NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project Name:	2019-04 Modifications to PRC-005-6 | Standard Authorization Request (Second Posting)
Comment Period Start Date:	6/2/2020
Comment Period End Date:	7/8/2020

There were 54 sets of responses, including comments from approximately 155 different people from approximately 115 companies representing 10 of the Industry Segments as shown in the table on the following pages.

All comments submitted can be reviewed in their original format on the project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, contact Vice President, Engineering and Standards Howard Gugel (via email) or at (404) 446-9693.

Questions

1. The SAR drafting team determined that BES protective functions that respond to electrical quantities inside excitation systems (including analog/digital AVRs) should be included in PRC-005, in addition to protective functions inside other control systems for BES elements. Do you agree that BES protective functions that respond to electrical quantities inside excitation systems and other BES element control systems should be included in PRC-005? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.

Summary Response:

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 current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.

The SAR drafting team has updated the SAR to read: “BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard.

The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System." Further, the SAR drafting team has updated the SAR to read: "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 alternative technologies, both battery-based and non-battery-based."

The original SAR was submitted by NAGF based on industry confusion around the inclusion of these devices. While some of these functions are already included in PRC-005-6, the SAR seeks to add clarity around these functions and their specific maintenance activities. Your comments will be forwarded to the future Standard Drafting Team responsible for the specific modifications to the standard and supplementary references.

2. The NERC Glossary of Terms defines Protection System as: "*Protection System –*

- ***Protective relays which respond to electrical quantities,***
- ***Communications systems necessary for correct operation of protective functions,***
- ***Voltage and current sensing devices providing inputs to protective relays,***
- ***Station dc supply associated with protective functions (including station batteries, battery chargers, and non-battery-based dc supply), and***
- ***Control circuitry associated with protective functions through the trip coil(s) of the circuit breakers or other interrupting devices."***

This definition omits protective functions in the excitation and other control systems that respond to electrical quantities and voltage/current sensing devices providing inputs to protective functions. In addition, the SAR drafting team found that the lack of a definition for protective function creates confusion and potential reliability gaps. These protective functions may measure similar quantities and may yield similar outcome as protective relays. Do you agree that this definition creates confusion with regards to protective functions embedded in control systems? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.

Summary Response:

Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. Protective functions inside the AVR that protect these components, such as field overcurrent relaying, V/Hz protection, etc. both respond to electrical quantities and protect BES elements. For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team does not intend to state that non-BES protective functions, such as those detecting malfunctions of the excitation system, are within the scope of PRC-005.

Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. Protective functions inside the AVR that protect these components, such as field overcurrent relaying, V/Hz protection, etc. both respond to electrical quantities and protect BES elements. For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team does not intend to state that non-BES protective functions, such as those detecting malfunctions of the excitation system, are within the scope of PRC-005.

The SAR drafting team determined that clarity is needed around the definition of protective function itself and what specific functions are protective v. control.

It should be noted that AVRs are currently within the scope of PRC-005-6, and the SAR drafting team merely seeks clarity to the standard to specify their inclusion.

3. The SAR drafting team determined that there are Protection System Station DC supply technologies that do not currently have maintenance activities in Reliability Standard PRC-005. Do you agree the standard should 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? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.

Summary Response:

The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4, including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.

Protection System is defined in the NERC Glossary of Terms and does not include Battery Energy Storage System (BESS).

4. Entities registered as ULFS-only DPs have PRC-005-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. Project 2017-07 Standards Alignment with Registration Do you agree with adding UFLS-only DPs as a Functional Entity applicable to PRC-005 to align with registration? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification below.

Summary Response:

UFLS-only DPs would be added to the Applicability Section to avoid any confusion and to be consistent with the FERC-approved Risk-Based Registration (RBR) registration changes.

5. Are there any logistical or cost considerations that would add significant burden to equipment owners trying to confirm protective functions in an exciter, inverter, or other control system? If so, do you have a more cost effective suggestion to accomplish the objective of the SAR that the drafting team should consider?

Summary Response:

The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. The intent of adding additional DC technologies is to provide clarity for entities using battery-based DC station-supply technologies (e.g., lithium ion) that at are not currently specified. Protective functions are already applicable in PRC-005

6. Provide any additional comments for the drafting team to consider, if desired.

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1,3,5	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	SPP RE	SRC PRC005	Helen Lainis	IESO	1	NPCC
					Greg Campoli	NYISO	1	NPCC
					Dave Zwergel	MISO	2	MRO
					Charles Yeung	SPP	1	MRO
					Matt Goldberg	ISONE	1	NPCC
					Matt Goldberg	ISONE	1	NPCC
MRO	Dana Klem	1,2,3,4,5,6	MRO	MRO NSRF	Joseph DePoorter	Madison Gas & Electric	3,4,5,6	MRO
					Larry Heckert	Alliant Energy	4	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Jodi Jensen	Western Area Power Administration	1,6	MRO
					Andy Crooks	SaskPower Corporation	1	MRO
					Bryan Sherrow	Kansas City Board of Public Utilities	1	MRO
					Bobbi Welch	Omaha Public Power District	1,3,5,6	MRO
					Jeremy Voll	Basin Electric Power Cooperative	1	MRO
					Bobbi Welch	Midcontinent ISO	2	MRO
					Douglas Webb	Kansas City Power & Light	1,3,5,6	MRO
					Fred Meyer	Algonquin Power Co.	1	MRO
					John Chang	Manitoba Hydro	1,3,6	MRO
					James Williams	Southwest Power Pool, Inc.	2	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Jamie Monette	Minnesota Power / ALLETE	1	MRO
					Jamison Cawley	Nebraska Public Power	1,3,5	MRO
					Sing Tay	Oklahoma Gas & Electric	1,3,5,6	MRO
					Terry Harbour	MidAmerican Energy	1,3	MRO
					Troy Brumfield	American Transmission Company	1	MRO
Westar Energy	Douglas Webb	1,3,5,6	MRO,SPP RE	Westar-KCPL	Doug Webb	Westar	1,3,5,6	MRO
					Doug Webb	KCP&L	1,3,5,6	MRO
Public Utility District No. 1 of Chelan County	Ginette Lacasse	1,3,5,6	WECC	Ginette Lacasse on behalf of PUD #1 Chelan County	Meaghan Connell	Public Utility District No. 1 of Chelan County	5	WECC
					Joyce Gundry	Public Utility District No. 1 of Chelan County	3	WECC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Ginette Lacasse	public Utility Distric No 1 of Chelan	1	WECC
					Glen Pruitt	Public Utility District No. 1 of Chelan County	6	WECC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,NA - Not Applicable,RF,SERC,Texas RE,WECC	ACES Standard Collaborations	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	1	SERC
					Kevin Lyons	Central Iowa Power Cooperative	1	MRO
					Bill Hutchison	Southern Illinois Power Cooperative	1	SERC
					Amber Skillern	East Kentucky Power Cooperative	1	SERC
					Jennifer Bray	Arizona Electric Power Cooperative, Inc.	1	WECC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Shari Heino	Brazos Electric Power Cooperative, Inc.	5	Texas RE
					Todd Bennett	Associated Electric Cooperative, Inc.	3	SERC
					Patti Metro	National Rural Electric Cooperative Association	3	NA - Not Applicable
					Paul McCurley	National Rural Electric Cooperative Association	3	NA - Not Applicable
DTE Energy - Detroit Edison Company	Karie Barczak	3,4,5		DTE Energy - DTE Electric	Adrian Raducea	DTE Energy - Detroit Edison Company	5	RF
					Daniel Herring	DTE Energy - DTE Electric	4	RF
					Karie Barczak	DTE Energy - DTE Electric	3	RF
Duke Energy		1,3,5,6	FRCC,RF,SERC	Duke Energy	Laura Lee	Duke Energy	1	SERC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
	Kim Thomas				Dale Goodwine	Duke Energy	5	SERC
					Greg Cecil	Duke Energy	6	RF
Tennessee Valley Authority	M Lee Thomas	1,3,5,6		Tennessee Valley Authority	Howell Scott	Tennessee Valley Authority	1	SERC
					Ian Grant	Tennessee Valley Authority	3	SERC
					M Lee Thomas	Tennessee Valley Authority	5	SERC
					Marjorie Parsons	Tennessee Valley Authority	6	SERC
FirstEnergy - FirstEnergy Corporation	Mark Garza	1,3,4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Ann Carey	FirstEnergy - FirstEnergy Solutions	6	RF
					Mark Garza	FirstEnergy-FirstEnergy	4	RF
Southern Company - Southern Company Services, Inc.	Marsha Morgan	1,3,5,6	SERC	Southern Company	Katherine Prewitt	Southern Company Services, Inc	1	SERC
					Jennifer Sykes	Southern Company Generation and Energy Marketing	6	SERC
					R Scott Moore	Alabama Power Company	3	SERC
					William Shultz	Southern Company Generation	5	SERC
Eversource Energy	Quintin Lee	1,3		Eversource Group	Sharon Flannery	Eversource Energy	3	NPCC
					Quintin Lee	Eversource Energy	1	NPCC
Northeast Power	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC Regional	Guy V. Zito	Northeast Power	10	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Coordinating Council				Standards Committee		Coordinating Council		
					Randy MacDonald	New Brunswick Power	2	NPCC
					Glen Smith	Entergy Services	4	NPCC
					Alan Adamson	New York State Reliability Council	7	NPCC
					David Burke	Orange & Rockland Utilities	3	NPCC
					Michele Tondalo	UI	1	NPCC
					Helen Lainis	IESO	2	NPCC
					David Kiguel	Independent	7	NPCC
					Paul Malozewski	Hydro One Networks, Inc.	3	NPCC
					Nick Kowalczyk	Orange and Rockland	1	NPCC
					Joel Charlebois	AESI - Acumen Engineered	5	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
						Solutions International Inc.		
					Mike Cooke	Ontario Power Generation, Inc.	4	NPCC
					Salvatore Spagnolo	New York Power Authority	1	NPCC
					Shivaz Chopra	New York Power Authority	5	NPCC
					Deidre Altobell	Con Ed - Consolidated Edison	4	NPCC
					Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
					Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
					Cristhian Godoy	Con Ed - Consolidated	6	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
						Edison Co. of New York		
					Nicolas Turcotte	Hydro-Qu?bec TransEnergie	1	NPCC
					Chantal Mazza	Hydro Quebec	2	NPCC
					Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
					Nurul Abser	NB Power Corporation	1	NPCC
					Randy MacDonald	NB Power Corporation	2	NPCC
					Silvia Parada Mitchell	NextEra Energy, LLC	4	NPCC
					Michael Ridolfino	Central Hudson Gas and Electric	1	NPCC
					Vijay Puran	NYSPS	6	NPCC
					ALAN ADAMSON	New York State Reliability Council	10	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					John Hasting	National Grid USA	1	NPCC
					Michael Jones	National Grid USA	1	NPCC
					Sean Cavote	PSEG - Public Service Electric and Gas Co.	1	NPCC
					Brian Robinson	Utility Services	5	NPCC
Dominion - Dominion Resources, Inc.	Sean Bodkin	3,5,6		Dominion	Connie Lowe	Dominion - Dominion Resources, Inc.	3	NA - Not Applicable
					Lou Oberski	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
					Larry Nash	Dominion - Dominion Virginia Power	1	NA - Not Applicable
					Rachel Snead	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
OGE Energy - Oklahoma Gas and Electric Co.	Sing Tay	1,3,5,6	SPP RE	OKGE	Sing Tay	OGE Energy - Oklahoma	6	MRO
					Terri Pyle	OGE Energy - Oklahoma Gas and Electric Co.	1	MRO
					Donald Hargrove	OGE Energy - Oklahoma Gas and Electric Co.	3	MRO
					Patrick Wells	OGE Energy - Oklahoma Gas and Electric Co.	5	MRO

