due to the observed systemic deficiencies in IBR performance and modeling. These performance deficiencies could be mitigated by taking advantage of the above-mentioned opportunities for improvement to enhance generator interconnection requirements and study processes through enhancements to FAC-001 and FAC-002. Deficiencies observed by NERC in numerous disturbance reports and other NERC publications show that Transmission Owners (TOs) have a need to enhance their publicly available generator interconnection requirements, as required in FAC-001, with uniform and comprehensive requirements. Additionally, enhancements to generator interconnection study processes, including conformity assessment processes for IBRs connecting to the BPS (i.e., all registered IBRs), are paramount to ensure reliable IBR operation and to prevent large disturbance events during normally cleared BPS events. Conformity assessments are intended to leverage existing skillsets within a more structured process with well-defined success criteria. Opportunities to improve generator interconnection requirements and conformity assessments[11], in the aforementioned technical areas and others, must be capitalized upon to prevent future unexpected IBR plant tripping risks that could compromise system reliability. Furthermore, insufficient commissioning practices have led to many facilities having protection, control settings, or control modes installed that were not studied as part of the generator interconnection process and going unnoticed until a major grid disturbance occurs.

This proposed project intends to address the reliability issues identified in the NERC disturbance reports by accomplishing the following:

1. Enhancing the latest FAC-001 Standard, in complement with FERC Order No. 2023 and FERC GIA/GIP to require that TOs in coordination with their associated Transmission Planners (TP) and Planning Coordinators (PC) establish IBR performance requirements covering specific topics of paramount importance for BPS reliability while leveraging technical aspects of work already completed within the industry.
2. Enhancing the latest FAC-002 Standard, in complement with FERC Order No. 2023 and FERC GIA/GIP to require TPs and PCs to enhance their generation interconnection study processes to assess in more detail IBR plant capability and performance conformity for example through a

[6] *April and May 2018 Fault Induced Solar Photovoltaic Resource Interruption Disturbances Report*, NERC. Atlanta, GA: January 2019. https://www.nerc.com/pa/rrm/ea/April_May_2018_Fault_Induced_Solar_PV_Resource_Int/April_May_2018_Solar_PV_Disturbance_Report.pdf

[7] *Panhandle Wind Disturbance*, NERC. Atlanta, GA: August 2022. https://www.nerc.com/pa/rrm/ea/Documents/Panhandle_Wind_Disturbance_Report.pdf

[8] *Multiple Solar PV Disturbances in CAISO*, NERC. April 2022. https://www.nerc.com/pa/rrm/ea/Documents/NERC_2021_California_Solar_PV_Disturbances_Report.pdf

[9] *1,200 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report*, NERC. June 2017. https://www.nerc.com/pa/rrm/ea/1200_MW_Fault_Induced_Solar_Photovoltaic_Resource_/1200_MW_Fault_Induced_Solar_Photovoltaic_Resource_Interruption_Final.pdf

[10] *San Fernando Disturbance*, NERC. November 2020. https://www.nerc.com/pa/rrm/ea/Documents/San_Fernando_Disturbance_Report.pdf

[11] https://www.iec.ch/conformity-assessment/what-conformity-assessment

Requested information

combination of review of documentation, simulation studies, and physical tests that a newly interconnecting IBR complies with applicable IBR performance requirements.

3. Modifying either FAC-001 or FAC-002 , in complement with FERC Order No. 2023 and FERC GIA/GIP, to include requirements for applicable entities (TOs, TOPs, Balancing Authority (BA), etc.) to enhance existing generator interconnection requirements and study practices, to include requirements for Generator Owners (GO) to appropriately and reliably commission IBR facilities and provide adequate proof that commissioning checks (i.e., as-built evaluation, commissioning testing, etc.) were conducted and that the as-built IBR plant is parameterized to represent the latest revision of the as-modeled IBR facility used in generator interconnection studies.

Reliability-related benefits of each of the above proposals are further clarified below.

Language in the latest FAC-001 Standard requires a TO to document Facility Interconnection Requirements, update them as needed, and make them available upon request; however, there is no specificity regarding what the requirements should entail. Some entities rely heavily or entirely on high-level requirements established in the *pro forma* LGIA and have not expanded upon these requirements. NERC Reliability Standards should operate in complement with FERC Order No. 2023 and FERC GIA/GIP and modernize and enhance requirements and study processes associated with IBRs. NERC disturbance reports highlight repeated causes of tripping that are not captured by existing requirements in the FERC GIA/GIP, nor should industry rely solely on these procedures for the establishment of performance-based requirements. This SAR proposes the enhancement of existing interconnection requirements and study processes through the inclusion of specific categories of requirements (i.e., voltage ride-through, fault ride-through performance, validation between models and installed equipment, etc) in FAC-001. These requirements must be coordinated with current and future NERC Standards, FERC Order No. 2023 and FERC GIA/GIP, and existing generator interconnection requirements. Having a uniform minimum set of generator interconnection requirement categories across North America outlined throughout NERC Reliability Standard requirements will help ensure clarity and consistency among equipment manufacturers, IBR developers, GOs, and TOs, and lead to new BPS-connected IBR plants designed with the capabilities necessary for reliable operation of the BPS.

Currently, the latest version of FAC-002 requires TPs and PCs to study the reliability impact of interconnecting generation and existing generation seeking to make a qualified change, as defined by the PC under requirement R6. There is currently no requirement to ensure that these generators, as-designed and as-installed or to-be-installed in the field, are assessed for compliance with applicable interconnection requirements (as created per FAC-001) during the interconnection process. Having a specific conformity assessment process (as enhancements to currently performed interconnection studies) will help ensure that the TP and PC verify generating resource conformity with applicable interconnection requirements, preferably prior to IBR plant commissioning. The standard drafting team should leverage FERC GIA/GIP requirements to determine sufficient timelines for resolving discrepancies in plant conformity. Enhancing current generator interconnection processes with clear conformity

Requested information
assessment processes will ensure that new BPS-connected IBR facilities are designed with the capabilities necessary for reliable operation. Lastly, IBR facility commissioning deficiencies have been documented numerous times by NERC in disturbance reports, alert findings, and other publications. Entities must adhere to both FERC Orders and FERC GIA/GIP throughout the generator interconnection processes, and NERC Standards that become subject to mandatory enforcement only upon commercial operation. Therefore, there is a handoff that occurs between the developer and GO, as well as between the FERC GIA/GIP and the NERC Standards. Because of these technically sensitive issues and the urgency to connect renewable energy resources to the BPS due to policies, tax credits, economics, etc., IBR interconnection is under intense pressure to be completed as quickly as possible. Therefore, there is a need to focus on the quality of commissioning and assurance that the as-built or to-be-built facility is consistent with the latest revision of the models used in generator interconnection studies conducted during the generator interconnection process and to reduce the risk of expected performance during real-time operations. To help ensure reliable operation of the BPS, as-built evaluation and commissioning requirements should be created to help ensure that the IBR will operate as expected and studied and that sufficiently documented proof of compliance has been provided to applicable TOs and TPs.
Project Scope (Define the parameters of the proposed project):
This project will modify the latest versions of NERC FAC-001 and FAC-002, while ensuring alignment and complement with FERC Order No. 2023 and FERC GIA/GIP. The scope of the project is to modify NERC Standards to: 1) Include specific IBR interconnection topics in FAC-001-4 for which generator interconnection requirements shall be defined by TOs/TPs 2) Include specific steps for a conformity assessment intended to assess FAC-001-4 conformity in FAC-002-4 3) Include requirements for TOs to include pre-commissioning requirements for GOs to provide evidence that the facility: a. Successfully passes an evaluation with performance that meets commissioning requirements. Discrepancies between plant performance and commissioning requirements should be shared with associated TP and PC to ensure visibility into the discrepancies and mitigation actions. b. Ensure that the parameters and control modes intended to be placed in-service produce performance that matches the performance of the as-designed plant model that was used in generator interconnection studies. 4) IBR control parameter updates that affect the performance of the facility, made during the commissioning process, are updated in the facility model and studied to ensure reliability

Requested information
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[12] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):

The proposed project will produce the following deliverables: modifications to the latest FAC-001 and modifications to the latest FAC-002 while ensuring alignment and complement with FERC Order No. 2023 and GIP.

NERC FAC-001-4 Enhancements to the requirement R1:

- Each TO shall document enhanced Facility Interconnection Requirements for IBR, in coordination with their TP, PC, and affected TOs, update them as needed and make them available upon request. IBR facilities generator interconnection requirements shall, at a minimum, include some or all the following scope leveraged from existing industry standards, NERC Standards and other NERC Publications, and other industry works. The Standard Drafting Team shall ensure coordination with FERC Order 901 and FERC GIA/GIP, already-approved NERC Standards, Standards currently under development, and consider region-specific reliability concerns and processes to allow variances to certain requirements if necessary to ensure BPS reliability.
  - General generation interconnection technical specifications and performance requirements
    - Reference points of applicability (e.g., specifying[13] where the interconnection requirements apply, e.g., point of interconnection)
    - Applicable voltages and frequencies (e.g., specifying the meaning of voltage and frequency for each of the following interconnection requirements (e.g., phase or instantaneous values, etc.))
    - Measurement accuracy (e.g., specifying the accuracy of steady state and transient measurement, accuracy requirements for an IBR Facility's performance monitoring and validation)
    - Operational measurement and communication capability (e.g. specifying communication capabilities required from an IBR Facility for providing real-time operational information)
    - Control capability requirements (e.g., specifying the capability of an IBR Facility to respond to external control inputs, e.g., capability to limit active power as specified by a TO)
    - Prioritization of IBR responses (e.g., specifying the priority of IBR Facility responses to TO's interconnection requirements)
    - Isolation device (e.g., specifying the requirement for break isolation device between the TO's network and the IBR Facility)

[12] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability standards. Please attach pertinent information to this form before submittal to NERC.

[13] For the purpose of this document, specifying means developing or referring to a requirement within a certain category.

Requested information

- Inadvertent energization of the transmission system (e.g., specifying requirements for IBR Facility, when the TO's network is de-energized)
- Enter service (e.g., specifying requirements for IBR Facility performance when entering service after an IBR Facility was out of operation)
- Interconnection Integrity (e.g., specifying protection from electromagnetic interference, surge-withstand performance, and interconnection switchgear)
- Integration with transmission system grounding (e.g., specifying requirements for the integration of grounding scheme between an IBR Facility and TO's network)

- Reactive power-voltage control requirements within the continuous operation region
  - Reactive power capability (e.g., specifying reactive power capability at the reference point of applicability)
  - Voltage and reactive power control modes (e.g. specifying voltage regulation capability by changing reactive power output, and voltage control modes during normal operation)
- Active power and frequency response requirements
  - Primary frequency response (e.g., specifying requirements for the primary frequency response)
  - Fast frequency response (e.g., specifying requirements for any fast frequency response, i.e., response to changes in frequency during the arresting phase of a frequency excursion to improve the frequency nadir or initial rate-of-change of frequency)
  - Active power ramp rate performance (e.g., specifying performance requirements for active power ramping. Alternatively, this requirement can be embedded in other performance requirements (e.g., Enter Service, Primary Frequency Response Requirement, etc.) as appropriate).
- Response to transmission system abnormal conditions
  - Voltage (e.g., specifying requirements for IBR Facility performance during and after large-signal voltage disturbances, including transient overvoltage ride-through and dynamic voltage support requirements)
  - Frequency (e.g., specifying requirements for IBR Facility performance during and after a large-signal frequency disturbance, including rate-of-change of frequency and voltage phase angle ride-through requirements)
  - Return to service after an IBR plant trip (e.g., specifying requirements for IBR Facility performance if it trips during or after a large-signal voltage or frequency disturbance)
- Protection (defining requirements for protective functions at an IBR Facility and coordination with the TO)
- Modeling Data (e.g., specifying requirements for IBR Facility models to be provided to TOs)

Requested information

- Verification Report comparing modeled parameters against to-be-commissioned parameters.
- Model Validation report showing benchmarking between all submitted model types (Standard Library Model, Positive Sequence User-defined model, and Electromagnetic Transient (EMT)) model and the real equipment as per FERC Order 2023[14]

- Measurement data for performance monitoring and validation (e.g., specifying measurements, data recording, and retention requirements at an IBR Facility for the purpose of performance monitoring and validation during an IBR Facility operation)
- Test and verification requirements (e.g., specifying requirements for testing and verifying an IBR Facility's conformity with applicable interconnection requirements during the interconnection process, at the commissioning stage, and during IBR Facility operation)

NERC FAC-002-4 Enhancements:

- Additional requirement: TPs and PCs shall develop the process for assessment and assess conformity with applicable interconnection requirements (as per FAC-001-4) for interconnecting IBR facilities and existing IBR facilities seeking to make a qualified change as defined by the Planning Coordinator under requirement R6. The SDT should reference the FERC GIA/GIP to ensure alignment when determining appropriate timelines for generator interconnection processes milestones along with the submission of qualified changes, updated models, model documentation, and test reports. The assessment may include physical testing such as factory testing or simulation-based assessment using detailed, representative models of the IBR facility that will be built in the field. Entities that implement physical testing requirements should also create requirements under FAC-001 that specify the data and measurements needed to be recorded during physical tests. These assessment processes should again leverage the work being done in the IEEE P2800.2 working groups.
- The Standard Drafting Team shall ensure coordination with FERC Order 901 and NERC Standards under development or currently subject to mandatory enforcement.

IBR Facility Commissioning Enhancements:

- New requirements created by applicable entities that require the GO of a registered IBR facility provide adequate proof that the facility was commissioned reliably.
- Documentation to the TO, Transmission Operator (TOP), TP, PC, Reliability Coordinator (RC), and BA regarding commissioning checks related to protection and control systems as well as plant capability.
- Documentation that the commissioned in-service facility matches the model used during the interconnection process. Any discrepancies should be identified and reported to the ERO

[14] E-1 | Order 2023 | RM22-14-000 | Federal Energy Regulatory Commission (ferc.gov)

Requested information
Enterprise and the aforementioned transmission entities for corrective action as needed. (NOTE: As-built settings, controls, or protections that do not match what was studied during the interconnection process present serious adverse BPS reliability impacts, leaving the TOP, RC, and BA operating the system in an "unknown operating state" since grid performance cannot be predicted.)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The exact costs for this project are unknown. Near-term and long-term costs are likely to increase as industry develops practices around IBR interconnection requirements and conformity assessment. GOs will need to familiarize themselves with newly developed and implemented interconnection requirements, procure equipment, and design IBR facilities in conformity with these. They will also need to do their own IBR Facility design evaluation to verify the IBR Facility's conformity with applicable interconnection requirements. TOs will need to develop IBR interconnection requirements, leveraging existing Standards insofar possible. TPs and PCs will need to develop conformity assessment and testing practices. Additionally, more testing and study work will be added during the interconnection process in order to conduct the conformity assessment, which will demand engineering staff's time and result in increased costs of interconnection studies overall. These initial costs may lead to reduced transmission expansion costs, as increased IBR performance and modeling should lead to a more efficient use of the transmission system. These costs are recognized; however, the team has made a focused and concerted effort to minimize costs while achieving the necessary reliability outcomes for this project. Additionally, added time costs due to added study work may necessitate adjustments to IBR interconnection timelines. Outcomes from this project will help ensure an adequate level of reliability for the BPS significantly outweighs the incremental costs of implementation from this proposed project.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed Standard development project (*e.g.*, Dispersed Generation Resources):
New BPS-connected IBR facilities and existing BPS-connected IBR facilities seeking to make a qualified change as defined by PC under requirement R6 of FAC-002-4 will be directly impacted as the Facility will need to be designed in conformity with the newly implemented interconnection requirements.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed Standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
This section presents two questions, and therefore the IRPS will address each separately. 1) Appropriate drafting team members could involve individuals from the following entities: TOs, TPs, PCs, GOs, OEMs, IBR commissioning contractors or consultants, TOPs, RCs, BAs 2) The proposed Standards changes should apply to the following: TOs, TPs, PCs, GOs

Requested information
Do you know of any consensus building activities[15] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
This SAR was developed by the NERC IRPS, which is a consensus building stakeholder group under the NERC RSTC. Upon endorsement by the NERC Reliability and Security Technical Committee (RSTC) through its stakeholder process and associated industry comment periods, the IRPS submits this SAR with that consensus building as well.
Are there any related Standards or SARs that should be assessed for impact as a result of this proposed project? If so, which Standard(s) or project number(s)?
Project 2023-05 is currently working on modifications to both FAC-001-4 and FAC-002-4 but modifications focus on distributed resources and not IBR. This SAR helps meet the goals of FERC Order 901 and thus should be coordinated with ongoing NERC Order No. 901 activities.
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.

