NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and please email this form, with attachment(s) to: sarcomm@nerc.net

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:	Supplemental SAR for Project 2018-04 Modifications to PRC-024-2		
Date Submitted:	6/14/2019		
SAR Requester			
Name:	Jason Espinosa		
Organization:	Seminole Electric Cooperative, Inc.		
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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	
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
During its discussions, the SDT identified two issues within PRC-024 that must be addressed to ensure the reliability intent of the standard is achieved. 1. In the currently enforceable standard, Requirements R1 and R2 refer only to "generator protective relaying" which seems to exclude the setting of voltage and frequency protection relays on the Generator Step-Up Transformer (GSU) associated with synchronous generators. Because the GSU and the generator are connected to the same bus and have the same source (the generator), they see the same voltage (and frequency). Consequently, the voltage and frequency protection settings applied to the relays on the GSU must be included in the standard as the operation of those relays would result in tripping the generator. Note: This situation does not exist in the standard for dispersed power producing resources because the associated collector transformer and its voltage and frequency protection is included via Inclusion I4 of the BES definition and in the standard through footnotes 2, 3, and 4.			

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2. The existing standard is applicable only to Generator Owners which excludes instances where the Transmission Owner is the Registered Entity that owns the GSU or collector transformer and the associated voltage and frequency protective relays. The Supplemental SAR expands the scope of the project to eliminate the identified reliability issues by: (1) requiring all voltage and frequency protection up to the point of interconnection (the high voltage side of the GSU or collector transformer) to adhere to the voltage and frequency boundary curves of PRC-024, and (2) requiring those Transmission Owners that own the GSU or collector transformer and the associated voltage and frequency protective relays to be compliant with the standard. Closing these gaps increases reliability by ensuring all of the Registered Entities and facilities relevant to achieving the reliability intent of this standard are included in the Applicability Section and requirement language of the revised standard.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
Ensure the voltage and frequency protection on all applicable equipment (including the GSU or collector transformer) up to the point of interconnection that could cause a generating resource to trip or cease to inject current meets the voltage and frequency ride-through requirements of PRC-024, thus enabling the generating resource to support grid stability during defined system voltage and frequency excursions.
Project Scope (Define the parameters of the proposed project):
Revise the Applicability to include all relevant Registered Entities and facilities to make the standard more comprehensive, and revise the requirement language to improve the clarity and completeness of the standard.