1. The SAR drafting team determined that BES protective functions that respond to electrical quantities inside excitation systems (including analog/digital AVRs) should be included in PRC-005, in addition to protective functions inside other control systems for BES elements. Do you agree that BES protective functions that respond to electrical quantities inside excitation systems and other BES element control systems should be included in PRC-005? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.

Thomas Foltz - AEP - 3,5	
Answer	No
Document Name	
Comment	
AEP is very concerned by the inclusion of “and other control systems” in the SAR. The initial SAR was clearly and appropriately addressing protective functions within the AVRs themselves, however the most recently-revised SAR and its inclusion of the phrase “and other control systems”, and the lack of boundaries and specifics that phrase infers, not only expands the scope but essentially changes the intended purpose of PRC-005. For example, control devices with non-electrical inputs (mechanical, pneumatic, hydraulic, etc.) should not be within the scope of this standard. Not only would their inclusion change the intention and purpose of this standard, but it would also be detrimental to the synergy in which PRC-005 integrates-with and relates-to other standards.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR.	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	No

Document Name	
Comment	
Reclamation agrees that adding additional tracking and visibility of exciter protective devices and relay input sensors would close reliability gaps. However, the inclusion of additional elements may not improve reliability. Overvoltage relays and field ground relays in AVRs are easily identified as relays and can be included in the PRC-005 maintenance program. Some entities may not use the protective functions available in the microprocessor-based DECs 400 or the ECS2100. If these protective elements were enabled, how would their functions be tested? Reclamation recommends using a supplemental reference document, implementation guidance, or FAQ document to explain how AVR components should be tested.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The original SAR was submitted by NAGF based on industry confusion around the inclusion of these devices. While some of these functions are already included in PRC-005-6, the SAR seeks to add clarity around these functions and their specific maintenance activities. Your comments will be forwarded to the future Standard Drafting Team responsible for the specific modifications to the standard and supplementary references.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 3,5,6, Group Name Dominion	
Answer	No
Document Name	
Comment	
Dominion Energy agrees with EEi's comments that the scope of the SAR should be limited to the orginal SAR submitted by NAGF and not this completely new SAR and scope that was not reviewed by the Standards Committee or endorsed by the original party who submitted the SAR.	

Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI.	
Colleen Campbell - AES - Indianapolis Power and Light Co. - 3	
Answer	No
Document Name	
Comment	
IPL agrees that these types of protective functions are important, but is not convinced there is sufficient cause to assume that existing maintenance activities already employed by utilities are not sufficient; IPL does not believe that requiring additional oversight and/or maintenance cycles is necessary.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR was originally created by NAGF based on data from its members suggesting that there is industry confusion as to whether these devices are within the scope of PRC-005 at all. The purpose of the SAR is to add clarity on their inclusion and to allow for the future Standard Drafting Team, if necessary, to determine specific maintenance activites and intervals for these devices.	
Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	
Answer	No
Document Name	
Comment	

Basin Electric supports comments drafted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	

On May 9, 2019, the North American Generator Forum (NAGF) submitted the original SAR for Reliability Standard PRC-005-6, "Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance," to clarify the applicability of PRC-005-6 to the protective functions within an Automatic Voltage Regulator (AVR) and provide the prescribed maintenance activities. The SAR also requested that the PRC-005-6 Supplementary Reference and FAQ be updated to reflect the changes to the standard.

The SAR was originally drafted by the Nuclear Energy Institute (NEI) and the NAGF following multiple discussions with NAGF members on open conference calls in the fall of 2018 and spring of 2019 to review and challenge the scope and wording. The SAR was carefully worded and reviewed by the NAGF members to be clear that the request was intended to be limited only to the "protective functions" of the AVR and limited to a Generator Owner (GO) that owns a synchronous generating unit with an installed digital AVR. The SAR was also communicated in advance and discussed with NERC prior to submittal.

The updated SAR currently posted for comment appears to have expanded the scope significantly from the original wording of the NAGF SAR and evolved into a draft that the NAGF can no longer support. Specifically, the scope is now expanded as written to "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" and was not the intent of the original request. Such an expansion of scope will have significant impacts on entity maintenance programs without justified reliability benefits.

Furthermore, the expansion into battery-based station DC technologies or "other emerging technologies" is also not supported by the NAGF given there is no definition for either term and therefore no limit on the interpretation of such technologies. Once an emerging technology is clearly defined then the applicability and application of the PRC-005-6 tables can be modified.

For these reasons the NAGF requests that the SAR drafting team revert back to the original SAR as previously submitted on May 9, 2019 and limit this project to providing clear guidance on the scope and applicability of Automatic Voltage Regulator (AVR) protective functions on a synchronous generating unit with an installed digital AVR.

The revision can sufficiently address the question of applicability of the Standard to AVR protective funcitions by either a) adding a footnote to "Protection Systems" to indicate that this includes any actively used protective relaying functions contained within the program logic of the excitation control system on a synchronous generator or b) by modifying the Facilities section 4.2.5.4 to indicate the same.

Likes 0	
Dislikes 0	

Response

Thank you for your comments. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed from the SAR since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow) This has been clarified in the SAR.

Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
Oklahoma Gas & Electric supports Edison Electric Institute's response to Question 1.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to the EEI comment.	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	No
Document Name	
Comment	
WEC Energy Group does not agree that protective functions that respond to electrical quantities inside excitation systems and other BES element control systems should be included in PRC-005. Applicability section 4.2.1 clearly states that this standard applies to Protection System and Sudden Pressure Relaying that are installed for the purpose of detecting Faults on BES Elements. AVR is the control system installed for the purpose of controlling the excitation system and any protection functions internal to the controls is for the purpose of detecting a malfunction of the excitation system and it's controls. This is in contrast to Protection Systems which are installed to detect Faults in BES Elements. In addition, NERC PRC-019 differentiates between generator voltage regulator controls and generator Protection Systems.	
Likes 0	
Dislikes 0	

Response
Thank you for your comment. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. AVR/Excitation systems can have the same protection functions as stand-alone relays for BES elements that act to trip the generator either directly or via lockout or auxilliary relays and are already included in the facilities section of PRC-005-6 (4.2.5). For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team did not intend non-BES protective functions, such as those detecting malfunctions of the excitation system, to be within the scope of this SAR. This has been clarified in the SAR.