Reliability Principles	
Does this proposed Standard development project support at least one of the following Reliability Principles ()? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.
☐	5. facilities for communication, monitoring and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber-attacks.

Market Interface Principles	
Does the proposed Standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability Standard shall not give any market participant an unfair competitive advantage.	Yes

[15] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise or develop a standard or definition.

Market Interface Principles	
2. A reliability Standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability Standard shall not preclude market solutions to achieving compliance with that Standard.	Yes
4. A reliability Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability Standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g., NPCC	

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☐ Draft SAR reviewed by NERC Staff	☐ Final SAR endorsed by the SC
☐ Draft SAR presented to SC for acceptance	☐ SAR assigned a Standards Project by NERC
☐ DRAFT SAR approved for posting by the SC	☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation	☐ Energy Policy
☐ Resilience/Extreme Events	☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Project 2022-03 Energy Assurance with Energy-Constrained Resources

Action

- Approve the below listed corrections for Project 2022-03 Energy Assurance with Energy-Constrained Resources Reliability Standard TOP-003-7 and its Implementation Plan as non-substantive changes, consistent with Section 4.13 of the Standards Process Manual (SPM).
  - Update the effective date for the new Glossary terms "Energy Reliability Assessment" and "Near-Term Energy Reliability Assessment" from 24 months to 18 months within the Implementation Plan.
  - Remove the term "Energy Reliability Assessment" from TOP-003-7 Requirement R1.

Background

The purpose of Project 2022-03 Energy Assurance with Energy-Constrained Resources is to develop Reliability Standards to enhance reliability by requiring entities to perform Energy Reliability Assessments (ERAs) to evaluate energy assurance and develop Operating Plan(s) to address identified risks. The Standard Drafting Team developed a new Reliability Standard, BAL-007-1, to require Balancing Authorities to perform ERAs to assess forecasted Energy Emergencies in the near-term time horizon and develop plans to address any such forecasted Energy Emergencies. The Standard Drafting Team also developed modifications to a new version of the TOP-003 Reliability Standard, TOP-003-7, to ensure that Balancing Authorities have the authority to collect the data needed to perform the Near-Term ERAs.

The Standards Committee (SC) authorized BAL-007-1 for initial posting in March 2024. The initial draft was posted January 25, 2024, through March 11, 2024, for a 45-day additional comment and ballot period and received 6.08% approval. A second draft of BAL-007-1 was posted May 7, 2024, through June 24, 2024, for a 45-day additional comment and ballot period and received 17.19% approval. Draft three of BAL-007-1 and initial draft of TOP-003-7 was posted September 19, 2024, through November 4, 2024, for a 45-day comment and ballot period. BAL-007-1 passed ballot with 81.53% approval along with TOP-003-7 passing ballot with 92.77% approval. The Implementation Plan for BAL-007-1 and TOP-003-7 passed ballot with 83.72% and 76.3% approvals, respectively.

During the third comment and ballot period, two errors were identified: one in the Implementation Plan and one in the Reliability Standard TOP-003-7. In the latest posted draft of the Implementation Plan, the BAL-007-1 Reliability Standard, the definition for ERA, and the definition for Near-Term ERA included an effective date of 24 months after the effective date of the applicable governmental authority's order approving BAL-007-1 and the definitions. This is in contrast to TOP-003-7, which included the term Near-Term ERA, with an effective date detailed in the Implementation Plan of 18 months after the effective date of the applicable governmental authority's order approving TOP-003-7.

The Drafting Team's intent was to allow TOP-003-7 to become effective six months before BAL-007-1 to allow the Balancing Authorities those six months to collect the data identified in

TOP-003-7 and before those Balancing Authorities were required to perform an ERA under BAL-007-1. As the Drafting Team also intended to have the new Glossary terms become effective while these standards using the terms, the Implementation Plan erroneously used a 24-month period for the new Glossary terms rather than use the more immediate 18-month period. Correcting this error requires changing the effective date for the new Glossary terms from 24 months to 18 months. The Drafting Team and NERC consider that this change qualifies as non-substantive as this would not fundamentally change the scope, applicability, or intent of any Reliability Standard requirement and is consistent with the intent of the Drafting Team to align the effective date of the new Glossary terms with the more immediate effective date in the Implementation Plan of 18 months. Applicable functional entities recognize in comments that this change would simply be aligning the definition with the standard effective date of 18 months.

Additionally, the term "Energy Reliability Assurance" term was erroneously left in TOP-003-7 Requirement R1 from a previously proposed draft. The Drafting Team contends that the term should not be in Requirement R1 as the requirement is only applicable to Transmission Operators, who would not be required to perform ERAs under BAL-007-1 and, in turn, have no need to collect data for ERAs under the TOP-003-7 Reliability Standard. Accordingly, the Drafting Team and NERC consider that the removal of this term from TOP-003-7 Requirement R1 qualifies as non-substantive as this would not fundamentally change the scope, applicability, or intent of any Requirement and is consistent with the applicability of the R1 requirement.

The proposed corrections to the Implementation Plan and Reliability Standard TOP-003-7 are as follows:

2022-03 Implementation Plan Proposed Modifications

Where approval by an applicable governmental authority is required, the definitions of Energy Reliability Assessment and Near-term Energy Reliability Assessment shall -become effective on the first day of the first calendar quarter that is ~~24~~18 months after the effective date of the applicable governmental authority's order approving ~~Reliability Standard BAL-007-1 TOP-003-7~~ the definitions, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the definitions of Energy Reliability Assessment and Near-term Energy Reliability Assessment ~~standard~~ shall become effective on the first day of the first calendar quarter that is ~~24~~18 months after the date that ~~Reliability Standard BAL-007-1 TOP-003-7~~definitions is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

TOP-003-7 Proposed Modifications

R1. Transmission Operator shall maintain documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments~~, and Energy Reliability Assessments~~. The specification shall include, but not be limited to: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

NERC staff recommends that Project 2022-03 Energy Assurance with Energy-Constrained Resources move forward with a 10-day final ballot that is tentatively scheduled for November 25 – December 4, 2024.

Summary

NERC staff recommends that the SC approve these corrections as non-substantive changes to Project 2022-03 Energy Assurance with Energy-Constrained Resources proposed Reliability Standard TOP-003-7 and Implementation Plan, as the correction of these errors would not change the scope or intent of the associated Reliability Standard, nor would the corrections have a material impact on the applicable entities of the Reliability Standard.

Agenda Item 4a
Standards Committee Meeting
November 13, 2024

Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard is adopted by the NERC Board of Trustees (Board).

Description of Current Draft

This is the 45-day formal comment period with initial ballot.

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	June 15, 2022
SAR posted for comment	June 22, 2022 – July 21, 2022

Anticipated Actions	Date
45-day formal comment period with initial ballot	September 19 – November 4, 2024
10-day final ballot	November 25 – December 4, 2024
Board adoption	December 13, 2024

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. Terms used in the proposed standard that are already defined and are not being modified can be found in the *Glossary of Terms Used in NERC Reliability Standards*. The new or revised terms listed below will be presented for approval with the proposed standard. Upon Board adoption, this section will be removed.

Term(s):

The term Near-Term Energy Reliability Assessment refers to the proposed definition being developed under the Project 2022-03 Energy Assurance. As of this posting, the proposed definition of Near-Term Energy Reliability Assessment is:

Near-Term Energy Reliability Assessment – An Energy Reliability Assessment with an assessment period that begins no later than two days after the operating day and has a minimum duration of five days and a maximum duration of six weeks.

A. Introduction

1. **Title:** Transmission Operator and Balancing Authority Data and Information

Specification and Collection

2. **Number:** TOP-003-7

3. **Purpose:** To ensure that each Transmission Operator and Balancing Authority has the data and information it needs to plan, monitor, and assess the operation of its Transmission Operator Area or Balancing Authority Area.

4. **Applicability:**

4.1 Functional Entities:

4.1.1 Transmission Operator

4.1.2 Balancing Authority

4.1.3 Generator Owner

4.1.4 Generator Operator

4.1.5 Transmission Owner

4.1.6 Distribution Provider

5. **Effective Date:** See Implementation Plan for Project 2022-03.

B. Requirements and Measures

R1. Each Transmission Operator shall maintain documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments~~, and Energy Reliability Assessments~~. The specification shall include, but not be limited to: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

1.1. A list of data and information needed by the Transmission Operator to support its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments including non-BES data and information, external network data and information, and identification of the entities responsible for responding to the specification as deemed necessary by the Transmission Operator.

1.2. Provisions for notification of current Protection System and Remedial Action Scheme (RAS) status or degradation that impacts System reliability.

1.3. Provisions for notification of BES generating unit(s) during local forecasted cold weather to include:

1.3.1. Operating limitations based on:

1.3.1.1. capability and availability;

1.3.1.2. fuel supply and inventory concerns;

1.3.1.3. fuel switching capabilities; and

1.3.1.4. environmental constraints

1.3.2. Generating unit(s) minimum:

1.3.2.1. design temperature; or

1.3.2.2. historical operating temperature; or

1.3.2.3. current cold weather performance temperature determined by an engineering analysis.

1.4. Identification of a mutually agreeable process for resolving conflicts.

1.5. Method(s) for the entity identified in Part 1.1 to provide the data and information that includes at a minimum the following.

1.5.1. Specified deadlines or periodicity which data and information are to be provided;

1.5.2. Performance criteria for the availability and accuracy of data and information as applicable;

1.5.3. Provisions to update or correct data and information, as applicable or necessary;

1.5.4. A mutually agreeable format;

1.5.5. Mutually agreeable method(s) for securely transferring data and information.

M1. Each Transmission Operator shall make available its dated, current, in force documented specification(s) for data and information.

R2. Each Balancing Authority shall maintain documented specification(s) for the data and information necessary for it to perform its analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments. The data specification shall include, but not be limited to: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

2.1. A list of data and information needed by the Balancing Authority to support its analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments, including non-Bulk Electric System data and information, and external network data and information, as deemed necessary by the Balancing Authority, and identification of the entity responsible for responding to the specification.

2.2. Provisions for notification of current Protection System and Remedial Action Scheme status or degradation that impacts System reliability.

2.3. Provisions for notification of BES generating unit(s) status during local forecasted cold weather to include:

2.3.1. Operating limitations based on:

2.3.1.1. capability and availability;

2.3.1.2. fuel supply and inventory concerns;

2.3.1.3. fuel switching capabilities; and

2.3.1.4. environmental constraints.

2.3.2. Generating unit(s) minimum:

2.3.2.1. design temperature; or

2.3.2.2. historical operating temperature; or

2.3.2.3. current cold weather performance temperature determined by an engineering analysis.

2.4. Identification of a mutually agreeable process in resolving conflicts

2.5. Methods for the entity identified in Part 2.1 to provide data and information that includes at a minimum the following.

2.5.1. Specific deadlines or periodicity in which data and information is to be provided;

2.5.2. Performance criteria for the availability and accuracy of data and information, as applicable;

2.5.3. Provisions to update or correct data and information, as applicable or necessary.

2.5.4. A mutually agreeable format.

2.5.5. A mutually agreeable method(s) for securely transferring data and information.

M2. Each Balancing Authority shall make available its dated, current, in force documented specification(s) for data and information.

R3. Each Transmission Operator shall distribute its data and information specification(s) to entities that have data and information required by the Transmission Operator's Operational Planning Analyses, Real- time monitoring, and Real-time Assessments. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

M3. Each Transmission Operator shall make available evidence that it has distributed its data specification(s) to entities that have data and information required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments.

Such evidence could include but is not limited to web postings with an electronic notice of the posting, dated operator logs, voice recordings, postal receipts showing the recipient, date and contents, or e-mail records.

R4. Each Balancing Authority shall distribute its data and information specification(s) to entities that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

M4. Each Balancing Authority shall make available evidence that it has distributed its data specification(s) to entities that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments. Such evidence could include but is not limited to web postings with an electronic notice of the posting, dated operator logs, voice recordings, postal receipts showing the recipient, or e-mail records.

R5. Each Transmission Operator, Balancing Authority, Generator Owner, Generator Operator, Transmission Owner, and Distribution Provider receiving a data and information specification(s) in Requirement R3 or R4 shall satisfy the obligations of the documented specifications. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Same-Day Operations, Real-time*

Operations]

M5. Each Transmission Operator, Balancing Authority, Generator Owner, Generator Operator, Transmission Owner, and Distribution Provider receiving a specification(s) in Requirement R3 or R4 shall make available evidence that it has satisfied the obligations of the documented specification. Such evidence could include, but is not limited to, electronic or hard copies of data transmittals or attestations of receiving entities.

C. Compliance

1. Compliance Monitoring Process

4.1.1 Compliance Enforcement Authority: "Compliance Enforcement Authority" (CEA) means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

4.1.2 Evidence Retention: The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the CEA may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

Each responsible entity shall keep data or evidence to show compliance as identified below unless directed by its CEA to retain specific evidence for a longer period of time as part of an investigation.

Each Transmission Operator shall retain its dated, current, in force, documented specification for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments in accordance with Requirement R1 and Measurement M1 as well as any documents in force since the last compliance audit.

Each Balancing Authority shall retain its dated, current, in force, documented specification(s) for the data and information necessary for it to perform its analysis functions and Real-time monitoring in accordance with Requirement R2 and Measurement M2 as well as any documents in force since the last compliance audit.

Each Transmission Operator shall retain evidence for three calendar years that it has distributed its specification(s) to entities that have data required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments in accordance with Requirement R3 and Measurement M3.