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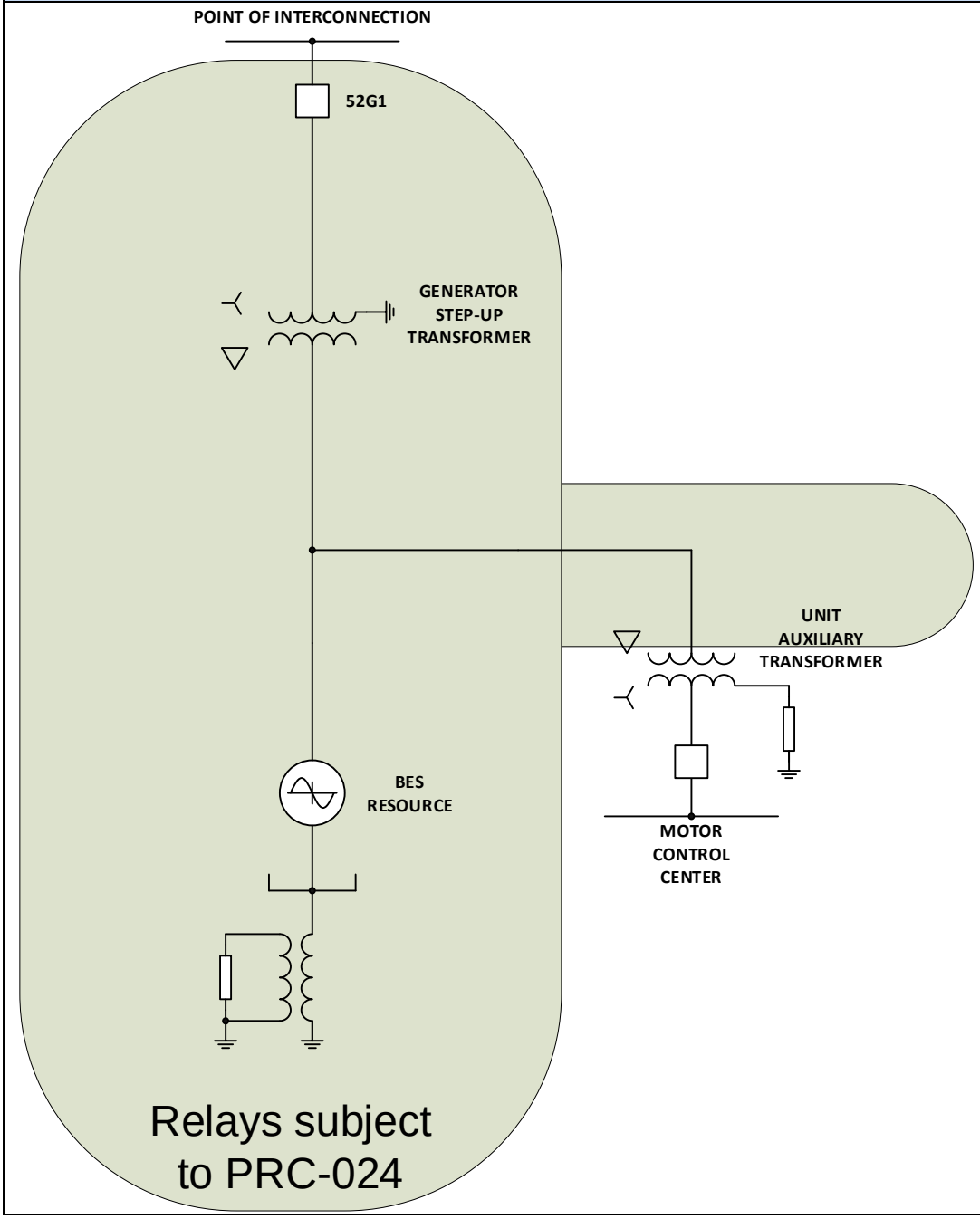
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] which includes a discussion of the reliability-related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



[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.

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Referring to the figure above, all voltage and frequency protection relays in the shaded area would not be considered "generator protective relaying" and would therefore not be subject to the existing PRC-024-2 standard. However, the operation of any of these voltage and frequency protections results in the disconnection of the generating resource. If these relays are getting their voltage and frequency inputs from the terminals of the generator, then they are seeing the same voltage and frequency as the "generator protective relaying". Because the generator, GSU, and Unit Auxiliary Transformer (UAT) all see the same voltage and frequency since they are connected to the same bus (the generator being the source), the settings applied to the voltage and frequency protection on the GSU and the high side of the UAT must also comply with the PRC-024 frequency and voltage curves to ensure the generator remains connected during defined frequency and voltage excursions. To avoid having to comply with PRC-024, an entity could remove (disable) the voltage and frequency protective functionality from the "generator protective relaying" and place it (enable) in either the GSU or UAT protection. Alternatively, an entity could enable voltage protective functions in both the "generator protective relaying" and the GSU relaying. If the generator voltage protective function is set outside of the no trip zone and the GSU relay voltage protective function is set within the no trip zone; then for a voltage excursion condition (within the no trip zone), the generator protection would not initiate a trip but the GSU relay would initiate a trip. This would not qualify as a violation of PRC-024 according to the existing language but it would conflict with the intent of the standard since the generation would be taken off-line without the generator protection initiating the trip. The SDT asserts that all frequency and voltage protective functions from the generator up to the point of interconnection should have to comply with the requirements of PRC-024. This would ensure the reliability intent of the standard is achieved, enabling the generator to ride through defined frequency and voltage excursions at the point of interconnection.

Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the 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):
Frequency and voltage protective functions on GSUs/collector transformers owned by transmission entities, synchronous generation, and inverter-based resources may be impacted by the revisions.
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 most recent version of the NERC Functional Model for definitions):
All Generator Owners and only those Transmission Owners that own a GSU or collector transformer and associated voltage and frequency protection.

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.
Project 2018-04 Modifications to PRC-024-2
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)?
No
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.
No

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

[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.

Market Interface Principles	
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	None

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

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