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	
AZPS supports the original SAR submitted by the NAGF to include Automatic Voltage Regulator protective functions. AZPS does not agree with the expanded Scope of the SAR which now includes “emerging technologies” as this is an undefined term that could have wide and varied interpretations resulting in a very broad and unbounded scope.	
Likes 0	
Dislikes 0	

Response
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed from the SAR since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow) This will be clarified in the SAR.

M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	No
Document Name	
Comment	

TVA agrees with the comments of the NAGF and supports providing clarity regarding applicability of digital AVRs that have protective relay functions. Furthermore, TVA disagrees with significant expansion of scope in the modified SAR and the resulting departure from criteria language currently in version 6. This departure is implied where the SAR broadens the application of the phrase "directly trip or trip via a lockout or auxiliary tripping relays" to include BES Elements in general, instead of only generators as stated in PRC-005-6, and in the associated Supplementary Reference.

The version 6 Supplementary Reference (p.6) documents that the V6 SDT intended for PRC-005-6 Section 4.2.1 to address non-generator BES Elements with base criteria that PRC-005 applies to "*Protection Systems and Sudden Pressure Relaying that are installed for the purpose of detecting Faults on BES Elements (lines, buses, transformers, etc.)".* Similarly, Sections 4.2.5 and 4.2.6, where the direct trip/lockout language currently resides, currently addresses BES Generators. To apply the direct trip criteria to non-generator BES Elements would represent a significant and unnecessary expansion in the scope of PRC-005 applicability. For instance, consider an Auxiliary Station Service transformer fed from a BES bus with double breakers in the switchyard of a generating facility. A Stations Service Transformer not fed from the generator bus and whose Protection System has no direct ability to trip the generator would currently have no applicability under 4.2.5 or 4.2.6. If the language in the SAR is replicated in the revised standard, the protection system of the described transformer would be brought into PRC-005 applicability because it directly trips the double breaker BES tie bus.

The purpose of the original SAR was to improve clarity in applying PRC-005 to digital AVRs. TVA objects to the additional scope in the modified SAR. When taken with the application of the direct trip clause to apply generically to all BES Elements, the clause "act to cease injecting current," serves to negate some or all of the potential improvement in clarity originally sought. Does the cessation of injecting

current apply to a certain class of technology, for instance, inverter based generation? The use of this phrase without clearly stating the scope of applicability is just one example of why TVA cannot support the modified SAR as written.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	No
Document Name	
Comment	
Additional clarification is requested on the devices and equipment included in the scope for the referenced “other control systems”. From previous PRC-005 audit experiences of cooperatives, this type of ambiguity has led to unintended audit scope creep. It is important to identify which BES elements are included in the control systems in the purview of this SAR . It is expected that the SDT will provide the specific applicable equipment/systems in the revised standard after proper engineering research and outreach. In addition to the project scope outlined in the SAR, it is recommended that a revision to PRC-005-6 be added to the scope to clearly define the applicability found in Section 4.2.1 to state BES Lines, transformers, and buses including breakers associated with each of those elements. This language would clarify the exact items Regional Entities are requesting during requests for information. The inclusion of “etc.” in the standard does not provide the desired clarity.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a	

Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The intent is to include all BES elements, not just lines, transformers, and buses for consideration by the future Standard Drafting Team.	
Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	No
Document Name	
Comment	
We agree that protection elements embedded with the software of digitial excitation control systems on synchronous machines need to be included in the class of microprocessor based protection. We, like others, have been including them in the PRC-005 Protection System Maintenance Program for many years. We disagree with the relevance and need to include any revision of this standard to "other BES element control systems". The implication that the clarifying changes of this revision apply to dispersed power-producing resources from the point of aggregation (greater than 75 MVA) to the point of Interconnection is contradictory to the function and systhesis of the dispersed power-producing plant voltage regulators. There are no excitation control systems for dispersed power-producing resources whose includion in the BES scope requires aggregation. Further, Power Plant Control (PPC) systems used at renewable energy sites which include voltage regulating functions are control systems explicitly and do not include protection elements as do the synchronous machine excitation control system devices.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed from the SAR since IBRs today do not	

typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.	
Randy Cleland - GridLiance Holdco, LP - 1	
Answer	No
Document Name	
Comment	
Our position is that this is beyond intended scope of the standard.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team is developing the scope of the SAR based on industry comments received. While the protective functions are already applicable in PRC-005, the SAR drafting team is considering clarifying defining terms to ensure that BES protective functions that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay are included in the maintenance activities.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
EEI supports the original SAR submitted by the NAGF to provide clarity on the scope of applicability to the Automatic Voltage Regulator protective functions. The revised scope of the SAR has been expanded to include issues that go beyond the original intent of the NAGF request, have no apparent relationship to the request, and are not technically justified. This SAR now appears to propose to expand that scope from protective functions to control functions, which includes equipment capabilities and limits without justification.	

While the existing definition of Protection System provides sufficient language to ensure that protective functions regardless of where they reside (e.g., Automatic Voltage Regulators (AVRs) and other control systems) are included within PRC-005, we acknowledge that GO compliance with PRC-005-6, as it relates to AVRs, is not clear. Moreover, as an alternative, Implementation Guidance may be a more effective solution for addressing many of the NAGF concerns. That said, we would not oppose adding language within PRC-005-6 that adds greater clarity to better address NAGF concerns related to this issue.

Additionally, the Scope for this SAR should not include "emerging technologies." While EEI supports efforts to modify existing standards or create new standards to address reliability gaps, it is not clear what gap the inclusion of "emerging technology" is intended to address. Moreover, PRC-005-6 already includes "Protection System Station dc Supply Using Non Battery Based Energy Storage," so it is unclear what other new technology the SDT intends to address.

One area that may require SDT attention is Table 1 of Reliability Standard (PRC-005-6) which may not be sufficiently explicit to define generator resource protective functions and associated maximum maintenance interval and maintenance activity that should be conducted to address AVR maintenance.

For these reasons, EEI does not support the proposed SAR as currently written.

Likes 0	
Dislikes 0	

Response

Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow) This will be clarified in the SAR.	
Douglas Webb - Westar Energy - 1,3,5,6 - MRO, Group Name Westar-KCPL	
Answer	No
Document Name	
Comment	
Westar Energy and Kansas City Power & Light, Evergy Companies, incorporate by reference, Edison Electric Institute's response to Question 1.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI's comments.	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	No
Document Name	
Comment	
The original SAR proposed by NAGF was to clarify the applicability to digital AVR systems. The drafting team has expanded the issue to include other control systems. In our opinion, this will increase confusion regarding applicability and the testing burden, and delay a revision to the standard. Protective functions that are clearly defined, and performed by common protective relays, should be included when implemented as part of the excitation system.	
Likes 0	

Dislikes 0	

Response

Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems.

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee

Answer	No
Document Name	

Comment

Specifically, the scope is now expanded as written to "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" and was not the intent of the original request. Such an expansion of scope will have significant impacts on entity maintenance programs without justified reliability benefits.

Due to the lack of clear guidance on the scope and applicability of the Excitation systems /Automatic Voltage Regulator (AVR) on PRC-005. Excitation system includes several controls, limiting and protective functions – control functions regulate specific quantities at the desired level, and the limiting functions prevent certain quantities from exceeding set limits and these are examined closely and reported as part of PRC-019.

We agree fundamentally that any BES protective function that responds to electrical quantities inside excitation systems and other BES Element’s control systems that would operate in the same manner as a protective relay should be included in PRC-005. It is important to note that a protective relay is a device designed to trip a circuit breaker when a fault is detected. Therefore it is imperative that the SDT makes a clear differentiation between a control system that is responding to electrical quantities by adjusting generator output in

response to a variation in system conditions as these types of control systems do not actually trip the generation offline, are not associated with a protective relay and therefore are entirely independent of a Protection System.

The revised standard should remain “technology neutral”. While an AVR does respond to electrical quantities, not all AVR’s contain protective functions that would trip the generation offline.

Clarification that the control system protective function must meet the functionality of a protective relay with the ability to trip a circuit breaker when certain conditions are met is required. Control system is a broad term and there are many variations of “control system” that respond to electrical quantities that affect the output of generation but do not trip the generation offline. For example, because a wind farm generation site’s typical voltage control is through a proprietary digital control system, and not an automatic voltage regulator (AVR) as typically seen on conventional generation, the SAR should clarify that this type of digital technology will not require maintenance and testing activities per PRC-005-6. Typically, these proprietary digital control devices will switch to power factor mode if automatic voltage regulation fails, and will not cause a trip of generation either directly or via lockout or auxiliary relays.

