

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:	PRC-005-6 applicability to AVR protective functions		
Date Submitted:	<u>6/8/2020</u> 5/9/2019		
SAR Requester			
Name:	<u>Brian Kasmarzik, Chair</u> Alison Mackellar		
Organization:	<u>Project 2019-04 Modifications to PRC-005-6 SAR Drafting Team</u> North American Generator Forum (NAGF)		
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SAR Type (Check as many as apply)			
<input checked="" type="checkbox"/> New Standard	<input type="checkbox"/> Imminent Action/ Confidential Issue (SPM Section 10)		
<input type="checkbox"/> Revision to Existing Standard	<input type="checkbox"/> Variance development or revision		
<input type="checkbox"/> Add, Modify or Retire a Glossary Term	<input type="checkbox"/> Other (Please specify)		
<input type="checkbox"/> Withdraw/retire an Existing Standard			
Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)			
<input type="checkbox"/> Regulatory Initiation	<input type="checkbox"/> NERC Standing Committee Identified		
<input type="checkbox"/> Emerging Risk (Reliability Issues Steering Committee) Identified	<input type="checkbox"/> Enhanced Periodic Review Initiated		
<input type="checkbox"/> Reliability Standard Development Plan	<input checked="" type="checkbox"/> Industry Stakeholder Identified		
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
<p><u>PRC-005-6 will be revised to provide clarity that the protective functions enabled within excitation systems (including analog/digital Automatic Voltage Regulators (AVRs)), and other control systems, that respond to electrical quantities and act to cease injecting current (75 MVA or greater) or trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. Without clear applicability, the industry is struggling with how to implement PRC-005 and what testing is acceptable to meet the required maintenance activities prescribed by PRC-005. The lack of clarity presents a reliability gap in the application of PRC-005.</u></p> <p><u>Additionally, there are Protection System Station direct current (DC) supply technologies that do not currently have maintenance activities established in PRC-005. The standard needs to address battery-based station DC technologies that are not covered by PRC-005 and consider other emerging technologies, both battery-based and non-battery-based.</u></p>			

Requested information

~~This project would modify Reliability Standard PRC-005-6 to be consistent with the Federal Energy Regulatory Commission (FERC)-approved changes to registration as part of the Risk Based Registration (RBR) initiative by specifying Underfrequency Load Shedding (UFLS)-only Distribution Providers (DPs) in the Applicability Section. PRC-005-6 needs to be revised to provide clear guidance on the scope of applicability to Automatic Voltage Regulator (AVR) protective functions. Without clear applicability the industry is struggling with how to implement PRC-005-6 and what testing is acceptable to meet the required maintenance activities prescribed by PRC-005-6.~~

Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):

Provide clear, unambiguous applicability of PRC-005-6 to AVR-protective functions and provide the specificity needed for the industry to consistently identify and implement the required maintenance activities.

Provide for the use of emerging Protection System Station DC supply technologies, battery based and non-battery- based, and ensure that they are subject to maintenance requirements.

This project would modify Reliability Standard PRC-005-6 to be consistent with the FERC-approved changes to registration as part of the RBR initiative and to add UFLS-only DPs in the Applicability Section.

Project Scope (Define the parameters of the proposed project):

~~Revise PRC-005-6 to provide clarity that the protective functions enabled within analog/Digital AVRs, excitation systems, and other control systems that respond to electrical quantities and act to cease injecting current or trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. clearly define the applicability of Protection Systems associated with AVR protective functions. Modifications to PRC-005-6 could also include defining terms, revising applicability, modifying maintenance activities and intervals, or other appropriate modifications needed to provide clarity. In addition, modify the PRC-005-6 Supplementary Reference and FAQ to align with revisions to PRC-005-6.~~

The clarifying changes would apply to BES Protection Systems and protective functions applied on generators, dispersed power producing resources from the point of aggregation (greater than 75 MVA) to the point of Interconnection, static and synchronous condensers and other BES elements as defined.

Modify PRC-005-6 to establish maintenance requirements for Protection System DC supply technologies that are not currently covered.