Each Balancing Authority shall retain evidence for three calendar years that it has distributed its specification(s) to entities that have data required by the Balancing

Authority's analysis functions and Real-time monitoring in accordance with Requirement R4 and Measurement M4.

Each Balancing Authority, Generator Owner, Generator Operator, Transmission Operator, Transmission Owner, and Distribution Provider receiving a specification(s) in Requirement R3 or R4 shall retain evidence for the most recent 90-calendar days that it has satisfied the obligations of the documented specifications in accordance with Requirement R5 and Measurement M5.

4.1.3 Compliance Monitoring and Enforcement Program: As defined in the NERC Rules of Procedure, "Compliance Monitoring and Enforcement Program" refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated reliability standard.

Violation Severity Levels

R#	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	The Transmission Operator did not include one or two of the parts (Part 1.1 through Part 1.5) of the documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real- time Assessments.	The Transmission Operator did not include three of the parts (Part 1.1 through Part 1.5) of the documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real- time Assessments.	The Transmission Operator did not include four of the parts (Part 1.1 through Part 1.5) of the documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real- time Assessments.	The Transmission Operator did not include any of the parts (Part 1.1 through Part 1.5) of the documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments. OR, The Transmission Operator did not have a documented specification(s) for the data and information necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real- time Assessments.
R2	The Balancing Authority did not include two or fewer of the parts (Part 2.1 through Part 2.5) of the documented specification(s) for the data and information necessary for it to perform its analysis functions, Real- time	The Balancing Authority did not include three of the parts (Part 2.1 through Part 2.5) of the documented specification(s) for the data and information necessary for it to perform its analysis functions, Real- time	The Balancing Authority did not include four of the parts (Part 2.1 through Part 2.5) of the documented specification(s) for the data and information necessary for it to perform its analysis functions, Real- time monitoring, and Near-Term Energy Reliability	The Balancing Authority did not include any of the parts (Part 2.1 through Part 2.5) of the documented specification(s) for the data and information necessary for it to perform its analysis functions, Real- time monitoring, and Near-Term Energy Reliability Assessments.

R#	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
	monitoring, and Near-Term Energy Reliability Assessments.	monitoring, and Near-Term Energy Reliability Assessments.	Assessments.	OR, The Balancing Authority did not have a documented specification(s) for the data and information necessary for it to perform its analysis functions, Real- time monitoring, and Near-Term Energy Reliability Assessments.
For the Requirement R3 and R4 VSLs only, the intent of the SDT is to start with the Severe VSL first and then to work your way to the left until you find the situation that fits. In this manner, the VSL will not be discriminatory by size of entity. If a small entity has just one affected reliability entity to inform, the intent is that that situation would be a Severe violation.				
R3	The Transmission Operator did not distribute its Specification(s) to one entity, or 5% or less of the entities, whichever is greater, that have data and information required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments.	The Transmission Operator did not distribute its Specification(s) to two entities, or more than 5% and less than or equal to10% of the reliability entities, whichever is greater, that have data and information required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments.	The Transmission Operator did not distribute its Specification(s) to three entities, or more than 10% and less than or equal to 15% of the reliability entities, whichever is greater, that have data and information required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments.	The Transmission Operator did not distribute its Specification(s) to four or more entities, or more than 15% of the entities that have data and information required by the Transmission Operator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments.
R4	The Balancing Authority did not distribute its Specification(s) to one entity, or 5% or less of the entities, whichever is greater, that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments.	The Balancing Authority did not distribute its Specification(s) to two entities, or more than 5% and less than or equal to 10% of the entities, whichever is greater, that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments.	The Balancing Authority did not distribute its Specification(s) to three entities, or more than10% and less than or equal to 15% of the entities, whichever is greater, that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments.	The Balancing Authority did not distribute its Specification(s) to four or more entities, or more than 15% of the entities that have data and information required by the Balancing Authority's analysis functions, Real-time monitoring, and Near-Term Energy Reliability Assessments.
R5	The responsible entity receiving a	The responsible entity receiving a	The responsible entity receiving a specification(s)	The responsible entity receiving a specification(s) in

R#	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
	specification(s) in Requirement R3 or R4 satisfied the obligations in the specification but failed to meet one of the parts in Requirement R1 Part1.5 or Requirement R2 Part 2.5.	specification(s) in Requirement R3 or R4 satisfied the obligations in the specification but failed to meet two of the parts in Requirement R1 Part 1.5 or Requirement R2 Part 2.5.	in Requirement R3 or R4 satisfied the obligations in the specification but failed to meet three or more of the parts in Requirement R1 Part 1.5 or Requirement R2 Part 2.5.	Requirement R3 or R4 did not satisfy the obligations of the documented specifications.

D. Regional Variances

None.

E. Interpretations

None.

F. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
1		Modified R1.2 Modified M1 Replaced Levels of Non-compliance with the Feb 28, BOT approved Violation Severity Levels (VSLs)	Revised
1	October 17, 2008	Adopted by NERC Board of Trustees	
1	March 17, 2011	Order issued by FERC approving TOP- 003-1 (approval effective 5/23/11)	
2	May 6, 2012	Revised under Project 2007-03	Revised
2	May 9, 2012	Adopted by Board of Trustees	Revised
3	April 2014	Changes pursuant to Project 2014-03	Revised
3	November 13, 2014	Adopted by Board of Trustees	Revisions under Project 2014-03
3	November 19, 2015	FERC approved TOP-003-3. Docket No. RM15-16-000, Order No. 817	
4	February 6, 2020	Adopted by NERC Board of Trustees	Revisions under

			Project 2017-07
4	October 30, 2020	FERC approved TOP-003-4. Docket No. RD20-4-000	
5	May 2021	Changes pursuant to Project 2019-06	Revised
5	June 11, 2021	Board approved	Project 2019-06 Cold Weather
5	August 24, 2021	FERC approved TOP –003-5 Docket No. RD21-5-000, Order 176	
6	TBD	Adopted by NERC Board of Trustees	Revisions under project 2021-06
6.1	Errata	Approved by the Standards Committee	August 23,2023
6.1	November 2, 2023	FERC Approved TOP-003-6.1 Docket No.RD23-6-000,	
6.1	November 3, 2023	Effective Date	July 1, 2025
7	TBD	Energy Assurance Modifications – Addition of Near-Term ERA.	Revised

Implementation Plan

Project 2022-03 Energy Assurance with Energy-Constrained Resources | Reliability Standard BAL-007-1 and TOP-003-7

Applicable Standard(s)

- BAL-007-1 – Near-term Energy Reliability Assessments
- TOP-003-7 – Transmission Operator and Balancing Authority Data and Information Specification and Collection

Requested Retirement(s)

- TOP-003-6.1 – Transmission Operator and Balancing Authority Data and Information Specification and Collection

Prerequisite Standard(s)

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

- None

Applicable Entities

- Balancing Authority
- Transmission Operator
- Generator Owner
- Generator Operator
- Transmission Owner
- Distribution Provider

Terms in the NERC Glossary of Terms

This section includes all newly defined, revised, or retired terms used or eliminated in the NERC Reliability Standard. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Proposed New Definition(s):

Energy Reliability Assessment:	Assessment of the resources necessary to reliably supply the Electrical Energy required to serve Demand

	and to provide Operating Reserves for the Bulk Power System throughout the associated Assessment period.
Near-Term Energy Reliability Assessment:	An Energy Reliability Assessment with an assessment period that begins no later than two days after the operating day and has a minimum duration of five days and a maximum duration of six weeks.

Background

Energy assurance is an increasingly important aspect of a reliable Bulk-Power System (BPS) but has been inconsistently defined and measured without explicit standards. Project 2022-03 Energy Assurance with Energy-Constrained Resources was initiated to address several energy assurance concerns related to the operations, operations planning, and mid- to long-term planning time horizons. Reliability Standard BAL-007-1 – Energy Reliability Assessments is focused on the operations planning time horizon.

BAL-007-1 Reliability Standard

Where approval by an applicable governmental authority is required, Reliability Standard BAL-007-1 shall become effective on the first day of the first calendar quarter that is 24 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 standard shall become effective on the first day of the first calendar quarter that is 24 months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

Definitions

Where approval by an applicable governmental authority is required, the definitions of Energy Reliability Assessment and Near-term Energy Reliability Assessment shall become effective on the first day of the first calendar quarter that is ~~24~~ 18 months after the effective date of the applicable governmental authority's order approving ~~Reliability Standard BAL-007-1~~~~TOP-003-7~~the definitions, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the definitions of Energy Reliability Assessment and Near-term Energy Reliability Assessment~~standard~~ shall become effective on the first day of the first calendar quarter that is ~~24~~ 18 months after the date that ~~Reliability Standard BAL-007-1~~~~TOP-003-7~~ definitions is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

TOP-003-7 Reliability Standard

Where approval by an applicable governmental authority is required, Reliability Standard TOP-003-7 shall become effective on the first day of the first calendar quarter that is 18 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 standard shall become effective on the first day of the first calendar quarter that is 18 months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

FERC Order No. 901 Milestone Project Update

Action
Informational

Summary
The update will provide the results of any commenting and balloting periods and next steps for projects associated with FERC Order No. 901.

Project 2022-02 Uniform Modeling Framework for IBR

Action

Authorize drafting of Reliability Standard(s) identified in the Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements Standard Authorization Request (SAR).

Background

The FERC Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements SAR addresses the specific directives of FERC Order No. 901 pertaining to the usage of a uniform framework for data sharing and model development. NERC staff assigned this SAR to Project 2022-02 Uniform Modeling Framework for Inverter-based Resources (IBR) (formerly Modifications to TPL-001 and MOD-032) to ensure modeling revisions from other IBR performance requirements in other FERC Order No. 901-related projects, Milestones 2, 3, and 4, will utilize the uniform framework. The drafting team will develop requirements for data aggregation estimation and data sharing of aggregated data for generation resources not registered by NERC Assets to be included as part of the revisions to the Compliance Registry criteria ("category 2 type assets") are considered "registered IBR" and not subject to the project objectives related to aggregated data or estimation methods. This project will also build mechanisms to allow equipment-specific models, if approved and as needed for model quality, to facilitate model changes as a result of the Milestones 2, 3, and 4 directives that evaluate performance of IBR.

At the September 21, 2022 meeting, the Standards Committee (SC) accepted the SAR assigned to Project 2022-02 Modifications to TPL-001 and MOD-032. The drafting team proposed revisions to one of the standards identified in the SAR, MOD-032. The initial draft was posted May 31, 2023 through July 14, 2023. An additional draft was posted October 6, 2022 through November 20, 2023. A second additional draft was posted August 27, 2024 through October 10, 2024.

At the May 15, 2024 SC meeting, the FERC Order No. 901 Milestone 3, Part 1: Modeling and Data Sharing Requirements SAR was assigned to this project. The FERC Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements SAR was accepted at the May 2024 SC meeting and posted for an informal comment period from May 17, 2024 to June 24, 2024. Additional nominees were solicited from May 17, 2024, to June 24, 2024, and then approved at the August 21, 2024 SC meeting.

This SAR is intended to establish new or revised Reliability Standards to address FERC Order No. 901 directives related to uniform framework for data sharing and model development by building mechanisms to allow equipment-specific models, if approved and needed for model quality, to facilitate model changes as a result of the Milestone 2, 3, and 4 directives that evaluate performance of IBR. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

At the May 15, 2024, Standards Committee (SC) meeting, the FERC Order No. 901 Milestone 3, Part 1: IBR Model Validation SAR was approved by the SC, and it was posted for formal comment period May 17-June 24, 2024.

Summary

NERC staff recommends that the SC authorize drafting revisions to the standards listed in the SAR.

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements		
Date Submitted:	4/29/24 (Revised on October 15, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (Revised by 2022-02 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard ☒ Revision to Existing Standard ☒ Add, Modify or Retire a Glossary Term ☒ Withdraw/retire an Existing Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by the North American Electric Reliability Corporation (NERC), with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs), including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order are four milestones that include sets of directives to NERC. In the Order, FERC has directed NERC to propose new or modified standards to mitigate reliability gaps in the current NERC

Requested information

Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance.

In January 2024, NERC filed the initial **Standards Development Work Plan in Response to FERC Order No. 901** (hereafter referred to as the "Work Plan"). A current version of the Work Plan will be maintained here. The Work Plan discusses how NERC will develop Reliability Standards within (Milestones 2-4) to meet FERC's filing deadlines. This SAR addresses Milestone 3 of the Work Plan related to Reliability Standards for modeling and data sharing requirements to establish sufficient IBR model data and parameters to assure accurate representation of IBR performance within the models. Further, collaborative sharing of this information and the utilization of this information throughout the lifecycle of IBRs will also be established.

Milestone 3 of the Work Plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. To be clear, assets to be included as part of revisions to the Compliance Registry criteria ("category 2 type assets") are considered herein as "registered IBR." NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

As often discussed within NERC recommendations and publications, the current paradigm of modeling and data sharing leaves the bulk power system (BPS) at a higher than necessary risk for unexpected and undesired IBR performance. Since 2016, approximately 15,000 MW of IBR have unexpectedly reduced output during NERC categorized disturbance events. None of the IBR facilities involved in these disturbances utilized models that could accurately represent the facility's performance during the disturbance event. These discrepancies between modeled and studied performance when compared to real-world performance are driven by current industry modeling practices and a dependence on generic IBR modeling throughout the lifecycle of the IBR facility.

NERC Modeling Guidance [1] states that additional model types, namely manufacturer-specific user-written models, should be used for local reliability studies, during the interconnection process and following commissioning to validate as-built performance – as well as through ongoing validation of performance. The deficiencies within the current state of model quality are well documented. As required by FERC Order No. 901, the development of positive sequence models based on an approved (standard) library of model types must be built into Interconnection-wide cases.