Likes 0	
Dislikes 0	

Response

Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems.

The wording regarding "cease injecting current" has been removed from the SAR since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

Your additional suggestions for the future SDT will be forwarded for their consideration.

Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	No
Document Name	
Comment	
We echo AEP's comments (.a-b-48756)	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to AEP's comments.	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	No
Document Name	
Comment	
Exelon concurs with the comments provided by the EEI and offers the following additional feedback. On May 9, 2019, the North American Generator Forum (NAGF) submitted the original SAR for Reliability Standard PRC-005-6, "Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance," to clarify the applicability of PRC-005-6 to the protective functions within an Automatic Voltage Regulator (AVR) and provide the prescribed maintenance activities. The SAR also requested that the PRC-005-6 Supplementary Reference and FAQ be updated to reflect the changes to the standard. The SAR was limited only to the "protective functions" of the AVR and limited to a Generator Owner (GO) that owns a synchronous generating unit with an installed digital AVR. The updated SAR currently posted for comment appears to have expanded the scope significantly from the original wording of the NAGF SAR and evolved into a draft that Exelon cannot support without revision. Specifically, the scope is now expanded as written to "***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" which was not the intent of the original request. The definition of Protection System includes protective functions within control systems while the proposed SAR expands that definition to also include non-protective functions (i.e., control functions) within that definition. Such an expansion of scope will have significant impacts on entity maintenance programs without justified reliability benefits.

Our understanding is that the SAR drafting team intended the SAR to be limited to protection systems associated with other control systems, not expanded to control systems in general.

Therefore, Exelon is either requesting that the SAR be reverted back to the original SAR submitted by the NAGF or revised as follows:

"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 protective functions of 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.

Furthermore, the expansion into battery-based station DC technologies or "other emerging technologies" is also not supported by Exelon given there is no definition for either term and therefore no limit on the interpretation of such technologies. Once an emerging technology is clearly defined then the applicability and application of the PRC-005-6 tables can be modified.

If the SAR reverts back to the original wording, the revision can sufficiently address the question of applicability of the Standard to AVR protective funcitions by either a) adding a footnote to "Protection Systems" to indicate that this includes any actively used protective relaying functions contained within the program logic of the excitation control system on a synchronous generator or b) by modifying the Facilities section 4.2.5.4 to indicate the same.

Likes 0	
Dislikes 0	

Response

Thank you for your comment. Please see the response to EEI's comments. In addition, the current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not

stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR.	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	
Comment	
DTEE supports comments submitted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	No
Document Name	
Comment	
Applicability of AVRs would largely be dependent on the settings for each case, i.e., whether an AVR is set for operation or protection purposes. AVRs set on the maximum range will typically rely on relays for protection, whereas those set to trip earlier are performing a protective function and have more merit to being included. In addition, AVR verification is already being performed pursuant to other Standards, such as MOD-026-1, for which AVR testing might not be in the right place for PRC-005, rather than expanding other Standards to include AVR testing.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment. The intent of the SAR is to clarify inclusion of BES protective functions that are included in the control system (that trip the generator or element when outside the limits of the machine). These are often in place of, or as a backup to, the standalone protective relays. These functions would not be applicable to MOD-026 as they operate outside the control system parameters, and they provide functionality similar or identical to protective relays, which is why their maintenance falls into the scope of PRC-005.	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
Xcel Energy supports the comments of the Edison Electric Institute (EEI).	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI's comments.	
Kevin Salsbury - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
NV Energy believes that AVRs are not Protection Systems, under the current definition, and should not be included explicitly within the scope of future revisions of PRC-005-6. Although the AVR measures the same electrical quantities as the protective relays, its exclusion from consideration resides in its primary function of excitation control, and not system protection. The primary protective function of the AVR or excitation control system are to specifically protect the exciter, and not BES equipment (i.e. generator and GSU). Generator protective relays primary function is to protect the generator, and are already sufficiently covered by PRC-005-6. NV Energy does	

acknowledge that GO compliance with PRC-005-6, as it relates to AVRs, is not clear. Moreover, as an alternative, Implementation Guidance may be a more effective solution for addressing many of the NAGF concerns.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. AVR/Excitation systems can have the same protection functions as stand-alone relays for BES elements that act to trip the generator either directly or via lockout or auxilliary relays and are already included in the facilities section of PRC-005-6 (4.2.5). For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team did not intend non-BES protective functions, such as those detecting malfunctions of the excitation system, to be within the scope of this SAR. This has been clarified in the SAR.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
Seattle City Light does not believe that it is prudent to add the AVR functions to the protection systems maintenance program. The AVR is meant to control generator voltage and not to provide any sort of protection functions. As such there are numerous relays functions that already detect under excitation, loss of field, reverse power - etc. Adding AVR functions to this would be redundant and would add unnecesssary burden for testing and maintenance. Specifically changes in AVR settings for protection functions may trigger the need to do generator verifications or testing which can be tricky depending upon the amount on geneators and entity operates. Also it seems as if some of the proposed additions for this SAR are already accouted for in other standards as well such as PRC-024. By setting the limiters correctly and operating the machines within those limits in should not spur the need to have the AVR being included in the PRC-005 program.	

The final point is a question. How many trips are being caused by AVR related functions anyway? Is it enough that it would even warrant addition to the PRC-005-6 standard? Is it such a pervasive issue in the industry that it merits addtion to a standard, or even it's own stand alone standard?	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. AVR/Excitation systems can have the same protection functions as stand-alone relays for BES elements that act to trip the generator either directly or via lockout or auxilliary relays and are already included in the facilities section of PRC-005-6 (4.2.5). For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team did not intend non-BES protective functions, such as those detecting malfunctions of the excitation system, to be within the scope of this SAR. This has been clarified in the SAR. The SAR was created by NAGF in response to industry feedback regarding interpretation of these protective functions as Protection Systems. For this reason, it would be impossible to know how many trips are being caused by these functions since those who are not maintaining them are most likely not reporting their operations or misoperations.	
Robert Blackney - Edison International - Southern California Edison Company - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
Please see comments submitted by the Edison Electirc Institute.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the respone to the EEI comments.	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	

Answer	No
Document Name	
Comment	
The initial SAR draft was to provide clear guidance on the applicability scope to protective functions included in the AVR. Now the scope seems to have expanded to include protection functions that respond to electrical quantities inside other control systems (in addition to AVRs). This may create more ambiguity and, as currently drafted, does not provide sufficient clarity to assess the impact to the PRC-005 maintenance and testing program. BC Hydro recommends that the protective functions included in excitation systems and other applicable control systems be appropriately defined and identified to be able to assess if they should be included in PRC-005.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The SAR Drafting Team seeks to identify the scope for the future SDT. The specific wording of the standard, to provide clarity, is the job of the Standard Drafting Team. We agree that the protective functions need to be clearly defined, and have outlined that in the scope of the SAR.	
Rahn Petersen - PNM Resources - Public Service Company of New Mexico - 5 - WECC	
Answer	No
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Donald Lock - Talen Generation, LLC - 5	
Answer	Yes
Document Name	
Comment	
Talen Energy supports the comments of the NAGF, particularly as regards having the expression, "trip BES elements," in the SAR be replaced by, "trip the generator," to match the language in para. 4.2.5.1 of PRC-005-6. Protective functions that trip fans and pumps, open excitation breakers, close fuel valves and the like cause generation units to shut-down and can therefore be said to trip BES elements, but only those that (directly or through a lockout) open the generator breaker are rightly part of the Protection System.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments. Additionally, protective functions which trip fans and pumps or close valves would not be considered BES protective functions, and therefore would not be under consideration for inclusion by the future Standard Drafting Team.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	

While Duke agrees the BES protective functions should be included in PRC-005, the SDT should ensure protections within Exciters/AVRs are well defined. For example, there are some electrically measured quantities that are considered to be equipment protection rather than standard defined protection elements. Control systems should also be defined to ensure elements that act to trip or cease current injection are only applicable if acting directly upon BES elements. These considerations will be needed to avoid misinterpretation and scope creep into auxiliary systems.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. The SAR Drafting Team agrees that the protective functions need to be clearly defined, and have outlined that in the scope of the SAR. Your suggestions will be forwarded to the future SDT.	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
We support this SAR as it provides some direction to deal with Excitation controls related protection function. This has been a gray area in the past. We would like to see similar approach taken in PRC-005 relays when dealing with the maintenance frequencies of protection functions in exciter controls systems based on technology, for eg. Monitored and unmonitored exciter control systems, 12 years vs 6 years etc. Implementation timeframe for these requirements should be 3 years, providing sufficient time to implement any changes to maintenance systems, tasks, and frequencies. Please clarify maintenance tasks on digital exciters (for example, is a setting file comparison sufficient?)	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment. The SAR drafting team agrees. The scope of the SAR includes the maintenance activities and frequencies. These recommendations will be forwarded to the future Standard Drafting Team.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
The reference to other BES element control systems raises some concerns about the scope of the proposed project. If a registered entity has a DVAR, STATCOM, WindFree, capacitor banks, or reactor banks are the protective systems on those included? Will entities now be required to perform all of the DC control circuit checking, AC input/output checking, trip coil checking, trip checking, etc?	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. Protection Systems for BES elements such as DVARs, STATCOMs, etc. are already in the scope of the existing standard. Furthermore, the SAR seeks clarity on the BES protective functions inside control systems for these elements. The specific details regarding maintenance activities for these protective functions will be addressed by the future SDT.	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	