~~This project would modify Reliability Standard PRC-005-6 to be consistent with the FERC-approved changes to registration as part of the RBR initiative and to add UFLS-only DPs -in the Applicability Section. In addition, revise the PRC-005-6 Supplementary Reference and FAQ to provide additional guidance related to AVR protective functions and acceptable methods of testing to meet PRC-005-6 required maintenance activities.~~

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 justification¹ 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):

The North American Generator Forum (NAGF) received feedback from members indicating that there was confusion regarding the applicability of protective functions inside synchronous generator excitation systems to PRC-005. The primary cause of confusion is the use of the NERC term "Protection System," which specifies "relays" but not the protective functions that are typically (but not always) associated with relays. Excitation systems may measure and utilize similar quantities as protective relays and may perform similar functions as protective relays applicable to PRC-005. For this reason, the SAR drafting team agrees that the aforementioned protective functions within excitation systems and other control systems need to be clearly and explicitly applicable to PRC-005.

PRC-005 will be modified to provide clarity on the inclusion of protective functions enabled within excitation systems (analog/digital AVRs), and other control systems, that respond to electrical quantities and act to cease injecting current or trip BES elements either directly or via lockout or auxiliary tripping relays. The clarifying changes would apply to BES Protection Systems and protective functions applied on generators, dispersed power producing resources from the point of aggregation (greater than 75 MVA) to the point of Interconnection, static and synchronous condensers and other BES elements as defined.

The SAR drafting team recommends considering the specification of American National Standards Institute (ANSI) Standard Device Numbers for the applicability to PRC-005 as outlined in the Applicability Section 4.2. Other options to provide clarity include: developing standard-specific definitions, developing or revising existing terms in the NERC Glossary of Terms, or making other modifications to the Applicability section.

The maintenance tables should be updated to include the aforementioned protective functions within control systems, and the associated maintenance activities and intervals..

Additionally, the maintenance tables should be updated to include new DC supply technologies for Protection System(s) not currently captured.

1. Entities registered as ULFS-Only (DPs) have PRC-005-6 applicable Protection Systems, but are not expressly listed as Applicable Entities in Section 4.1 UFLS-Only DPs should be added to the Applicability Section to avoid any confusion and to be consistent with the FERC-approved RBR registration changes. ~~Revise PRC 005-6 to add a new section under Facilities~~

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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<p>to clearly delineate the applicability of Protection Systems associated with AVR protective functions. This new section needs to clearly limit the scope of the AVR protective functions to those elements that open a breaker directly or via lockout or tripping auxiliary relays.</p> <p>2. Revise the PRC-005-6 Supplementary Reference and FAQ Section 15 to provide a more detailed description of the applicability of AVR protective functions and to provide acceptable methods of testing to meet PRC-005-6 required maintenance activities.</p>
<p>Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):</p>
<p><u>The SAR DT is seeking industry input regarding cost impact. Unknown</u></p>
<p>Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (e.g., Dispersed Generation Resources):</p>
<p><u>The clarifying changes would apply to BES Protection Systems and protective functions applied on generators, dispersed power producing resources from the point of aggregation (greater than 75 MVA) to the point of Interconnection, static and synchronous condensers and other BES elements as defined. The items under consideration related to DC supply technologies would impact multiple facility owners. Only applicable to a Generator Owner that owns a synchronous generating unit with an installed digital AVR</u></p>
<p>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):</p>
<p><u>Generator Owner (GO), Transmission Owner (TO), Distribution Provider (DP), Underfrequency Load Shedding (UFLS)-only DP</u></p>
<p>Do you know of any consensus building activities² in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.</p>
<p>The NAGF and the NEI worked together to generate this SAR and have communicated the issue in advance to NERC.</p>
<p><u>This project would modify Reliability Standard PRC-005-6 to be consistent with the FERC-approved changes to registration as part of the RBR initiative and to add UFLS-only DPs in the Applicability Section.</u></p>
<p>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)?</p>
<p><u>Options to provide clarity for PRC-005 include: developing standard-specific definitions, developing or revising existing terms in the NERC Glossary of Terms, or making other modifications to the Applicability section. In the event of developing or revising existing terms in the NERC Glossary of Terms, review of the effects on other standards must be performed.</u></p>

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

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.

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.

<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/> <input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/> <input type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	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
e.g., NPCC	None

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SAR Status Tracking (Check off as appropriate).	
<input type="checkbox"/> Draft SAR reviewed by NERC Staff <input type="checkbox"/> Draft SAR presented to SC for acceptance <input type="checkbox"/> DRAFT SAR approved for posting by the SC	<input type="checkbox"/> Final SAR endorsed by the SC <input type="checkbox"/> SAR assigned a Standards Project by NERC <input type="checkbox"/> 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
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
<u>4</u>	<u>February 25, 2020</u>	<u>Standards Information Staff</u>	<u>Updated template footer</u>