Revisions to data sharing expectations and the creation of a "NERC Approved Model Library" that allows the use of manufacturer-specific models in instances where generic modeling cannot represent the

[1] https://www.nerc.com/pa/RAPA/ModelAssessment/Documents/Dynamic%20Modeling%20Recommendations.pdf

Requested information
performance of the IBR are necessary to ensure BPS reliability through improvements to the inputs of current study practices.
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System (BES) being addressed, and how does this proposed project provide the reliability-related benefit described above?):
This SAR addresses specific pieces of the NERC filed Work Plan related to Milestone 3 and addresses the various industry comments to meet the regulatory directives of FERC Order No. 901. This project shall coordinate with other relevant projects in developing standard language and meeting the FERC Order No. 901 directives. This Project will address FERC Order No. 901 directives related to aggregation of data, parameters, and estimation methods to provide the Transmission Planner (TP) and Transmission Operator (TOP) with the estimate values, explanation for limitations on data availability, and the method used for all estimations. This project is intended to serve as a data sharing center point for many of the revisions being established within all of the 901-related projects. Performance of IBR during an event (grid disturbance) are identified and corrected within the Standards Development projects pertaining to Milestone 2 of the Work Plan. However, any requisite changes to model data as a result of correcting IBR performance, must be communicated through a uniform model framework to assure all impacted entities and users of the approved models are adequately informed and provided updated models (as developed within this project). Similarly, revisions to model validation being drafted by the drafting team assigned the Milestone 3 Part 2 SAR, must also assure entities follow the uniform model framework established here.
Project Scope (Define the parameters of the proposed project):
The FERC Order No. 901 directives assigned to this SAR are outlined in the Detailed Description section below. The project scope shall address all those directives, and should consider the following objectives during the standards development process: 1. Modify applicable Reliability Standards (e.g. MOD-032, TOP-003, and IRO-010) to ensure the usage of a uniform framework for each Interconnection that includes a minimum modeling criteria consistent with NERC's Dynamic Modeling Recommendations, a registered modeling designee, and necessary data exchange requirements. The framework must require: a. The usage of a "NERC-Approved Model Library" (hereafter: "Model Library"). i. The Model Library will be developed and maintained by NERC and will be consistent with NERC's published Dynamic Modeling Recommendations. The Model Library will not prohibit the use of equipment-specific models in Interconnection-wide base cases. ii. The Model Library will be accessible to the general public. NERC will develop an open and transparent process for maintaining the library. iii. The Model Library will include recommendations to facilitate the exchange of neighboring entities' respective planning and operation models to be used in Interconnection-wide case creation and in other NERC Reliability Standards for IBR.

Requested information
iv. The Model Library will include recommendations regarding model usage depending on study type. v. The DT may consider documenting additional guidance for NERC related to maintaining a model library. b. Data specification and notifications for the data necessary to develop Interconnection-wide models and models for other reliability studies. Specifications must include: i. Provisions and a periodicity for new, modified, or changed equipment for any changes that alter the performance of the IBR, and ii. Provisions and a periodicity for unregistered IBRs and DERs that include estimation, aggregation, or other data submittal. c. Data exchange of models from the Model Library for Interconnection-wide model creation (i.e., system models in the language of FERC Order No. 901 (157, 161)) that most accurately reflects, according to manufacturer documentation, the behavior of each IBR during steady state, short-circuit, and dynamic conditions; d. Data exchange of estimated modeling data and parameters, estimation methods, and documented limitations of the availability of accurate data for unregistered IBR and DER as developed by Transmission Owners and Distribution Providers. 2. The drafting team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[2] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific directive text in FERC Order No. 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in the underlying FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** NERC will maintain a current version of NERC Standards Development's Work Plan to Address FERC Order No. 901 on the NERC website under Reliability Standards Under Development. Included in this Work Plan is a list of the directives in FERC Order No. 901 and their associated mapping of each SAR

[2] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

submitted by NERC. The Work Plan will be updated should any mapping of FERC directives be reassigned due to ongoing work in the various Standards Development Projects. As of April 1, 2024, this SAR will address the following FERC Order No. 901 directives, with the scope of this SAR emphasized in **bold** where the Paragraph language is separated[3] across multiple projects:

1. **"Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning: (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate**; and (2) data and model validation for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate." (P 7)
2. **"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require registered IBR generator owners and operators to provide IBR-specific modeling data and parameters (e.g., steady-state, dynamic, and short circuit modeling information ,and control settings for momentary cessation and ramp rates)** that accurately represent the registered IBRs **to their planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities that are responsible for planning and operating the Bulk-Power System."** (P 76)
3. "Nevertheless, to support accurate modeling and performance, we direct NERC to consider during its standards development process AEU and ACP/SEIA's suggested data sharing requirements when developing the framework, criteria, and necessary data exchange requirements to meet the registered IBR data sharing directive." (P 77)
4. **"As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions." (P78)
5. "Likewise, regarding CAISO's request that the Commission direct NERC to consider requiring registered IBRs to provide additional data, we agree that such data collections may be warranted, and direct NERC to consider through its standards development process whether additional IBR data points (e.g., telemetry collections or other automated platform integrations) are needed to further enhance real-time visibility of Bulk-Power System operations." (P 86)
6. "Specifically, as proposed in the NOPR, we direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require: (1) transmission owners to provide to Bulk-Power System planners and operators modeling data and parameters for unregistered IBRs in their transmission owner areas that, individually or in the aggregate, materially affect the reliable operation of the Bulk-Power System and (2) distribution providers to provide to Bulk-Power System planners and operators modeling data and parameters for IBR-DERs in the aggregate in their distribution provider areas where the IBR-DERs in the aggregate materially affect the reliable operation of the Bulk-Power System." (P 102)

[3] Other Projects will cover the non-bolded sections of the same Order Paragraph containing the directive.

Requested information

7. "Recognizing that there may be instances in which transmission owners are unable to gather adequate unregistered IBR modeling data and parameters to create and maintain unregistered IBR models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the unregistered IBR modeling data and parameters, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by unregistered IBRs, and (4) the method used for estimation." (P 104)
8. "To support this data collection, we further direct NERC to consider commenters suggestions to implement a process or mechanism by which transmission owners would receive modeling data and parameters." (P 104)
9. "Accordingly, to account for instances in which distribution providers are unable to gather adequate modeling data and parameters of IBR-DERs to create and maintain IBR-DER models, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require that each distribution provider, if unable to gather accurate IBR-DERs data in the aggregate or unable to gather IBR-DERs data in the aggregate at all, provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs in the aggregate, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of the data provided by IBR-DERs, and (4) the method used for estimation." (P 105)
10. "In support of above, we further direct NERC to consider commenters' suggestions to implement a process or mechanism by which distribution providers would receive modeling data and parameters." (P 105)
11. "For those areas with IBR-DERs that in the aggregate materially affect the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we direct NERC to determine the appropriate registered entity responsible for providing data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, or, when unable to gather such accurate IBR-DERs data, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by the IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and (4) the method used for estimation." (P 106)
12. "Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, we direct NERC to determine through its standards development process the minimum categories or types of data that must be provided

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to transmission planners, transmission operators, transmission owners, and distribution providers necessary to predict the behavior of all IBRs and to ensure that compliance obligations are clear." (P 108)

13. **"As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions." (P 108)
14. **"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the use of approved industry generic library IBR models** that accurately reflect the behavior of IBRs during steady state, short-circuit, and dynamic conditions when developing planning, operations, and interconnection-wide models." (P 122)
15. "We direct NERC to determine through its standards development process which nation-wide approved component models are needed to build IBR plant models for steady state, short-circuit, and dynamics studies." (P 124)
16. "Accordingly, we direct NERC to develop new or modified Reliability Standards that require the sole use of nation-wide approved component generic library models for system models to facilitate the exchange of neighboring entities' respective planning and operation models and to build interconnection-wide models." (P 125)
17. "**We also direct NERC to require** the generator owners of registered IBRs and **the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of** registered and **unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior**." (P 141)
18. "Recognizing that there may be instances in which transmission owners are unable to gather accurate unregistered IBR modeling data and parameters to create and maintain accurate unregistered IBR dynamic models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas, dynamic models of unregistered IBRs using estimated data in accordance with this final rule's section IV.B.3 data sharing directives." (P 141)
19. "Further, we direct NERC to require distribution providers to provide to the planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities aggregated dynamic models that adequately represent the dynamic performance of IBR-DERs on their systems that in the aggregate have a material impact on the Bulk-Power System, including momentary cessation and/or tripping, and all ride through behavior (e.g., IBR-DERs in the

Requested information

aggregate modeled by interconnection requirements performance to represent different steady-state and dynamic behavior)." (P141)

20. "Recognizing that there may be instances in which distribution providers are unable to gather data that accurately represents IBR-DERs in the aggregate, we modify the NOPR proposal and direct NERC to include in the proposed new or modified Reliability Standards a requirement that the distribution provider, if unable to gather data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, provide to the Bulk-Power System planners and operators (i.e., the data recipients) a dynamic model using estimated data for IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, in accordance with this final rule's section IV.B.3 data sharing directives." (P 141)
21. "Furthermore, we acknowledge that there may be areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider. Therefore, we modify the NOPR proposal and direct NERC to determine the appropriate registered entity responsible for providing adequate data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and to identify the registered entities for coordinating, verifying, and keeping up to date the respective dynamic models." (P 141)
22. "Finally, NERC must ensure that the proposed new or modified Reliability Standards account for the dynamic performance of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System." (P 141)
23. "Accordingly, we direct NERC to develop new or modified Reliability Standards that require the use of the DER_A model or successor models to represent the behaviors of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System at a sufficient level of fidelity for Bulk-Power System planners and operators to create valid planning and operations and interconnection-wide models and to be able to perform respective system studies." (P 146)
24. "**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate** and to establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models." (P 157)
25. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models)** and the validation of each respective system model." (P 161)

Requested information
26. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown, and the modifications necessary for each specific directive are also unknown though they are expected to vary based on DT outcome.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
IBRs connected to the transmission system.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
This Project should contain appropriate members representing the following Functional Entities: Balancing Authority Distribution Provider Generator Owner Generator Operator Planning Coordinator Reliability Coordinator Transmission Owner Transmission Operator Transmission Planner
Do you know of any consensus building activities[4] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
FERC Order No. 901 NERC Standards Development Work Plan in Response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
1. SARs:

[4] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Requested information
a. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Model Validation b. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: IBR Modeling Revision 2. Active Reliability Standards Projects: a. 2020-06 Verifications of Models and Data for Generators b. 2021-01 Modifications to MOD-025 and PRC-019 c. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1 (NERC Standards Development recommends assigning the SAR to this active project) d. 2022-04 EMT Modeling e. 2023-05 Modifications to FAC-001 and FAC-002 f. 2023-08 Modifications of MOD-031 Demand and Energy Data
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them. Since the directives of FERC Order 901 instruct NERC to develop new or modified standards, there were no other alternatives considered.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff	☐ Final SAR endorsed by the SC
☐ Draft SAR presented to SC for acceptance	☐ SAR assigned a Standards Project by NERC
☐ DRAFT SAR approved for posting by the SC	☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation	☐ Energy Policy
☐ Resilience/Extreme Events	☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer
5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to ~~improve~~ the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements		
Date Submitted:	4/29/24 (Revised on October 15, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (Revised by 2022-02 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☒ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by the North American Electric Reliability Corporation (NERC), with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs~~);~~), including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order are four milestones that include sets of directives to NERC. In the Order, FERC has directed NERC to propose new or modified standards to mitigate reliability gaps in the current NERC

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Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance.

In January 2024, NERC filed the initial **Standards Development Work Plan in Response to FERC Order No. 901** (hereafter referred to as the "Work Plan"). A current version of the Work Plan will be maintained here. The Work Plan discusses how NERC will develop Reliability Standards within (Milestones 2-4) to meet FERC's filing deadlines. This ~~Standard Authorization Request~~SAR addresses Milestone 3 of the Work Plan~~,~~ related to Reliability Standards for modeling and data sharing requirements to establish sufficient IBR model data and parameters to assure accurate representation of IBR performance within the models. Further, collaborative sharing of this information~~,~~ and the utilization of this information throughout the lifecycle of IBRs will also be established.

Milestone 3 of the Work Plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. To be clear, assets to be included as part of revisions to the Compliance Registry criteria ("category 2 type assets") are considered herein as ~~:~~"registered IBR."~~.~~ NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

As often discussed within NERC recommendations and publications, the current paradigm of modeling and data sharing leaves the bulk power system (BPS) at a higher than necessary risk for unexpected and undesired ~~inverter-based resource (~~IBR~~)~~ performance. Since 2016, approximately 15,000 MW of IBR have unexpectedly reduced output during NERC categorized disturbance events. None of the IBR facilities involved in these disturbances utilized models that could accurately represent the facility's performance during the disturbance event. These discrepancies between modeled and studied performance when compared to real-world performance are driven by current industry modeling practices and a dependence on generic IBR modeling throughout the lifecycle of the IBR facility.

NERC Modeling Guidance [1] states that additional model types, namely manufacturer-specific user-written models, ~~must~~ should be used for local reliability studies, during the interconnection process and following commissioning to validate as-built performance – as well as through ongoing validation of performance. The deficiencies within the current state of model quality are well documented. As required by FERC Order No. 901, the development of positive sequence models based on an approved (standard) library of model types must be built into Interconnection-wide cases.

Revisions to data sharing expectations and the creation of a "NERC Approved Model Library" that allows the use of manufacturer-specific models ~~in addition to standard library (generic) models~~ in instances

[1] https://www.nerc.com/pa/RAPA/ModelAssessment/Documents/Dynamic%20Modeling%20Recommendations.pdf

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where generic modeling cannot represent the performance of the IBR are necessary to ensure BPS reliability through improvements to the inputs of current study practices.
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System (BES) being addressed, and how does this proposed project provide the reliability-related benefit described above?):
This SAR addresses specific pieces of the NERC filed Work Plan related to Milestone 3 and addresses the various industry comments to meet the regulatory directives of FERC Order No. 901. This project shall coordinate with other relevant projects in developing standard language and meeting the FERC Order No. 901 directives~~among other projects (i.e., act as a clearing house to tie directive language to standard revisions), develop standard language (i.e., perform the normal duties of a standard development Project), and build upon other Milestones from FERC Order No. 901 Standards Projects to meet regulatory deadlines (i.e., maintain agility based on how FERC Order No. 901 related Projects proceed to meet the directive deadlines)~~. This Project will ~~also~~ address FERC Order No. 901 directives related to aggregation of data, parameters, and estimation methods to provide the Transmission Planner (TP) and Transmission Operator (TOP) with the estimate values, explanation for limitations on data availability, and the method used for all estimations. This project is intended to serve as a data sharing center point for many of the revisions being established within all of the 901-related projects. Performance of IBR during an event (grid disturbance) are identified and corrected within the Standards Development projects pertaining to Milestone 2 of the Work Plan. However, any requisite changes to model data as a result of correcting IBR performance, must be communicated through a uniform model framework to assure all impacted entities and users of the approved models are adequately informed and provided updated models (as developed within this project). Similarly, revisions to model validation being drafted by the drafting team assigned the Milestone 3 Part 2 SAR, must also assure entities follow the uniform model framework established here.
Project Scope (Define the parameters of the proposed project):
The FERC Order No. 901 directives assigned to this SAR are outlined in the Detailed Description section below. The project scope shall address all those directives, and should consider the following objectives during the standards development process: ~~Modify MOD-032 to require the usage of a "NERC-Approved Model Library" (Hereafter: "The Model Library") that shall identifycontains acceptable (and unacceptable) models, recommendations on which models should be used for each study, and include recommendations to facilitate the exchange of neighboring entities' respective planning and operation models and to be used in Interconnection-wide case creation and in other NERC Reliability Standards for IBR.~~ ~~This Model Library will be developed and maintained by NERC and include recommendations regarding model usage depending on study type. Updates on the Model Library development will be coordinated with the Drafting Team. The Drafting Team may solicit feedback comments of the NERC process from industry as needed.~~ ~~The Model Library will be accessible to the general public. NERC will develop an open and transparent process for maintaining the library.~~

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~~The Model Library will be consistent with NERC's published Dynamic Modeling Recommendations. The Model Library will not prohibit the use of equipment-specific models in Interconnection-wide base cases.~~
~~, primarily: Placeholder for DT guidance.~~

~~i. Industry-approved library models are sufficient for use in Interconnection-wide base case creation and interconnection-wide studies;~~

~~ii. For local reliability studies (e.g. performance during the interconnection process, model quality validation), equipment specific models should be used if standard library models (i.e. WECC Generic) cannot accurately represent the performance of the IBR. if generic models from the Model Library cannot accurately represent the IBR.~~

~~2.~~1. Modify applicable Reliability Standards (e.g. MOD-032, TOP-003, and IRO-010) to ~~require Planning Coordinators (PC), Transmission PlannersTPs, Reliability Coordinators (RC), Transmission OperatorsTOPs, and Balancing Authorities (BA) to~~ ensure the usage of a uniform framework for each Interconnection ~~that includes the usage of a "NERC-Approved Model Library" (hereafter:the Model Library"). which The uniform framework will~~that includes a minimum modeling criteria consistent with NERC's Dynamic Modeling Recommendations, a registered modeling designee, and necessary data exchange requirements. The framework must require:

a. The usage of a "NERC-Approved Model Library~~-~~" (hereafter: "Model Library").

i. The~~is~~ Model Library will be developed and maintained by NERC and will be consistent with NERC's published Dynamic Modeling Recommendations. The Model Library will not prohibit the use of equipment-specific models in Interconnection-wide base cases.

ii. The Model Library will be accessible to the general public. NERC will develop an open and transparent process for maintaining the library.

iii. The Model Library will include recommendations to facilitate the exchange of neighboring entities' respective planning and operation models to be used in Interconnection-wide case creation and in other NERC Reliability Standards for IBR.

iv. The~~is~~ Model Library will include recommendations regarding model usage depending on study type.

v. The DT may consider documenting additional guidance for NERC related to maintaining a model library~~Placeholder for DT guidance~~.