Dislikes 0	
Response	
Thank you for your comment. Please see the response to MRO comments.	
Gladys DeLaO - CPS Energy - 1,3,5	
Answer	Yes
Document Name	
Comment	
CPS Energy agrees with the recommendation, however the scope shall be limited to only specific protection functions that respond only to electrical quantities as they would for microprocessor based protective relays. In addition, the scope shall only apply to automatic voltage regulators with protection functions that are similar to stand alone protective relays as defined by PRC-005-6.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The SAR Drafting Team seeks to identify the scope for the future Standard Drafting Team.	
mark fowler - Ameren - Ameren Services - 1 - SERC	
Answer	Yes
Document Name	
Comment	

We believe this question is too vague, since control functions of an excitation system also respond to electrical quantities. The facilities under section 4.2.5.1 specify Protection Systems that act to trip the generator directly or via lockout or auxiliary tripping relays. We are concerned that including protective functions inside control systems could inadvertently bring into scope protection systems for non-BES elements that reside inside plant control systems that trip the generator directly. From our perspective the intention of this SAR is that functions which provide protection for the generator or field are covered, and this should be clearly specified. We would also like clarity on devices that provide exciter ground protection by checking for the presence of a ground by applying a recommended test quantity.

Likes 0	
Dislikes 0	

Response
Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The question regarding exciter ground protection will be forwarded to the future SDT.

Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC	
Answer	Yes
Document Name	

Comment
Tacoma Power agrees that PRC-005 should include certain protective functions in the AVR. The in-scope protective functions within the AVR should be limited to electrical quantities measured at the generator terminals. Other protection functions such as those associated with the field (eg. field ground, field current which may not be feasible to measure) and internal AVR protection (eg. failure of the thyristor, controller failure) should not be included.

Likes 0	
Dislikes 0	

Response	
Thank you for your comment. The SAR Drafting Team seeks to identify the scope for the future SDT. The specific wording of the standard, to provide clarity, is the job of the Standard Drafting Team. We agree that the protective functions need to be clearly defined, and have outlined that in the scope of the SAR.	
Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	
Minnkota Power Cooperative supports comments submitted by the MRO NERC Standards Review Forum.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to MRO comments.	
Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 - NPCC	
Answer	Yes
Document Name	
Comment	
We disagree with the first 2 paragraphs of the comment form submitted by NPCC RSC. We agree with the remainder of the comments except for the comment regarding exclusion of digital technology not requiring maintenance and testing activities as per PRC-005-6 (such as the casd for wind farm generation's voltage control through a proprietary digital control system and not an automatic voltage regulator (AVR) as typically seen in conventional generation.). We do not support the last three paragraphs of the comment form as submitted by NPCC RSC.	

Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see the response to NPCC RSC comments.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
BPA believes testing of trip paths that take BES equipment out of service is good practice. Trips that come from non-BES excitation systems but trip BES equipment through a lockout or other auxiliary relay(s) should be tested. If NERC proceeds, BPA recommends that any equipment included have its own table in PRC-005, with maintenance tasks and cycles, that are supported by data on failure modes, level of risk to the BES systems, and best practices for these specific Protection Systems.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Robert Hirchak - Cleco Corporation - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for your support.	
Laura Nelson - IDACORP - Idaho Power Company - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Sandra Shaffer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Wayne Guttormson - SaskPower - 1	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you for your support.	
Fannie Champagne - Hydro-Qu?bec Production - 1,5 - NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	

Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	
Document Name	
Comment	

NA	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
This is beyond the scope of interest (and expertise) of many of the members of the IEEE Energy Storage and Stationary Battery (ESSB) Committee. As a result we will abstain from a Yes or No Vote or comment on this point.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE agrees with the proposed inclusions for the Standard Authorization Request (SAR). Texas RE does, however, seek clarification regarding the location of in-scope protective functions. In particular, Texas RE notes that the current SAR provides that “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." The current SAR then states that protective functions enabled within "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."

In Texas RE's experience, past momentary cessation events involving dispersed power production resources occurred as a result of control system issues at the individual turbine level, resulting in BES generators ceasing to inject current or tripping of BES elements. Moreover, Texas RE is not currently aware of many protective functions within control systems at the plant control level (75 MVA or greater) that act to cease injecting current or trip BES elements in this manner. Accordingly, Texas RE seeks clarity whether "other control systems" responding to electrical quantities and acting to cease injecting current would include control systems at the individual turbine level that can result in momentary cessation or BES element trips in this manner. From a reliability perspective, Texas RE recommends including such individual turbine level protective functions within the scope of the proposed SAR.

Texas RE does note that there are other protective functions, including voltage control protective functions, which are not related to electrical signals or power measurement. Texas RE recommends the drafting team consider such protection systems within this scope of this project as well.

In addition, Texas RE has a few addition suggestions, as shown by section below.

Industry Need Section

- Since current is not measured in MVA and thus the phrase "75 MVA or greater", should not be used. Texas RE recommends using a different phrase such as "cease injecting current", "cease injecting current to the BES" or "cease injecting current", which is used in the Project Scope and Detailed Description sections.
- Since "Station" is not a defined term, it should not be capitalized.

Purpose or Goal Section

- Since "Station" is not a defined term, it should not be capitalized.

Project Scope Section

- Since “Interconnection” is used in the context of “point of Interconnection” and not the context of the NERC Glossary-defined term, it should not be capitalized.

Requested Information

- Since “Interconnection” is used in the context of “point of Interconnection” and not the context of the NERC Glossary-defined term, it should not be capitalized.

Other

Texas RE has experienced confusion regarding Table 1-4. For example in Table 1-4(f), the formatting has led some to pick any Component Attribute to exclude a maintenance activity. It was not clear that each exclusion of a maintenance activity has a specific Component Attribute associated with it. In Table 1-4(b), the formatting has led some to pick an interval for a maintenance activity that is not associated with that interval. Reformatting the table where the entirety of the rows connect would solve such a misinterpretation.

Likes 0	
Dislikes 0	

Response

Thank you for your support. The wording regarding "cease injecting current" has been removed since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay. The SAR drafting team determined that Inclusion of individual turbine-level protection is outside the scope of the SAR, which seeks to clarify protective functions already included in PRC-005-6.

The SAR drafting team agrees with the remaining suggestions for the Industry Need Section.

2. The NERC Glossary of Terms defines Protection System as: "*Protection System –*

- ***Protective relays which respond to electrical quantities,***
- ***Communications systems necessary for correct operation of protective functions,***
- ***Voltage and current sensing devices providing inputs to protective relays,***
- ***Station dc supply associated with protective functions (including station batteries, battery chargers, and non-battery-based dc supply), and***
- ***Control circuitry associated with protective functions through the trip coil(s) of the circuit breakers or other interrupting devices.*"**

This definition omits protective functions in the excitation and other control systems that respond to electrical quantities and voltage/current sensing devices providing inputs to protective functions. In addition, the SAR drafting team found that the lack of a definition for protective function creates confusion and potential reliability gaps. These protective functions may measure similar quantities and may yield similar outcome as protective relays. Do you agree that this definition creates confusion with regards to protective functions embedded in control systems? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.