~~a.~~b. Data specification and notifications for the data necessary to develop ~~i~~Interconnection-wide models and models for other reliability studies. Specifications must include:~~;~~

i. ~~Specifications must include p~~Provisions and a periodicity for new, modified, or changed equipment for any changes that alter the performance of the IBR, and

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~~ii. Specifications must include provisions for changes to an approved equipment-specific models for any changes that alter the performance of the IBR,~~

~~iii.~~ii. ~~Specifications must include p~~Provisions and a periodicity for unregistered IBRs and DERs that include estimation, aggregation, or other data submittal. ~~exchanging estimated aggregated unregistered IBR and DER data.~~

~~b.~~c. Data exchange of ~~generic~~ models from the Model Library for ~~i~~Interconnection-wide model creation (i.e., system models in the language of FERC Order No. 901 (157, 161)) that most accurately reflects, according to manufacturer documentation, the behavior of each IBR during steady state, short-circuit, and dynamic conditions; ~~;~~

~~c. A review and approval process for additional model types from the Model Library (other than generic model types) for other reliability studies;~~

d. Data exchange of estimated modeling data and parameters~~aggregated data~~, estimation methods, and documented limitations of the availability of accurate data for unregistered IBR and DER as developed by Transmission Owners and Distribution Providers ~~in Item 4~~.

~~3. Modify MOD-032 to require Generator Owners (GO) and Transmission Owners (TO) to follow the uniform framework developed in Item 2, specifically;~~

~~a. GO and TO of IBR must provide generic models from the Model Library for interconnection-wide model creation that most accurately reflect the behavior of each IBR during steady state, short-circuit, and dynamic conditions;~~

~~b. GO and TO of IBR must provide sufficient documentation regarding technical limitations and any inaccuracies as justification for the use of additional equipment-specific models.~~

~~i. For instance, a Corrective Action Plan created by a planner or operator to address model quality due to exceeded performance criteria (reference Milestone 3 Part 2 SAR), may should necessitate usage of an equipment specific model, if available, instead of a generic model from the Model Library. ;~~

~~ii. For instance, studied discrepancies between the generic model and performance or of the IBR or equipment specific model demonstrated during the interconnection process may should necessitate usage of an equipment specific model, if available, instead of a generic model. from the Model Library.~~

~~iii. For instance, discrepancies between the generic model and performance of the IBR during a disturbance (i.e. from a post-event analysis) may should necessitate usage of an equipment-specific model, if available. instead of a generic model from the Model Library. ;~~

~~4. Modify TOP-003 and IRO-010 to require Transmission Owners and Distribution Providers to establish and implement data aggregation methods for unregistered IBR and DER. The SDT~~

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~~should consider including these methods in the TOP, BA, and RC data specifications these entities maintain. These standards must address:~~ ~~a. An estimate of the modeling data and parameters of IBR-DERs and unregistered IBRs,~~ ~~b. An explanation of the limitations of the availability of accurate data, and~~ ~~c. The method used for all estimations.~~ ~~5.~~2. The drafting team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[2] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific directive text in FERC Order No. 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in the underlying FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** NERC will maintain a current version of NERC Standards Development's Work Plan to Address FERC Order No. 901 on the NERC website under Reliability Standards Under Development. Included in this Work Plan is a list of the directives in FERC Order No. 901 and their associated mapping of each SAR submitted by NERC. The Work Plan will be updated should any mapping of FERC directives be reassigned due to ongoing work in the various Standards Development Projects. As of April 1, 2024, this SAR will address the following FERC Order No. 901 directives, with the scope ~~for~~ of this SAR emphasized in **bold** where the Paragraph language is separated[3] across multiple projects: ~~this SAR emphasized in **bold** as appropriate:~~ 1. **"Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning: (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate**; and (2) data and model validation for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate." (P 7) 2. **"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require registered IBR generator owners and operators to provide IBR-specific modeling data and parameters (e.g., steady-state,**

[2] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.
[3] Other Projects will cover the non-bolded sections of the same Order Paragraph containing the directive.

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dynamic, and short circuit modeling information ,and control settings for momentary cessation and ramp rates) that accurately represent the registered IBRs **to their planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities that are responsible for planning and operating the Bulk-Power System."** (P 76)

3. "Nevertheless, to support accurate modeling and performance, we direct NERC to consider during its standards development process AEU and ACP/SEIA's suggested data sharing requirements when developing the framework, criteria, and necessary data exchange requirements to meet the registered IBR data sharing directive." (P 77)
4. **"As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions." (P78)
5. "Likewise, regarding CAISO's request that the Commission direct NERC to consider requiring registered IBRs to provide additional data, we agree that such data collections may be warranted, and direct NERC to consider through its standards development process whether additional IBR data points (e.g., telemetry collections or other automated platform integrations) are needed to further enhance real-time visibility of Bulk-Power System operations." (P 86)
6. "Specifically, as proposed in the NOPR, we direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require: (1) transmission owners to provide to Bulk-Power System planners and operators modeling data and parameters for unregistered IBRs in their transmission owner areas that, individually or in the aggregate, materially affect the reliable operation of the Bulk-Power System and (2) distribution providers to provide to Bulk-Power System planners and operators modeling data and parameters for IBR-DERs in the aggregate in their distribution provider areas where the IBR-DERs in the aggregate materially affect the reliable operation of the Bulk-Power System." (P 102)
7. "Recognizing that there may be instances in which transmission owners are unable to gather adequate unregistered IBR modeling data and parameters to create and maintain unregistered IBR models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the unregistered IBR modeling data and parameters, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by unregistered IBRs, and (4) the method used for estimation." (P 104)
8. "To support this data collection, we further direct NERC to consider commenters suggestions to implement a process or mechanism by which transmission owners would receive modeling data and parameters." (P 104)

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9. "Accordingly, to account for instances in which distribution providers are unable to gather adequate modeling data and parameters of IBR-DERs to create and maintain IBR-DER models, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require that each distribution provider, if unable to gather accurate IBR-DERs data in the aggregate or unable to gather IBR-DERs data in the aggregate at all, provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs in the aggregate, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of the data provided by IBR-DERs, and (4) the method used for estimation." (P 105)
10. "In support of above, we further direct NERC to consider commenters' suggestions to implement a process or mechanism by which distribution providers would receive modeling data and parameters." (P 105)
11. "For those areas with IBR-DERs that in the aggregate materially affect the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we direct NERC to determine the appropriate registered entity responsible for providing data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, or, when unable to gather such accurate IBR-DERs data, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by the IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and (4) the method used for estimation." (P 106)
12. "Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, we direct NERC to determine through its standards development process the minimum categories or types of data that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers necessary to predict the behavior of all IBRs and to ensure that compliance obligations are clear." (P 108)
13. **"As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions." (P 108)
14. **"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the use of approved industry generic library IBR models** that accurately reflect the behavior of IBRs during steady state, short-circuit, and dynamic conditions when developing planning, operations, and interconnection-wide models." (P 122)

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15. "We direct NERC to determine through its standards development process which nation-wide approved component models are needed to build IBR plant models for steady state, short-circuit, and dynamics studies." (P 124)
16. "Accordingly, we direct NERC to develop new or modified Reliability Standards that require the sole use of nation-wide approved component generic library models for system models to facilitate the exchange of neighboring entities' respective planning and operation models and to build interconnection-wide models." (P 125)
17. "**We also direct NERC to require** the generator owners of registered IBRs and **the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of** registered and **unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior**." (P 141)
18. "Recognizing that there may be instances in which transmission owners are unable to gather accurate unregistered IBR modeling data and parameters to create and maintain accurate unregistered IBR dynamic models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas, dynamic models of unregistered IBRs using estimated data in accordance with this final rule's section IV.B.3 data sharing directives." (P 141)
19. "Further, we direct NERC to require distribution providers to provide to the planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities aggregated dynamic models that adequately represent the dynamic performance of IBR-DERs on their systems that in the aggregate have a material impact on the Bulk-Power System, including momentary cessation and/or tripping, and all ride through behavior (e.g., IBR-DERs in the aggregate modeled by interconnection requirements performance to represent different steady-state and dynamic behavior)." (P141)
20. "Recognizing that there may be instances in which distribution providers are unable to gather data that accurately represents IBR-DERs in the aggregate, we modify the NOPR proposal and direct NERC to include in the proposed new or modified Reliability Standards a requirement that the distribution provider, if unable to gather data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, provide to the Bulk-Power System planners and operators (i.e., the data recipients) a dynamic model using estimated data for IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, in accordance with this final rule's section IV.B.3 data sharing directives." (P 141)
21. "Furthermore, we acknowledge that there may be areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider. Therefore, we modify the NOPR proposal and direct NERC to

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determine the appropriate registered entity responsible for providing adequate data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and to identify the registered entities for coordinating, verifying, and keeping up to date the respective dynamic models." (P 141) 22. "Finally, NERC must ensure that the proposed new or modified Reliability Standards account for the dynamic performance of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System." (P 141) 23. "Accordingly, we direct NERC to develop new or modified Reliability Standards that require the use of the DER_A model or successor models to represent the behaviors of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System at a sufficient level of fidelity for Bulk-Power System planners and operators to create valid planning and operations and interconnection-wide models and to be able to perform respective system studies." (P 146) 24. "**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate** and to establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models." (P 157) 25. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models)** and the validation of each respective system model." (P 161) 26. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown, and the modifications necessary for each specific directive are also unknown though they are expected to vary based on DT outcome.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
IBRs connected to the transmission system.

Requested information
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
This Project should contain appropriate members representing the following Functional Entities: Balancing Authority Distribution Provider Generator Owner Generator Operator Planning Coordinator Reliability Coordinator Transmission Owner Transmission Operator Transmission Planner ~~Reliability Coordinator~~
Do you know of any consensus building activities[4] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
FERC Order No. 901 NERC Standards Development Work Plan in Response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
1. SARs: a. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Model Validation b. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: IBR Modeling Revision 2. Active Reliability Standards Projects: a. 2020-06 Verifications of Models and Data for Generators b. 2021-01 Modifications to MOD-025 and PRC-019 c. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1 (NERC Standards Development recommends assigning the SAR to this active project) d. 2022-04 EMT Modeling e. 2023-05 Modifications to FAC-001 and FAC-002 f. 2023-08 Modifications of MOD-031 Demand and Energy Data

[4] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Requested information
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them. Since the directives of FERC Order 901 instruct NERC to develop new or modified standards, there were no other alternatives considered.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation ☐ Resilience/Extreme Events	☐ Energy Policy ☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer
5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Project 2020-06 Verifications of Models and Data for Generators

Action

Authorize drafting of the Reliability Standard(s) identified in the Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation Standard Authorization Request (SAR).

Background

FERC Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation SAR addresses specific directives of FERC Order No. 901 pertaining to performance-based validation at the generator level. NERC staff assigned this SAR to Project 2020-06 Verifications of Models and Data for Generators to ensure that obligations to conduct model validation for Inverter-based Resource (IBR) at the plant generator level are not duplicative in nature or create competing expectations for IBR to conduct verification/validation of model data at the system level. It is also necessary to prevent duplicative model validation requirements that do not align with the performance-based objectives of the regulatory directives. Project 2020-06 will incorporate uniform model framework verifications into FAC-002 to assure a consistent holistic approach for model data sharing is established throughout the lifespan of an IBR. This SAR complements the objectives of the SAR entitled FERC Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs (formerly: Modifications to MOD-025 and PRC-019), which covers verification and validation of the IBR at the system level.

At the July 21, 2021, meeting, the Standards Committee (SC) accepted the SAR assigned to Project 2020-06 Verifications of Models and Data for Generators. The drafting team proposed revisions to one of the standards identified in the SAR, MOD-026. The initial draft was posted May 20, 2022, through July 6, 2022. An additional draft was posted November 21, 2022, through January 18, 2023. A second additional draft was posted June 7, 2023, through July 21, 2023.

At the May 15, 2024, SC meeting, the FERC Order No. 901 Milestone 3, Part 2: IBR Plant Model Validation SAR was assigned to this project. FERC Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation SAR was accepted at the May 2024 SC meeting and posted for an informal comment period from May 23, 2024, to June 26, 2024. Additional nominees were solicited from May 23, 2024, to June 26, 2024, and then approved at the September 18, 2024. SC meeting.

This SAR is intended to establish new or revised Reliability Standards to address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing actual performance data, including performance of IBR performance during a disturbance. This will help ensure the facility's model(s) reflect(s) the in-service equipment throughout the lifecycle of the IBR facility. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

Summary

NERC staff recommends that the SC authorize drafting revisions to the standards listed in the SAR.

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation		
Date Submitted:	4/29/24 (Revised on October 15, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (Revised by 2020-06 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard ☒ Revision to Existing Standard ☒ Add, Modify or Retire a Glossary Term ☒ Withdraw/retire an Existing Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by NERC, with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs), including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order, are four milestones that include sets of directives to NERC. In the Order, FERC has directed NERC to propose new or modified standards to mitigate reliability gaps in the current NERC Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified

Requested information
Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance. In January 2024, NERC filed the initial **Standards Development Work Plan in Response to FERC Order No. 901** (hereafter referred to as the "Work Plan). A current version of the Work Plan will be maintained here. The Work Plan discusses how NERC will develop Reliability Standards within three tranches (Milestones 2-4) to meet FERC's filing deadlines. This Standard Authorization Request addresses Milestone 3 – Part 2 of the Work Plan, related to Reliability Standards for IBR data sharing and model validation. Milestone 3 of the Work Plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System being addressed, and how does this proposed project provide the reliability-related benefit described above?):
This SAR addresses specific pieces of the NERC filed Work Plan related to Milestone 3 and addresses the various industry comments to meet the regulatory directives of FERC Order No. 901. This project shall coordinate among other projects (i.e., act as a clearing house to tie directive language to standard revisions), develop standard language (i.e., perform the normal duties of a standard development Project), and build upon other Milestones from FERC Order No. 901 Standards Projects to meet regulatory deadlines (i.e., maintain agility based on how FERC Order No. 901 related Projects proceed to meet the directive deadlines). Specifically, the drafting team will address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing performance data. This will help ensure the facility's model(s) reflects the in-service equipment throughout the lifecycle of the IBR facility.
Project Scope (Define the parameters of the proposed project):
The FERC Order No. 901 directives assigned to this SAR are outlined in the Detailed Description section below. The project scope shall address all those directives, and should consider the following objectives during the standards development process: The Drafting Team shall address the following project objectives: **Phase 1 Objectives (November 2025):** 1. Define the terms as such "Model Verification" and "Model Validation" either in added terms to the NERC Glossary of Terms or by requirements in NERC Reliability Standards.

Requested information

2. Either revise current model validation and verification standards (e.g.,, MOD-026, MOD-027 as indicated in FERC 901) and review other related standards (e.g., FAC-002), or develop a new resource model validation Reliability Standards to include the holistic model verification process (including DERs in the aggregate and unregistered or registered IBRs), in Scope item 1. This process shall include:
    a. A complete set of validation expectations using performance data from disturbance monitoring equipment at the resource site, e.g., disturbance recorders (DDRs) and digital fault recorders (DFRs), to capture the dynamic response of the IBR. These expectations must include the performance of IBR during disturbances in addition to any other periodicity requirements in these expectations.
    b. A model that represents dynamic behavior at a sufficient level of fidelity to be provided for Bulk-Power System planners and operators to perform valid interconnection, planning, and operational studies.
        i. All models should be verified by the OEM to be accurately parameterized to represent site-specific controls, settings, and protections with supporting documentation and attestations. They should also be validated against actual product performance whenever system events suitable for validation purposes occur, and according to NERC Reliability Standards and local TP and PC requirements
        ii. A model benchmarking report should be prepared that compares all the models against OEM device tests and each other, and documents any discrepancies across the models, including those due to software platform limitations. The benchmark reports should be available among neighboring PCs.
    c. A process for post-interconnection model validation based on performance data and not solely staged testing.
    d. To set a process which includes a set of minimum criteria to perform validation (e.g., time, tolerance, impact)
    e. A set of requirements for the planners and operators to specify additional performance criteria to initiate this process. Planners and operators should be required to communicate these criteria to Generator Owners.
    f. A set of duties, roles, and responsibilities for registered entities for registered IBR, unregistered IBR, and DERs in the aggregate. The DT should consider the GO of registered IBR to provide a validated model or recorded performance data. For unregistered IBR and DERs, the DT should consider the TO and DP, respectively, to coordinate, verify, and keep up to date models of such resources. Where the DP does not exist for DER model verification, the DT should consider the TO providing a portion of or all the typical roles for DERs in this process. The DT should review FERC Order 901 Paragraph 157 and 161 for this Scope item.
    g. The consideration of corrective action plans (CAP) to solve discrepancies and align model output with captured plant performance.

Requested information
3. Coordinate with the drafting team of **Project 2021-01** to ensure these plant verified and validated models are used when performing system level validation (and are out of scope for system validation). 4. The Drafting Team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation. a. Ensure consistency in timelines for model verification, with FERC Orders and Other Reliability Standards under development.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific FERC Directive text in FERC Order 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in the FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** This SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate: 1. "**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards** technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-Power System, **and to require Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment**." (P85) 2. "With respect to NERC's recommendation for model benchmarking, we direct NERC to determine through its standards development process whether the development of benchmark cases to test model performance and a subsequent report comparing model performance are needed and at what periodicity." (P 126) 3. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the generator owners of registered

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

IBRs, transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system to provide models that represent the dynamic behavior of these IBRs at a sufficient level of fidelity to provide to Bulk-Power System planners and operators to perform valid interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources." (P 140)

4. "We also direct NERC to require the generator owners of registered IBRs and the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior." (P 141)
5. "While we decline to include this level of detail in the directive to NERC, we nonetheless direct NERC to establish a standard uniform model verification process. A uniform model verification process will ensure that all entities use the same set of minimum requirements to verify that all generation resource (i.e., synchronous and non-synchronous) models are complete and that the models accurately represent the dynamic behavior of all generation resources at a sufficient level of fidelity for Bulk-Power system planners and operators to perform valid interconnection-wide, planning, and operational studies." (P 143)
6. "Therefore, we direct NERC to define the model verification process and to require consistency among the model verification processes for existing Reliability Standards (e.g., FAC-002, MOD-026, and MOD-027) and any new or modified Reliability Standards." (P 143)
7. "Moreover, although the Reliability Standards will apply to a different (albeit overlapping) set of entities than Order No. 2023, we believe consistency is needed between the complimentary proceedings and therefore direct NERC to include in the new or modified Reliability Standards a similar model verification process timeline consistent with FERC Order No. 2023 modeling deadline requirements." (P 149)
8. "**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to** determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate and to **establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models."** (P 157)
9. "Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of registered IBRs, unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models." (P 161)
10. "For those areas with IBR-DERs in the aggregate that have a material impact on the reliable operation of the Bulk-Power System but do not have an associated registered distribution

Requested information
provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the models of those IBR-DERs and to determine the registered entities responsible for updating, verifying, and coordinating models for IBR-DERs in the aggregate to meet the system models directives." (P 161) 11. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226) This SAR is necessary to ensure that a single solution for IBR plant model validation using performance data may be established within the Milestone 3 Part 3 drafting team and does not create duplicative data reporting requirements for transmission system validation. Establishment of data sharing requirements, including the coordination of protection settings and generating resource must be established within Milestone 3 Part 1. System level model verification and validation is covered in Milestone 3 Part 3.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown. There may be potential cost savings if fewer reoccurring staged tests are performed. Costs can be moderate if additional disturbance monitoring equipment is required to be installed at facilities in the post-interconnection process.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
Inverter-Based Resources connected to the Bulk Power System (BPS) Distributed Energy Resources (DER-IBR), in aggregate
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
Transmission Planner Reliability Coordinator Distribution Provider Generator Owner and Generator Operator Transmission Owner and Transmission Operator Planning Coordinator

Requested information
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
FERC Order No. 901 NERC Standards Development Work Plan in Response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
1. SARs: a. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements b. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3System Model Validation with IBRs 2. Active Reliability Standards Projects: a. 2020-06 Verifications of Models and Data for Generators (NERC Standards Development recommends assigning the SAR to this active project) b. 2021-01 Modifications to MOD-025 and PRC-019 i. MOD-033 c. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1 d. 2022-04 EMT Modeling e. 2023-05 Modifications to FAC-001 and FAC-002 f. 2023-08 Modifications of MOD-031 Demand and Energy Data
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.
NERC has evaluated industry progress toward adopting the recommendations outlined in NERC guidelines, white papers, its prior Alerts, and other industry efforts. Since the directives of FERC Order 901 instruct NERC to develop new or modified standards, there were no other alternatives considered

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise or develop a standard or definition.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
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☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
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Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g., NPCC	Unknown at this time.

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation ☐ Resilience/Extreme Events	☐ Energy Policy ☐ Critical Infrastructure Interdependencies
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Standard Authorization Request (SAR)

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Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation		
Date Submitted:	4/29/24 (Revised on October 15, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (Revised by 2020-06 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☒ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation	☒ NERC Standing Committee Identified
☒ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☒ Reliability Standard Development Plan	☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

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Requested information
Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance. In January 2024, NERC filed the initial **Standards Development Work Plan in Response to FERC Order No. 901** (hereafter referred to as the "Work Plan). A current version of the Work Plan will be maintained here. The Work Plan discusses how NERC will develop Reliability Standards within three tranches (Milestones 2-4) to meet FERC's filing deadlines. This Standard Authorization Request addresses Milestone 3 – Part 2 of the Work Plan, related to Reliability Standards for IBR data sharing and model validation. Milestone 3 of the Work Plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.
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This SAR addresses specific pieces of the NERC filed Work Plan related to Milestone 3 and addresses the various industry comments to meet the regulatory directives of FERC Order No. 901. This project shall coordinate among other projects (i.e., act as a clearing house to tie directive language to standard revisions), develop standard language (i.e., perform the normal duties of a standard development Project), and build upon other Milestones from FERC Order No. 901 Standards Projects to meet regulatory deadlines (i.e., maintain agility based on how FERC Order No. 901 related Projects proceed to meet the directive deadlines). Specifically, the drafting team will address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing ~~actual~~ performance data. This will help ensure the facility's model(s) reflects the in-service equipment throughout the lifecycle of the IBR facility.
Project Scope (Define the parameters of the proposed project):
The FERC Order No. 901 directives assigned to this SAR are outlined in the Detailed Description section below. The project scope shall address all those directives, and should consider the following objectives during the standards development process: The Drafting Team shall address the following project objectives: **Phase 1 Objectives (November 2025):** 1. Define the terms as such "Model Verification" and "Model Validation" either in added terms to the NERC Glossary of Terms or by requirements in NERC Reliability Standards.

Requested information

~~1. Either revise MOD-033 or create a new IBR model validation Reliability Standard to require model validation using actual performance data.~~

2. Either revise current model validation and verification standards (e.g.,, MOD-026, MOD-027 as indicated in FERC 901) and review other related standards (e.g., FAC-002), or develop a new resource model validation Reliability Standards to include the holistic model verification process (including DERs in the aggregate and unregistered or registered IBRs), in Scope item 1. This process shall include:

   a. ~~include a~~A complete set of validation expectations using performance data ~~(~~from disturbance monitoring equipment at the resource site, e.g., disturbance recorders (DDRs) and digital fault recorders (DFRs), to capture the dynamic response of the IBR. These expectations must include performance ~~data~~ of IBR during disturbances ~~as well as other performance measures);~~ in addition to any other periodicity requirements in these expectations.

   ~~b. leverages the most accurate and highest quality model type available (reference data sharing scope from Milestone 3 Part 1 SAR);~~

   b. A model that represents the dynamic behavior at a sufficient level of fidelity to be provided for Bulk-Power System planners and operators to perform valid interconnection, planning, and operational studies.

   i. All models should be verified by the OEM to be accurately parameterized to represent site-specific controls, settings, and protections with supporting documentation and attestations. They should also be validated against actual product performance whenever system events suitable for validation purposes occur, and according to NERC Reliability Standards and local TP and PC requirements

   ii. A model benchmarking report should be prepared that compares all the models against OEM device tests and each other, and documents any discrepancies across the models, including those due to software platform limitations. The benchmark reports should be available among neighboring PCs.

   c. ~~ensure~~A process for post-interconnection ~~validations are not solely~~model validation based on performance data and not solely staged testing~~, but instead are periodically validated using performance data;~~.

   ~~d. be designed to follow and be able to leverage new performance validations expected to be done during the interconnection process (to be established in phase 2 of this SAR);~~

   ~~e.~~d. ~~include~~To set a process which includes a set of minimum criteria ~~for performing~~to perform validation (e.g., time, tolerance, impact)~~;~~

   e. A set of requirements for the planners and operators to specify additional performance criteria to initiate this process. Planners and operators should be required to communicate these criteria to Generator Owners.

Requested information

f. A set of duties, roles, and responsibilities for registered entities for registered IBR, unregistered IBR, and DERs in the aggregate. The DT should consider the GO of registered IBR to provide a validated model or recorded performance data. For unregistered IBR and DERs, the DT should consider the TO and DP, respectively, to coordinate, verify, and keep up to date models of such resources. Where the DP does not exist for DER model verification, the DT should consider the TO providing a portion of or all of the typical roles for DERs in this process. The DT should review FERC Order 901 Paragraph 157 and 161 for this Scope item.

~~f. include some planner/operator flexibility in determining specific performance criteria –~~

~~g. Require planner and operators to communicate any performance criteria to Generator Owners;~~

~~h. the DT should ensure any performance criteria established by the DT or by the planner and operators are risk-based and region-specific;~~

~~i. the DT should consider other criteria may be created by planners and operators to demonstrate performance in upcoming revisions to Reliability Standards due to Milestone 4 projects (planning and operator studies using performance data); and~~

~~j.~~g. ~~the DT must require~~The consideration of corrective action plans (~~CAPs~~CAP) to ~~be created by planners and operators that require the GO/TO to identify and improve model performance characteristics to align with~~solve discrepancies and align model output with captured plant performance.

~~2. Revise MOD-026 and MOD-027 to remove IBR from those Standards as this holistic approach includes some form of ongoing quality review and corrections based on new performance-based validation.~~

3. Coordinate with the drafting team of **Project 2021-01** to ensure these plant verified and validated models are used when performing system level validation (and are out of scope for system validation).

~~3.~~4. The ~~drafting team~~Drafting Team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.

a. Ensure consistency in timelines for model verification, with FERC Orders and Other Reliability Standards under development.