Robert Blackney - Edison International - Southern California Edison Company - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
Please see comments submitted by the Edison Electirc Institute.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comments. Please see the response to EEI comments.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
No. The AVR only provides inputs and is not sensing electrical quantities - it is an electrical quantity. It does not fit this definition and does not belong in the guidelines of a Protection System. As stated above the function of an AVR is to provide voltage regulation for the generator - there are already adequate protection functions provided by the generator relays.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. Protective functions inside the AVR that protect these components, such as field overcurrent relaying, V/Hz protection, etc. both respond to electrical quantities and protect BES elements. For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team does not intend to state that non-BES protective functions, such as those detecting malfunctions of the excitation system, are within the scope of PRC-005.	
Kevin Salsbury - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
Generally, protection functions have traditionally resided in protective relays but now reside within a wide range of devices and systems. That said, the current definition for Protection System may create some confusion with protective functions embedded in control systems since the definition currently specifies protective relays, which is an undefined term, but generally well understood. For this reason, NV	

Energy agrees that the definition creates confusion, but not as it relates to protective functions embedded in control systems. Thus, NV Energy would support changes to the definition that clarify that protective functions within control systems are to not be maintained under the PRC-005 Reliability Standard.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. Protective functions inside the AVR that protect these components, such as field overcurrent relaying, V/Hz protection, etc. both respond to electrical quantities and protect BES elements. For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team does not intend to state that non-BES protective functions, such as those detecting malfunctions of the excitation system, are within the scope of PRC-005.	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
We support the comments of EEI.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI comments.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	No
Document Name	

Comment	
BPA disagrees that the definition is vague in this area. Excitation systems that trip BES equipment are both 1) *"Voltage and current sensing devices providing inputs to protective relays"* and 2) *"Control circuitry associated with protective functions through the trip coil(s) of the circuit breakers or other interrupting devices."* BPA believes further definition is unecessary.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team determined that clarity is needed around the definition of protective function itself and what specific functions are protective v. control.	
Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group	
Answer	No
Document Name	
Comment	
Include this as a facility and not change the definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT. The SAR drafting team will forward your comment to the future development team.	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	No
Document Name	

Comment	
LDWP believes that the current Protection System definition is clear and should continue to exclude AVR. There can be AVRs that do not serve any protective functions. Revising the definition would require establishing how to differentiate between an AVR being a protective device versus being a control device. How would a revised definition apply to other control systems, such as PLCs?	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. The SAR drafting team seeks to identify the scope for the future SDT. The SAR drafting team will forward your comment to the future development team. However, it should be noted that AVRs are currently within the scope of PRC-005-6, and the SAR drafting team merely seeks clarity to the standard to specify their inclusion.	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	
Comment	
DTEE supports comments submitted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	No
Document Name	

Comment	
The definition of Protection Systems as currently written only creates confusion if expanded to control systems which Exelon does not support. Exelon concurs with the EEIs comments on the question.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI comments.	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	No
Document Name	
Comment	
We echo AEP's comments (.a-b-48757)	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to AEP comments.	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	No
Document Name	
Comment	

The confusion comes from expansion of the first bullet from "protective relays" to include voltage regulators and other control systems. Expanding the definition to include "protective functions" in other technologies than "protective relays" should be done carefully such that more confusion is not created. Chelan suggest that protective functions be defined as only those standard device/function numbers identified in Section 3 of IEEE Standard C37.2 that respond to electrical quantities.

Likes 0	
Dislikes 0	

Response
Thank you for your comments. The SAR Drafting Team seeks to identify the scope for the future SDT. The specific wording of the standard, to provide clarity, is the job of the Standard Drafting Team. The SAR drafting team agrees that the protective functions need to be clearly defined, and have outlined that in the scope of the SAR. Your suggestions will be forwarded to the future SDT.

Douglas Webb - Westar Energy - 1,3,5,6 - MRO, Group Name Westar-KCPL	
Answer	No
Document Name	

Comment
Westar Energy and Kansas City Power & Light, Evergy Companies, incorporate by reference, Edison Electric Institute's response to Question 2

Likes 0	
Dislikes 0	

Response
Thank you for your comment. Please see the response to EEI comments.

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	

Comment
Generally, protection functions have traditionally resided in protective relays but now reside within a wide range of devices and systems. That said, the current definition for Protection System may create some confusion with protective functions embedded in control systems since the definition currently specifies protective relays, which is an undefined term, but generally well understood. For this reason, EEI could support changes that clarify that **protective functions** within control systems are to be maintained under the PRC-005 Reliability Standard.

Likes 0	
Dislikes 0	

Response
Thank you for your comment. The SAR Drafting team seeks to identify the scope for the future SDT and believes that this should be within the scope for their consideration due to similar confusion within other standards. Your suggestions will be forwarded to the future SDT.

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	No
Document Name	

Comment
We believe that sufficient instructions within PRC-005 can serve to make it clear that entities using the excitation control system based protection functions within the microprocessor-based program are to perform the minimum maintenance activities that are present in Table 1-1 for the microprocessor based relays (non-monitored and monitored, as appropriate). We do not believe that the NERC Glossary definition needs to be revised. Stating that Table 1-1 applies, and possibly modifying the title of Table 1-1 title from "Component Type - Protective Relay" to "Component Type - Protective Relay and protective functions enabled within AVRs". The addition of device numbers is not recommended because not all AVR manufacturers use them within the control programs of their equipment and the scope of PRC-005 is already clear to protection engineers. Again, including other control systems in the question is beyond the scope of the clarification request.

Likes 0	

Dislikes 0	

Response
Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that this should be within the scope for their consideration due to similar confusion within other standards aside from PRC-005 and within other protective functions outside of those imbedded within AVRs. Your suggestions will be forwarded to the future SDT.

M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	No
Document Name	

Comment
TVA cannot support this change. The definition of Protection Systems as currently written creates confusion only if expanded to include control systems. TVA could support a change or note to clarify the applicability is limited to the protective relaying functions in the programmable logic of a digital (AVR) on a synchronous generating unit. The basic criteria for applicability of a programmable digital AVR should be restricted to include only the functions in such systems that respond to electrical quantities and trip a generator either directly, or via a lockout or auxiliary tripping relay when performing the function of a protective relay. Phrases such as “may measure similar quantities and may yield similar outcome” introduce unacceptable ambiguity to the process of determining applicability.

Likes 0	
Dislikes 0	

Response
The SAR drafting team seesk to identify the scope for the future SDT and believes that this should be within the scope for their consideration due to similar confusion within other standards aside from PRC-005 and within other protective functions outside of those imbedded within AVRs. Furthermore, the SAR drafting team determined that applicability of NERC standards should be based on risk to the BES and not the technology being employed, such as synchronous generation. Your additional comments will be forwarded to the future SDT for consideration.

Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	No
Document Name	
Comment	
WEC Energy Group does not agree that the definition of Protection System includes the controls associated with AVRs. Any protective functions embedded into control system within the AVRs are used to detect malfunctions of the AVR.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Based on the definition of the BES, the generator rotor, stator, bus, and GSU are all BES elements. Protective functions inside the AVR that protect these components, such as field overcurrent relaying, V/Hz protection, etc. both respond to electrical quantities and protect BES elements. For this reason, the SAR drafting team determined that their inclusion in PRC-005 should be clarified. The SAR drafting team did not intend that non-BES protective functions, such as those detecting malfunctions of the excitation system, are within the scope of PRC-005. This has been clarified in the SAR.	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
Oklahoma Gas & Electric supports Edison Electric Institute's response to Question 2.	
Likes 0	
Dislikes 0	
Response	

Thank you for your comment. Please see the response to EEI comments.	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The definition of Protection Systems as currently written only creates confusion if expanded to control systems which the NAGF does not support. The NAGF could support a change or note to clarify the applicability is limited to the protective functions within an installed digital (AVR) of a synchronous generating unit.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that this should be within the scope for their consideration due to similar confusion within other standards aside from PRC-005 and within other protective functions outside of those imbedded within AVRs. Furthermore, the SAR drafting team determined that applicability of NERC standards should be based on risk to the BES and not the technology being employed, such as synchronous generation. Your suggestions will be forwarded to the future SDT.	
Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	
Answer	No
Document Name	
Comment	
Basin Electric supports comments drafted by the NAGF.	
Likes 0	

Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Colleen Campbell - AES - Indianapolis Power and Light Co. - 3	
Answer	No
Document Name	
Comment	
IPL agrees with the NAGF comments. The definition of Protection Systems as currently written only creates confusion if expanded to control systems.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to NAGF comments.	
Gladys DeLaO - CPS Energy - 1,3,5	
Answer	No
Document Name	
Comment	
No, the current definition does not create confusion. Excitation and other control systems are clearly not identified in current definition, therefore maintenance for these devices should not be applicable to PRC-005-6. If a revision is made to the standard, it should clearly identify the Excitation system as an individual protection system component with maintenance activities listed under the same table for microprocessor protective relays or a separate table.	
Likes 0	

Dislikes 0	
Response	
Thank you for your comments. The SAR drafting team seeks to identify the scope for the future SDT. The SAR drafting team will forward your comment to the future development team. Protective functions in control systems may measure and utilize similar quantities as protective relays and may perform similar functions as BES 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.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 3,5,6, Group Name Dominion	
Answer	No
Document Name	
Comment	
Dominion Energy agrees with comments submitted by EEI.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see the response to EEI comments.	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	No
Document Name	
Comment	
The above definition provided in the Glossary of terms should not be changed, as it provides a clear meaning of the protection function. If protection functions in generator exciter controls need added to the PRC-005 standard that should be dealt with outside of the definition, similar to how auto reclose functions etc. were added to the PRC-005 standard, using the Applicability section similar to 4.2.7	

Likes 0	
Dislikes 0	

Response

Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that this should be within their realm of consideration due to similar confusion around NERC standards outside PRC-005 and within other control systems outside AVRs for synchronous machines. Your suggestions will be forwarded to the future SDT.