~~**Phase 2 Objectives (not required as part of 901 Milestone 3 timeline)**~~

~~4. Either revise FAC-002 or create a new SAR to incorporate similar changes to IBR validation during the interconnection process or create a new IBR model validation standard to require model validation using actual performance data to validate model quality during the interconnection process.~~

~~a. include a complete set of validation expectations using performance data,~~

~~b. leverages the most accurate and highest quality model type available,~~

Requested information
~~c. ensure post-interconnection validations are not based on staged testing but instead are periodically validated using performance data,~~ ~~d. be designed to follow and be able to leverage new performance validations done during the interconnection process,~~ ~~e. include minimum criteria for performing validation (e.g., time, tolerance, impact),~~ ~~f. include some planner/operator flexibility in determining specific performance criteria,~~ ~~g. These are necessary to ensure that performance criteria are risk-based and region-specific~~ ~~h. These should consider parallel criteria developed for TPL-001 and the new PRC-030 to allow corrective action plans to be created by planners and operators that require the GO/TO to identify and improve model performance characteristics to align with performance.~~
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific FERC Directive text in FERC Order 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in the FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** ~~NERC will maintain a current version of NERC Standards Development's Work Plan to Address FERC Order No. 901 on the NERC website under Reliability Standards Under Development. Included in this Work Plan is a list of the directives in FERC Order No. 901 and their associated mapping to each SAR submitted by NERC. The Work Plan will be updated should any mapping of FERC directives be reassigned due to ongoing work in the various Standards Development Projects. As of April 1, 2024, this SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate:~~ This SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate: 1. "**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards** technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

Power System, **and to require Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment**." (P85)

2. "With respect to NERC's recommendation for model benchmarking, we direct NERC to determine through its standards development process whether the development of benchmark cases to test model performance and a subsequent report comparing model performance are needed and at what periodicity." (P 126)
3. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the generator owners of registered IBRs, transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system to provide models that represent the dynamic behavior of these IBRs at a sufficient level of fidelity to provide to Bulk-Power System planners and operators to perform valid interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources." (P 140)
4. "We also direct NERC to require the generator owners of registered IBRs and the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior." (P 141)
5. "While we decline to include this level of detail in the directive to NERC, we nonetheless direct NERC to establish a standard uniform model verification process. A uniform model verification process will ensure that all entities use the same set of minimum requirements to verify that all generation resource (i.e., synchronous and non-synchronous) models are complete and that the models accurately represent the dynamic behavior of all generation resources at a sufficient level of fidelity for Bulk-Power system planners and operators to perform valid interconnection-wide, planning, and operational studies." (P 143)
6. "Therefore, we direct NERC to define the model verification process and to require consistency among the model verification processes for existing Reliability Standards (e.g., FAC-002, MOD-026, and MOD-027) and any new or modified Reliability Standards." (P 143)
7. "Moreover, although the Reliability Standards will apply to a different (albeit overlapping) set of entities than Order No. 2023, we believe consistency is needed between the complimentary proceedings and therefore direct NERC to include in the new or modified Reliability Standards a similar model verification process timeline consistent with FERC Order No. 2023 modeling deadline requirements." (P 149)

~~8. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate, coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR~~

Requested information

~~models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and resulting system models against actual system operational behavior." (P 156)~~

~~9.~~8. "**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to** determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate and to **establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models."** (P 157)

~~10. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require** planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and **the validation of each respective system model**." (P 161)~~

~~11.~~9. "Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of registered IBRs, unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models." (P 161)

~~12.~~10. "For those areas with IBR-DERs in the aggregate that have a material impact on the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the models of those IBR-DERs and to determine the registered entities responsible for updating, verifying, and coordinating models for IBR-DERs in the aggregate to meet the system models directives." (P 161)

~~13.~~11. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)

This SAR is necessary to ensure that a single solution for IBR plant model validation using performance data may be established within the Milestone 3 Part 3 drafting team and does not create duplicative data reporting requirements for transmission system validation. Establishment of data sharing requirements, including the coordination of protection settings and generating resource must be established within Milestone 3 Part 1. System level model verification and validation is covered in Milestone 3 Part 3.

Requested information
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown. There may be potential cost savings if fewer reoccurring staged tests are performed. Costs can be moderate if additional disturbance monitoring equipment is required to be installed at facilities in the post-interconnection process.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
Inverter-Based Resources connected to the Bulk Power System (BPS) Distributed Energy Resources (DER-IBR), in aggregate
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
Transmission Planner Reliability Coordinator Distribution Provider Generator Owner and Generator Operator Transmission Owner and Transmission Operator Planning Coordinator
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
FERC Order No. 901 NERC Standards Development Work Plan in Response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
1. SARs: a. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements b. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part ~~3: IBR Modeling Revision~~3System Model Validation with IBRs 2. Active Reliability Standards Projects:

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Requested information
a. 2020-06 Verifications of Models and Data for Generators (NERC Standards Development recommends assigning the SAR to this active project) b. 2021-01 Modifications to MOD-025 and PRC-019 i. MOD-033 c. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1 d. 2022-04 EMT Modeling e. 2023-05 Modifications to FAC-001 and FAC-002 f. 2023-08 Modifications of MOD-031 Demand and Energy Data
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.
NERC has evaluated industry progress toward adopting the recommendations outlined in NERC guidelines, white papers, its prior Alerts, and other industry efforts. Since the directives of FERC Order 901 instruct NERC to develop new or modified standards, there were no other alternatives considered

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	yes

Market Interface Principles	
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g., NPCC	Unknown at this time.

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation ☐ Resilience/Extreme Events	☐ Energy Policy ☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Project 2021-01 System Model Validation with IBRs (formerly: Modifications to MOD-025 and PRC-019)

Action

Authorize drafting of Reliability Standard(s) identified in Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs Standard Authorization Request (SAR)

Background

FERC Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs SAR addresses specific directives in FERC Order No. 901 pertaining to system model validation. NERC staff assigned this SAR to Project 2021-01 Modifications to MOD-025 and PRC-019 (renamed by the drafting team (DT)) to Project 2021-01 System Model Validation with IBRs to reflect the new direction of the project) to ensure that obligations to conduct model validation for Inverter-Based Resource (IBR) at the system level are not duplicative in nature or create competing expectations for IBR to conduct verification/validation of model data for IBR. This SAR complements the objectives of the SAR titled FERC Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation, which covers verification and validation of the IBR plant. The goal of this project is to address system model validation by using verified and validated IBR plant models.

At the December 15, 2021, Standards Committee (SC) meeting, the SC accepted the original SARs assigned to Project 2021-01 Modifications to MOD-025 and PRC-019. The DT has only proposed revisions to both MOD-025 and PRC-019. The initial drafts were posted November 4, 2022, through November 17, 2022. Additional drafts were posted April 25, 2023, through June 8, 2023.

At the May 15, 2024, SC meeting, the FERC Order No. 901 Milestone 3, Part 3: IBR Modeling Revision SAR was assigned to the project and posted for comment from May 23, 2024, through June 28, 2024. Additional nominees were solicited from August 15, 2024, to September 13, 2024, and are being presented at the November 13, 2024, SC meeting.

This SAR is intended to revise Reliability Standard MOD-033 or establish new Reliability Standard(s) to address FERC Order No. 901 directives requiring system modeling validation against actual system operational behavior during Disturbances. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

Summary

NERC staff recommends that the SC authorize drafting revisions to the standards listed in the FERC Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs SAR.

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs		
Date Submitted:	10/18/2024 (Revised on October 18, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (revised by 2021-01 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☒ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by the North American Electric Reliability Corporation (NERC), with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs), including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order, are four milestones that include sets of directives to NERC. In Order 901, the Federal Energy Regulatory Commission ("FERC") directed NERC to propose new or modified standards to mitigate

Requested information
reliability gaps in the current NERC Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance. In January 2024, NERC filed the initial Standards Development **Work Plan to Address FERC Order 901** (hereafter referred to as the "Work Plan). The Work Plan discusses how NERC will develop Reliability Standards within three tranches (Milestones 2-4) to meet FERC's filing deadlines. Milestone 3 of the work plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. All FERC directives associated with Milestone 3 are addressed in three SARs submitted by NERC: 1. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements 2. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation 3. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: System Model Validation with IBRs
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System being addressed, and how does this proposed project provide the reliability-related benefit described above?):
This Standard Authorization Request addresses specific directives in P156 and P161 of FERC Order No. 901 that address system model validation and is intended to complement the work proposed by the SAR titled Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation, which covers verification and validation of the IBR plant. The goal of this project is to address system model validation using the verified and validated IBR plant models.
Project Scope (Define the parameters of the proposed project):
The Drafting Team shall address the following project objectives: 1. Either revise MOD-033 or create a new Reliability Standard to require system model validation against actual system operational behavior during Disturbances. As transient dynamics require an initial condition, these revisions should consider modification of steady-state procedure to align dynamic and steady-state representations where appropriate. This system model validation should consider:

Requested information

a. A complete set of validation expectations using system operational data. These expectations should be in concert with and not duplicative of IBR plant verification and validation procedures covered in Milestone 3, Part 2.

b. A set of minimum criteria for performing validation (e.g., time, tolerance, impact). This set of criteria should allow for some entity flexibility to initiate system model validation.

   i. The SDT should consider region specific criteria to verify the expected transient dynamic behavior for IBRs.

c. A set of minimum system conditions to study. For example, the SDT should consider requirements for system model validation under low or high IBR conditions as well as varying load levels and system conditions.

d. A set of minimum disturbance types and data for those disturbances. For example, the SDT should consider requiring system model validation for balanced and unbalanced faults, generation loss, and disturbance report events as a starting point.

e. A process to communicate system model deficiencies and incorporate associated updates into transmission planning, operations, and Interconnection-wide models (i.e., system models).

The drafting team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.

Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):

The project scope above will need to account for the specific FERC directive text in FERC Order 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process.

FERC Order 901 Directives Assigned to this SAR:
This SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate:

1. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and **direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate**, coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information
models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and **resulting system models against actual system operational behavior.**" (P 156) 2. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require** planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and **the validation of each respective system model**." (P 161) 3. "NERC may implement this directive by **modifying Reliability Standards** MOD-032-1 and **MOD-033-2 or by developing new Reliability Standards** to establish requirements mandating an annual process **to coordinate, validate, and keep up-to-date the transmission planning, operations, and interconnection-wide models**." (P 161) 4. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown, and the modifications necessary for each specific directive are also unknown though they are expected to vary based on SDT outcome.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
Inverter-based resources connected to the transmission system.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
This Project should contain appropriate members representing the following Functional Entities: Balancing Authority Distribution Provider Generator Owner Generator Operator Planning Coordinator Reliability Coordinator Transmission Owner Transmission Operator Transmission Planner

Requested information
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
FERC Order No. 901 NERC Standards Development Work Plan in response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
1. SARs: 2. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements 3. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation 2. Active Reliability Standards Projects: 1. 2020-06 Verifications of Models and Data for Generators 2. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1 3. 2022-04 EMT Modeling 4. 2023-05 Modifications to FAC-001 and FAC-002
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
	None

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation ☐ Resilience/Extreme Events	☐ Energy Policy ☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
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4	February 25, 2020	Standards Information Staff	Updated template footer
5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to ~~improve the~~ reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: ~~IBR Modeling Revision~~System Model Validation with IBRs		
Date Submitted:	4/29/2024 (Revised on October 18, 2024)		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath (Revised by 2021-01 DT)		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☒ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by the North American Electric Reliability Corporation (NERC~~,~~), with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs~~),~~), including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order, are four milestones that include sets of directives to NERC. In Order 901, the Federal Energy Regulatory Commission ("FERC") ~~has~~ directed NERC to propose new or modified standards to

Requested information
mitigate reliability gaps in the current NERC Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance. In January 2024, NERC filed the initial Standards Development ~~**Work Plan in Response to FERC Order No. 901**~~**Work Plan to Address FERC Order 901** (hereafter referred to as the "Work Plan). ~~A current version of the Work Plan will be maintained here.~~ The Work Plan discusses how NERC will develop Reliability Standards within three tranches (Milestones 2-4) to meet FERC's filing deadlines. ~~This Standard Authorization Request addresses Milestone 3 – Part 4 of the Work Plan, related to modifying other Reliability Standards that involve model validation or verification for IBR to remove duplicative model validation requirements.~~ Milestone 3 of the work plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. ~~This SAR does not pertain to specific~~ All FERC directives associated with Milestone 3 are addressed in ~~FERC Order No. 901 directly, rather it is intended to complement the work proposed~~three SARs submitted by ~~the~~ NERC: 1. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements 2. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Plant Model Validation ~~1.~~3. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: System Model Validation~~.~~ with IBRs
Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System being addressed, and how does this proposed project provide the reliability-related benefit described above?):
~~All FERC~~This Standard Authorization Request addresses specific directives ~~associated with Milestone 3~~in P156 and P161 of ~~**NERC Standards Development Work Plan to Address**~~ **FERC Order No. 901** ~~are addressed~~that address system model validation and is intended to complement the work proposed by the ~~other three SARs submitted by NERC. Most relevant to this SAR is the~~ SAR titled~~:~~ Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR ~~Model~~Plant Model Validation. The IBR Model Validation SAR includes a holistic set of objectives and scope intended to address validation of IBR model and assure a robust approach to model quality improvement. As revisions to address model validation and improving quality will be addressed by the drafting team assigned the IBR Model Validation SAR, other active projects that are addressing IBR model data validation/verification

Requested information
~~must adjust their Reliability Standard Project scope to remove IBR from the applicability of affected Reliability Standards.~~ ~~The purpose~~and validation of the IBR plant. The goal of this project is to ~~ensure that obligations to conduct model validation for IBR are not duplicative in nature or create competing expectations for IBR to conduct verification/validation of model data for IBR. This drafting team should collaborate as needed with the drafting team for **Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Model Validation** to assure no gaps are introduced.~~ address system model validation using the verified and validated IBR plant models.
Project Scope (Define the parameters of the proposed project):
The Drafting Team shall address the following project objectives: ~~1. NERC Standards Development recommends assigning this SAR to the active **Project 2021-01 Modifications to MOD-025 and PRC-019**. If assigned to that project, the drafting team shall remove inverter-based resources from the scope of applicability for MOD-025-2 and PRC-019-2. If assigned to another project, the drafting team shall coordinate with the drafting team of **Project 2021-01 Modifications to MOD-025 and PRC-019** to accomplish this objective.~~ ~~2. Coordinate with the drafting team of Project **2020-06 Verifications of Models and Data for Generators** to ensure removal of inverter-based resources from the applicability of MOD-026-1 and MOD-027-1.~~ 1. Either revise MOD-033 or create a new Reliability Standard to require system model validation against actual system operational behavior during Disturbances. As transient dynamics require an initial condition, these revisions should consider modification of steady-state procedure to align dynamic and steady-state representations where appropriate. This system model validation should consider: a. A complete set of validation expectations using system operational data. These expectations should be in concert with and not duplicative of IBR plant verification and validation procedures covered in Milestone 3, Part 2. b. A set of minimum criteria for performing validation (e.g., time, tolerance, impact). This set of criteria should allow for some entity flexibility to initiate system model validation. i. The SDT should consider region specific criteria to verify the expected transient dynamic behavior for IBRs. c. A set of minimum system conditions to study. For example, the SDT should consider requirements for system model validation under low or high IBR conditions as well as varying load levels and system conditions. d. A set of minimum disturbance types and data for those disturbances. For example, the SDT should consider requiring system model validation for balanced and unbalanced faults, generation loss, and disturbance report events as a starting point. e. A process to communicate system model deficiencies and incorporate associated updates into transmission planning, operations, and Interconnection-wide models (i.e., system models).