Thomas Foltz - AEP - 3,5

Answer	No
Document Name	

Comment

AEP does not agree with revising the definition of Protection System to address the concerns regarding PRC-005. It is important to differentiate between sensing devices and inputs which truly ***protect*** the system from those devices and inputs used to ***monitor the stability and regulation*** of the system. As a result, we do not believe it is advisable to revise the definition of Protection System. Instead, we recommend a new definition be developed for "Stability Monitoring System" for identifying those devices and inputs which are specificially tasked with maintaining system ***stability***.

Likes 0	
Dislikes 0	

Response

Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that the NERC Glossary of Terms should be within the realm of their consideration due to similar confusion around NERC standards outside PRC-005 and within other control systems outside AVRs and Stability Monitoring Systems.

Your suggestions will be forwarded to the future SDT.

Donald Lock - Talen Generation, LLC - 5

Answer	No

Document Name	
Comment	
Talen Energy supports the comments of the NAGF, noting also that it has already been well-established that a PRC-005-6 relay is not necessarily a discrete device. A line of code that responds to electrical quantities and opens the generator breaker directly or through a lockout falls under Table 1-1 of the standard whether the programming is in the AVR (e.g. for V/Hz protection) or in a multifuction microprocessor relay. The Protection System definition is correct as-is, but so terse as to lack clarity. The SAR should stick to the original intent of establishing clarity in PRC-005 and in the associated Supplementary Reference and FAQ document, saying that AVRs may harbor relays, using the existing Protection System definition. Modifying the Protection System definition to include functions that "measure similar quantities and may yield similar outcome as protective relays," would consitute a massive change and increase rather than reduce the amount of confusion, and should not be attempted. Elements that trip fans and pumps, open excitation breakers, close fuel valves and the like are not and should not be included in the Protection System definition. This point is especially important for modern gas turbine units, for which the OEM control system has many protective functions that the user cannot adjust and some that we can't even see.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that the NERC Glossary of Terms should be within the realm of their consideration due to similar confusion around NERC standards outside PRC-005 and within other control systems outside AVRs. The intent of the SAR drafting team is to include BES Protective Functions that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a protection system by tripping BES elements directly or via lockout or auxiliary tripping relay.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	No
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
BC Hydro recommends that the protective functions included in excitation systems and other applicable control systems be appropriately defined and identified to be able to assess if they should be included in PRC-005.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team seeks to identify the scope for the future SDT and believes that this should be within the scope for their consideration. The SDT ultimately has the responsibity of addressing the scope of the SAR including the specific protective functions.	
Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 - NPCC	
Answer	Yes
Document Name	
Comment	

We agree with the comments submitted by NPCC RSC and have an additional comment.

Protection systems are aimed at interrupting a current that flows into the protected equipment. In most cases, this is done by tripping breakers that are in series with the equipment. But when it comes to series compensation systems, the tripping logic is reversed: instead of tripping breakers, a protection system has to close breakers that are in parallel with the protected equipment.

The way the Standard is written, focus is being placed on "tripping" and "trip coils", but the actual goal of a protection system is to "remove" an equipment from a circuit whether by tripping or closing breakers.

Thus, both the PRC-005 Standard and the Glossary definition of "Protection System" should consider these reversed logic protection schemes so that the action of a protective function is not limited to tripping breakers or other interrupting devices.

Likes 0	
Dislikes 0	

Response

Thank you for your support. Your suggestions will be forwarded to the future SDT.

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee

Answer	Yes
Document Name	

Comment

Yes, we agree that the definition creates confusion because the current definition of the protection system is protective relay centric. It should be technology or equipment neutral and focuses on protective functions.

Likes 0	
Dislikes 0	

Response

Thank you for your support.

Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	
Minnkota Power Cooperative supports comments submitted by the MRO NERC Standards Review Forum.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see the response to MRO comments.	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Tacoma Power supports changing the definition to include “protective functions”. However, as discussed in our comment to question 1 above, discretion should be used to determine what is included in the definition of “protective function”. The protective functions should be limited to only those functions that impact the overall reliability and security of the BES.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR Drafting Team agrees and will forward your suggestion to the future SDT.	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes

Document Name	
Comment	
Expand protective relay to devices that perform protective functions. Clarify that protective functions for bullets 2, 4, and 5 are referring to those in the first bullet (i.e. not sudden pressure relays).	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Your suggestions will be forwarded to the future SDT.	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	Yes
Document Name	
Comment	
American Transmission Company (ATC) supports modification of the NERC Glossary of Terms “Protection System” definition, provided that the modifications are consistent with proposed changes to the standard related to AVR.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Your suggestions will be forwarded to the future SDT.	
mark fowler - Ameren - Ameren Services - 1 - SERC	
Answer	Yes
Document Name	
Comment	

The standard through Table 1-1 in PRC-005-6 provides different activities for unmonitored versus monitored microprocessor relays. An AVR or other control system with protective functions may consist of many components assembled in one cabinet. At what point do the subparts have to be treated as being subject to different requirements in the standard? We agree that the definition of Protection System is unclear and we support modifications or additional reference documentation. In the context of PRC-005 specifically, we believe it should only apply to Protection Systems that protect the BES, which for generation specifically would be the field and armature.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Your suggestions will be forwarded to the future SDT.	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see the response to MRO NSRF comments.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	

Comment	
Given the scope of the SAR, it is logical that the definition is considered for revision, however, we recommend caution as to the extent of change, given the potential to impact other standards, see question 5.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Any modifications to the NERC Glossary of Terms requires careful examination, modification (if necessary) and re-approval of all standards in which the definition is used.	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
There are several terms in the definition of Protection System that cause confusion if expanded to control systems. Reclamation suggests that one possible cause is the difference between relays and other control circuitry capable of sending a trip signal. If a sudden pressure switch is tested and the relay is tested, there are no additional components that produce such a signal. The same is true for microprocessor relays used in recloser systems. Currently recloser control circuitry testing requirements cause considerable challenges with microprocessor relays. Reclamation supports clarifying the scope of PRC-005 to include protective functions embedded in control systems. Reclamation recommends the SDT identify the intended components in a Table and describe the component attributes, maintenance activities, and maximum maintenance intervals.	
Likes 0	
Dislikes 0	
Response	

Thank you for your support. Your suggestions will be forwarded to the future SDT.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you for your support.	
Randy Cleland - GridLiance Holdco, LP - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Fannie Champagne - Hydro-Qu?bec Production - 1,5 - NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	

Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Wayne Guttormson - SaskPower - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Sandra Shaffer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Rahn Petersen - PNM Resources - Public Service Company of New Mexico - 5 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Laura Nelson - IDACORP - Idaho Power Company - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Robert Hirchak - Cleco Corporation - 1,3,5,6	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
This is beyond the scope of interest (and expertise) of the many of the members of the IEEE Energy Storage and Stationary Battery (ESSB) Committee. As a result we will abstain from a Yes or No Vote or comment on this point.	
Likes 0	
Dislikes 0	
Response	

3. The SAR drafting team determined that there are Protection System Station DC supply technologies that do not currently have maintenance activities in Reliability Standard PRC-005. Do you agree the standard should 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? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification in the comments section.	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	No
Document Name	
Comment	
These technologies need a clearer definition before they can be included in to PRC-005 standard, otherwise a vague inclusion may leave the standard open to interpretation and confusion.	
Likes 0	
Dislikes 0	
Response	
The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 3,5,6, Group Name Dominion	
Answer	No
Document Name	
Comment	

Dominion Energy agrees with the comments submitted by EEI. This proposal is not technically supported or justified and should not be included in the project.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI's comment.	
Colleen Campbell - AES - Indianapolis Power and Light Co. - 3	
Answer	No
Document Name	
Comment	
IPL does not agree with the concept of requiring maintenance activities for unspecified "emerging technologies" tied to Protection Systems. Any element applicable under PRC-005 must be clearly defined and identified so there is no ambiguity for both the registered entity and auditors.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	
Answer	No
Document Name	

Comment	
Basin Electric supports comments drafted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to NAGF comments.	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF agrees with the comments of the EEI and also does not support the proposed modifications to this SAR because the description of the technology and associated reliability gaps have not been adequately stated and explained in the SAR. It is also unclear how the current standard does not already adequately address this technology. Proposed changes to a Reliability Standard should clearly address any reliability gaps and other industry needs within the Industry Needs section of the SAR. At this time, no justification has been provided.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No

Document Name	
Comment	
ATC does not support proposed modifications to this SAR, because the description of technologies and associated reliability gaps have not been adequately stated in the SAR. It remains unclear how the current standard does not already adequately address these technologies. Proposed changes to a reliability standard should clearly address any reliability gaps and other industry needs within the “Industry Need” section of the SAR. At this time, no justification or description of technologies have been provided.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
Oklahoma Gas & Electric supports Edison Electric Institute's response to Question 3.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI’s comment.	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	

Answer	No
Document Name	
Comment	
WEC Energy Group does not support the proposed modifications to this SAR because the description of the technology and Industry need has not been adequately stated and explained in the SAR. Proposed changes to a Reliability Standard should clearly address any reliability gaps. It is not clear what gap the inclusion of "emerging technology" is intended to address. PRC-005-6 already includes "Protection System Station dc Supply Using Non Battery Based Energy Storage," so it is unclear what other new technology the SDT intends to address.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	
AZPS does not agree with the expanded Scope of the SAR which now includes "emerging technologies" as this is an undefined term that could have wide and varied interpretations resulting in a very broad and unbounded scope.	
Likes 0	
Dislikes 0	

Response
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.