Requested information
The drafting team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific FERC directive text in FERC Order 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** ~~NERC will maintain a current version of NERC Standards Development's Work Plan to Address FERC Order No. 901 on the NERC website under Reliability Standards Under Development. Included in this Work Plan, is a list of the directives in FERC Order No. 901 and their associated mapping to each SAR submitted by NERC. The Work Plan will be updated should any mapping of FERC directives be reassigned due to ongoing work in the various Standards Development Projects. As of April 1, 2024, this SAR will address no specific directives from FERC Order No. 901. This SAR is necessary to assure that a single solution for model validation using performance data may be established within the Milestone 3 Part 2 drafting team and does not create duplicative requirements. Establishment of data sharing requirements, including the coordination of protection settings and generating resource must be established within Milestone 3 Part 1.~~ This SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate: 1. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and **direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate**, coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and **resulting system models against actual system operational behavior.**" (P 156) 2. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require** planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information
exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and **the validation of each respective system model**." (P 161) 3. "NERC may implement this directive by **modifying Reliability Standards** MOD-032-1 and **MOD-033-2 or by developing new Reliability Standards** to establish requirements mandating an annual process **to coordinate, validate, and keep up-to-date the transmission planning, operations, and interconnection-wide models**." (P 161) ~~1.~~4. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown, and the modifications necessary for each specific directive are also unknown though they are expected to vary based on SDT outcome.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
Inverter-based resources connected to the transmission system.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
This Project should contain appropriate members representing the following Functional Entities: Balancing Authority Distribution Provider Generator Owner Generator Operator Planning Coordinator Reliability Coordinator Transmission Owner Transmission Operator Transmission Planner ~~Reliability Coordinator~~
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Requested information
FERC Order No. 901 NERC Standards Development Work Plan in response to FERC Order No. 901 Inverter-Based Resource Activities, Quick Reference Guide Distributed Energy Resource Activities, Quick Reference Guide IBR Registration Initiative, Quick Reference Guide
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
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Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒ ☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
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☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.

Reliability Principles	
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
	None

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation ☐ Resilience/Extreme Events	☐ Energy Policy ☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template

2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
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5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

Project 2021-01 System Model Validation with IBRs

Action

Appoint chair, vice chair, and supplemental members to the Project 2021-01 System Model Validation with IBRs drafting team (DT), as recommended by NERC staff.

Background

At the May 15, 2024, Standards Committee (SC) meeting, the SC accepted Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3 Standard Authorization Request (Milestone 3 SAR) and assigned it to the Project 2021-01 Modifications to MOD-025 and PRC-019 DT as a High Priority project. The SC also authorized posting of the Milestone 3 SAR from May 23 through June 28, 2024.

The Milestone 3 SAR addresses specific directives in FERC Order No. 901 pertaining to system model validation. Project 2021-01 Modifications to MOD-025 and PRC-019 DT changed the name of the project to "Project 2021-01 System Model Validation with IBRs" to reflect the new direction of the project. Only two members of the existing DT believe they have the technical expertise to contribute going forward and wanted to participate, the remainder of the DT requested to be removed from the roster.

At its June 12, 2024, meeting, the SC authorized solicitation of nominations to supplement the Project 2021-01 DT. NERC solicited nominations from August 15, 2024, through September 13, 2024.

Summary

NERC received four (4) nominations from industry and recommends the SC appoint all four (4) individuals, to include the chair, vice chair, and two (2) members to the DT as they all have the requisite background, experience, and skills. NERC Staff recommends Candidates one (1) and two (2) be appointed chair and vice chair, respectively.

Motion to Reconsider

Action

Motion to reconsider Item 5 from the October 16, 2024, Standards Committee Meeting, Appointment of the Project 2024-02 Planning energy Assurance drafting team– Standards Committee (SC) consider adding additional member(s) to Project 2024-02 Standard Drafting Team

Background

A SC member had trouble logging in to the October 16, 2024, SC meeting via the normal pc version of the Webex App. The SC member was able to log into the meeting using the Webex mobile app. Due to reduced functionality of the mobile app, the SC member was unable to make a motion to consider adding a candidate to the 2024-02 SDT before a vote for approval was conducted.

Summary

It is requested that an agenda item be add to the November 13, 2024, SC meeting to consider adding additional members from the previously provided candidate pool to the project 2024-02 SDT.

2025 Standards Committee Meeting Schedule

Action
Informational

Summary
The 2025 Standards Committee (SC) Meeting Schedule will be posted on the SC landing page under Committee Resources.

2025 Standards Committee Meeting Schedule

Please note that the times for in-person meetings highlighted in red are based on local time zones, while the times indicated for conference calls are based on Eastern Time.

- January 15, 2025 — Conference Call | 1:00 - 3:00 p.m. Eastern
- February 19, 2025 — Conference Call | 1:00 - 3:00 p.m. Eastern
- March 19, 2025 — Dallas, TX (Roam Facility) | 10:00 a.m. – 3:00 p.m. Central
- April 16, 2025 — Conference Call | 1:00 - 3:00 p.m. Eastern
- May 21, 2025 — Conference Call | 1:00 - 3:00 p.m. Eastern
- June 11, 2025 — Folsom, CA (CAISO) | 10:00 a.m. - 5:00 p.m. Pacific | Joint with RSTC and RISC
- June 12, 2025 — Folsom, CA (CAISO) | 9:00 a.m. – 12:00 p.m. Pacific
- July 16, 2025— Conference Call | 1:00 – 3:00 p.m. Eastern
- August 20, 2025 —Conference Call | 1:00 - 3:00 p.m. Eastern
- September 17, 2025 — Charlotte, NC (Duke Energy) | 10:00 a.m. – 3:00 p.m. Eastern
- October 15, 2025 — Conference Call | 1:00 - 3:00 p.m. Eastern
- November 19, 2025 —Conference Call | 1:00 - 3:00 p.m. Eastern
- December 9, 2025 — Atlanta, GA (Roam Facility) | 10:00 a.m. – 3:00 p.m. Eastern

Standards Committee 2025-2026 Term Elections and Segment 6 Special Election

Action
Informational

Background
Rules of Procedure Appendix 3b states:

"*Standards Committee membership shall be for a term of two years, with members' terms staggered such that half of the member positions (one per Segment) are refilled each year by Segment election. Prior to the end of each term, nominations will be received, and an election will be held in accordance with this procedure, or a qualified Segment procedure, to elect Standards Committee representatives for the next term. There is no limit on the number of two-year terms that a member of the Standards Committee may serve, although the setting of limits in the future is not precluded*."

Additionally, no two persons employed by the same corporation or organization, or an affiliate may serve concurrently as Committee members. (Standards Committee Charter, Chapter 4)

Term elections for the 2025-2026 term will begin in October 2024. In addition to the term election, there is an open spot for a one-year term (remaining 2024-2025 seat) in segment 6. Any individual nominated for Segment 6 will be considered for both seats. The candidate who receives the highest number of votes will be awarded the two-year seat, while the candidate with the second-highest number of votes will be awarded the one-year seat. Both elections will follow the schedule below:

- October 21 – November 12, 2024: Nominations accepted from industry
- December 5 – December 13, 2024: Election held
- Election results announced shortly after election closes

Included is a list of Standards Committee members whose terms are concluding:

Segment and Terms	Representative	Organization
Segment 1-2023-24	Amy Casuscelli Manager, Reliability Assurance & Risk Management	Xcel Energy
Segment 2-2023-24	Charles Yeung Executive Director Interregional Affairs	Southwest Power Pool
Segment 3-2023-24	Vicki O' Leary Director – Reliability, Compliance, and Implementation	Eversource Energy

Segment and Terms	Representative	Organization
Segment 4-2023-24	Patti Metro Senior Grid Operations & Reliability Director	National Rural Electric Cooperative Associate
Segment 5-2023-24	Jim Howell Sr Director, Strategy	Treaty Oak Clean Energy
Segment 6-2023-24	Justin Welty Senior Manager, NERC Reliability Standards	NextEra Energy
Segment 7-2023-24	Venona Greaff Senior Energy Analyst	Occidental Chemical Corporation
Segment 8-2023-24	Philip Winston Retired	Independent
Segment 9-2023-24	William Chambliss General Counsel	Virginia State Corporation Commission
Segment 10-2023-24	Steven Rueckert Director of Standards	WECC

Segment and Terms	Representative	Organization
Segment 6-2024-2025	Peter Yost Manager, NERC Reliability Compliance	Con Edison Company of New York, Inc.

NERC Legal and Regulatory Update
October 2, 2024 – October 31, 2024

NERC FILINGS TO FERC SUBMITTED SINCE LAST SC UPDATE

FERC Docket No.	Filing Description	FERC Submittal Date
RR25-1-000	Petition for Approval of Revisions to ROP Appendix 4E NERC submitted a Petition for Approval of Proposed Revisions to Appendix 4E to the NERC Rules of Procedure (ROP).	10/14/2024
RM24-6-000	DLR ANOPR Comments NERC and the Regional Entities submitted comments on FERC's Advance Notice of Proposed Rulemaking (ANOPR) regarding the use of dynamic line ratings (DLR).	10/15/2024

FERC ISSUANCES SINCE LAST SC UPDATE

FERC Docket No.	Issuance Description	FERC Issuance Date
EL21-99-000	Order Denying Complaint FERC issued an order denying the Complaint of Michael Mabee regarding use of Chinese equipment on the North American BPS.	10/1/2024
RR24-2-001	Letter Order Approving Compliance Filing FERC issues a letter order approving the August 26, 2024 Compliance Filing submitted in response to FERC's Order Approving Revisions to NERC's Rules of Procedure Regarding Registration of Inverter-Based Resources.	10/30/2024

ANTICIPATED UPCOMING FILINGS

FERC Docket No.	Filing Description	Anticipated Filing Date
RM13-11-000	2024 Frequency Response Annual Analysis Report	10/31/2024
TBD	Petition for approval of IBR Definition	11/4/2024
TBD	Petition for approval of PRC-028 & PRC-002 (Disturbance Monitoring)	11/4/2024
TBD	Petition for approval of PRC-024, PRC-029 (Ride-through)	11/4/2024
TBD	Petition for approval of PRC-030 (IBR Performance)	11/4/2024
RM05-17-000; RM05-25-000; RM06-16-000	2024-2026 Reliability Standards Development Plan (RSDP) annual filing	12/15/2024

Standards Committee Expectations

Approved by Standards Committee January 12, 2012

Background

Standards Committee (SC) members are elected by members of their segment of the Registered Ballot Body, to help the SC fulfill its purpose. According to the Standards Committee Charter, the SC's purpose is:

> *In compliance with the NERC Reliability Standards Development Procedure, the Standards Committee manages the NERC standards development process for the North American-wide reliability standards with the support of the NERC staff to achieve broad bulk power system reliability goals for the industry. The Standards Committee protects the integrity and credibility of the standards development process.*

The purpose of this document is to outline the key considerations that each member of the SC must make in fulfilling his or her duties. Each member is accountable to the members of the Segment that elected them, other members of the SC, and the NERC Board of Trustees for carrying out their responsibilities in accordance with this document.

Expectations of Standards Committee Members

1. SC members represent their segment, not their organization or personal views. Each member is expected to identify and use mechanisms for being in contact with members of the segment in order to maintain a current perspective of the views, concerns, and input from that segment. NERC can provide mechanisms to support communications if an SC member requests such assistance.
2. SC members base their decisions on what is best for reliability and must consider not only what is best for their segment, but also what is in the best interest of the broader industry and reliability.
3. SC members should make every effort to attend scheduled meetings, and when not available are required to identify and brief a proxy from the same segment. SC business cannot be conducted in the absence of a quorum, and it is essential that each SC member make a commitment to being present.
4. SC members should not leverage or attempt to leverage their position on the SC to influence the outcome of standards projects.
5. The role of the SC is to manage the standards process and the quality of the output, not the technical content of standards.

Parliamentary Procedures

Based on Robert's Rules of Order, Newly Revised, 11th Edition, plus "Organization and Procedures Manual for the NERC Standing Committees"

Motions

Unless noted otherwise, all procedures require a "second" to enable discussion.

When you want to…	Procedure	Debatable	Comments
Raise an issue for discussion	Move	Yes	The main action that begins a debate.
Revise a Motion currently under discussion	Amend	Yes	Takes precedence over discussion of main motion. Motions to amend an amendment are allowed, but not any further. The amendment must be germane to the main motion, and cannot reverse the intent of the main motion.
Reconsider a Motion already approved	Reconsider	Yes	Allowed only by member who voted on the prevailing side of the original motion.
End debate	Call for the Question *or* End Debate	No	If the Chair senses that the committee is ready to vote, he may say "if there are no objections, we will now vote on the Motion." The vote is subject to a 2/3 majority approval. Also, any member may call the question. This motion is not debatable. The vote is subject to a 2/3 vote.
Record each member's vote on a Motion	Request a Roll Call Vote	No	Takes precedence over main motion. No debate allowed, but the members must approve by 2/3 majority.
Postpone discussion until later in the meeting	Lay on the Table	Yes	Takes precedence over main motion. Used only to postpone discussion until later in the meeting.
Postpone discussion until a future date	Postpone until	Yes	Takes precedence over main motion. Debatable only regarding the date (and time) at which to bring the Motion back for further discussion.
Remove the motion for any further consideration	Postpone indefinitely	Yes	Takes precedence over main motion. Debate can extend to the discussion of the main motion. If approved, it effectively "kills" the motion. Useful for disposing of a badly chosen motion that cannot be adopted or rejected without undesirable consequences.
Request a review of procedure	Point of order	No	Second not required. The Chair or secretary shall review the parliamentary procedure used during the discussion of the Motion.

Notes on Motions

Seconds. A Motion must have a second to ensure that at least two members wish to discuss the issue. The “seconder” is not recorded in the minutes. Neither are motions that do not receive a second.

Announcement by the Chair. The Chair should announce the Motion before debate begins. This ensures that the wording is understood by the membership. Once the Motion is announced and seconded, the Committee “owns” the motion, and must deal with it according to parliamentary procedure.

Voting

Voting Method	When Used	How Recorded in Minutes
Unanimous Consent The standard practice.	When the Chair senses that the Committee is substantially in agreement, and the Motion needed little or no debate. No actual vote is taken.	The minutes show "by unanimous consent."
Vote by Voice	The standard practice.	The minutes show Approved or Not Approved (or Failed).
Vote by Show of Hands (tally)	To record the number of votes on each side when an issue has engendered substantial debate or appears to be divisive. Also used when a Voice Vote is inconclusive. (The Chair should ask for a Vote by Show of Hands when requested by a member).	The minutes show both vote totals, and then Approved or Not Approved (or Failed).
Vote by Roll Call	To record each member's vote. Each member is called upon by the Secretary, and the member indicates either "Yes," "No," or "Present" if abstaining.	The minutes will include the list of members, how each voted or abstained, and the vote totals. Those members for which a "Yes," "No," or "Present" is not shown are considered absent for the vote.

Decorum Talking Points

Standards Committee Meetings use the following Governance Structure:

- Following each Agenda item, the Chair will call for the Sponsor to make a presentation.
- The Chair will solicit any motions from the Committee, including motions for action on the agenda item.
- To make a motion, a member of the Standards Committee or recognized proxy must obtain the floor. To obtain the floor a member may raise their hand virtually, or table tent for in person meetings. The Chair will recognize the member, who may then state their motion.
- The motion must receive a second to be considered. To second a motion, a member would obtain the floor and state that they second the motion.
- After a second, the Chair will ask whether there is any discussion.
- At this time, SC members may either debate the motion or make another motion.
- To participate in discussion, members must obtain the floor.
- Following such discussion, the Chair will call the vote.
- To amend a motion or make another motion, a member must obtain the floor and propose their amendment. The amendment must then be seconded. The amendment must be voted on prior to returning to the main motion.
- Agenda items will pass with a simple majority of votes cast being in the affirmative. An exception exists for revisions to the Standard Processes Manual and the Standards Committee Charter, which require a 2/3 affirmative vote.