M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	No
Document Name	
Comment	
TVA does not support this proposed modification to the subject SAR. The description of the potential new technology and any associated reliability gaps have not been adequately stated and explained in the SAR. It is also unclear how the current standard does not already adequately address this technology, assuming there is indeed a reliability gap. Proposed changes to a Reliability Standard should include a clearly identified reliability gap and describe how that gap would be addressed by the proposed change. Merely not having maintenance activites established in PRC-005 for undefined “emerging” technologies is not necessarily a reliability gap unless the technologies are in broad use and have recognized best-practice maintenance activities on which to base minimally essential and achievable required maintenance activities to list in the standard.	
Likes 0	
Dislikes 0	

Response
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	No

Document Name	
Comment	
Non Battery Based energy storage protection system station dc supply maintenance requirements are already included in Table 1-4(d) of PRC-005-6.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
EEI does not support the proposed modifications to this SAR because the description of the technology and Industry need has not been adequately stated and explained in the SAR. It is also unclear how the current standard does not already adequately address this technology. Proposed changes to a Reliability Standard should clearly address any reliability gaps and other industry needs within the Industry Needs section of the SAR. At this time, no justification has been provided nor has the increased scope been approved by the Standards Committee.	
Likes 0	
Dislikes 0	
Response	

Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Douglas Webb - Westar Energy - 1,3,5,6 - MRO, Group Name Westar-KCPL	
Answer	No
Document Name	
Comment	
Westar Energy and Kansas City Power & Light, Evergy Companies, incorporate by reference, Edison Electric Institute's response to Question 3.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI's comment.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee	
Answer	No
Document Name	
Comment	
It must be clear that this is only pertaining to the DC supply for the Protection System. Maintenance items for Protection System DC supply should not be confused with maintenance activities for DC technologies which are installed for any other purpose (i.e. supplying services to the BES).	

Another consideration is as technology evolves the standard should not limit the use of new technologies that are not contemplated by the standard. It will be important to avoid specifically defining what these technologies are in order to allow entities to use the new technologies. It is proposed that the SAR drafting team modify the SAR to more clearly describe the technology it believes PRC-005 presently applies and excludes, and to more directly state the reliability gap that is being addressed. It is also unclear how the current standard does not already adequately address this technology. Proposed changes to a Reliability Standard should clearly address any reliability gaps and other industry needs within the Industry Needs section of the SAR. At this time, no justification has been provided.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Protection System is defined in the NERC Glossary of Terms and does not include Battery Energy Storage System (BESS). The SAR drafting team will forward your comment regarding defining new technologies to the future SDT. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4, including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	No
Document Name	
Comment	
We echo Manitoba Hydro’s comments (.a-b-48781)	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to Manitoba Hydro’s comments.	

Daniel Gacek - Exelon - 1,3,5,6	
Answer	No
Document Name	
Comment	
Exelon agrees with the comments of the EEI and also does not support the proposed modifications to this SAR because the description of the technology and associated reliability gaps have not been adequately stated and explained in the SAR. It is also unclear how the current standard does not already adequately address this technology. Proposed changes to a Reliability Standard should clearly address any reliability gaps and other industry needs within the Industry Needs section of the SAR. At this time, no justification has been provided.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	
Comment	
DTEE supports comments submitted by the NAGF.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment. Please see response to NAGF comments.	
Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group	
Answer	No
Document Name	
Comment	
PRC-005 Table 1.4(d) describes non-battery based energy storage maintenance, so there already is a table for non-battery based DC supplies. However if Lithium Ion or other technologies are the concern, this would be out of scope for this SAR and we recommend that this concern be handled with another SAR.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team is responsible for defining the scope of the SAR. The SAR will go to the Standards Committee for approval prior to drafting the modifications to PRC-005. The SAR being drafted is responsive to comments received by industry, which included comments received regarding alternative DC supplies. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4, including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
We support the comments of EEI.	

Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI's comment.	
Kevin Salsbury - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
NV Energy shares EEI's comments on that we do not support the proposed modifications to this SAR because the description of the technology and Industry need has not been adequately stated and explained in the SAR. It is also unclear how the current standard does not already adequately address this technology. Proposed changes to a Reliability Standard should clearly address any reliability gaps and other industry needs within the Industry Needs section of the SAR. At this time, no justification has been provided nor has the increased scope been approved by the Standards Committee.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	

The SAR was worded very vaguely. If there are DC supply technologies (or emerging technologies) that serve the exact purpose of what is already included in the defintion then it is already covered and this is redundant. The items should already be included because they are DC systems supporting protection functions.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Robert Blackney - Edison International - Southern California Edison Company - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
Please see comments submitted by the Edison Electirc Institute.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI's comment.	
Rahn Petersen - PNM Resources - Public Service Company of New Mexico - 5 - WECC	
Answer	No
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Sandra Shaffer - Berkshire Hathaway - PacifiCorp - 6	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Donald Lock - Talen Generation, LLC - 5	
Answer	Yes
Document Name	
Comment	
Talen Energy supports the comments of the NAGF.	
Likes 0	
Dislikes 0	

Response	
Thank you. Please see response to NAGF comments.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Thomas Foltz - AEP - 3,5	
Answer	Yes
Document Name	
Comment	
The drafting team may wish to also consider how their proposed revisions may or may not be impacted by continuing, future innovations in technology.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Your comment will be forwarded to the future SDT.	

Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
Reclamation recommends the term “emerging” is too subjective and should be clarified. It is unclear which technologies that do not use conventional batteries are intended to be included.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. The SAR drafting team has updated the SAR to replace the term “emerging” with the more accepted term “alternative” battery Protection System Station DC supplies (e.g., lithium ion, flow).	
Gladys DeLaO - CPS Energy - 1,3,5	
Answer	Yes
Document Name	
Comment	
CPS Energy agrees only if the emerging Protection System Station DC supply technologies do not fall under what is already identified and are associated with protective functions. Their maintenance activity requirements should be clearly listed in the maintenance tables.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including	

maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
mark fowler - Ameren - Ameren Services - 1 - SERC	
Answer	Yes
Document Name	
Comment	
We believe the standard already provides the necessary activities for non-battery DC systems. See Table 1-4(d) in PRC-005-6. We recommend modifying this table to include battery and non-battery systems not covered in the previous tables.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4 including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
It is important that future DC supplies are maintained. We feel that standard should address infrequently used technologies (i.e. manufacturer recommendations), but should be integrated into the standard with prescriptive requirements once they become commonplace. Table 1.4(d) could be expanded to include these sources (battery and non-battery based) to address these technologies.	
Likes 0	

Dislikes 0	
Response	
Thank you for your support. The SAR drafting team will forward your comment to the future SDT.	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Tacoma Power supports adding the emerging technology to PRC-005. However, in order to definitely conclude that this should be added to the scope of PRC-005, Tacoma Power requests that the drafting team clarify with example emerging technologies (e.g. inverter, flywheels, chargers, etc.). This clarification does not need to be captured in the Standard, but would be helpful in subsequent webinars or implementation guidance development.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4, including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). The SAR drafting team has updated the SAR to replace the term “emerging” with the more accepted term “alternative” battery Protection System Station DC supplies (e.g., lithium ion, flow). This will be clarified in the SAR. The SAR drafting team will forward your suggestions to the future SDT for consideration as they develop the project and prepare for outreach of the project.	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	

The expanding use of lithium-ion (several varieties), flow batteries, flywheels and other emerging energy storage technologies are and will continue play an expanded role in all areas of electric utility functions (transmission, power generation, and distribution). Also the increasing role of distributed energy resources utilizing these technologies interconnecting with the grid (bulk power system) make it essential that maintenance and safety related issues be addressed with guidance/requirements adopted in PRC 005-6. The actual placement in the standard and its relationship to other published standards including NFPA 855 (and thereby other installation and maitnenance standards) which references NERC PRC 005 can be properly solidified.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. This will be clarified in the SAR. The SAR drafting team will forward your comments will be forwarded to the future SDT.	
Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	
Minnkota Power Cooperative supports comments submitted by the MRO NERC Standards Review Forum.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see response to MRO NERC Standards Revidew Forum.	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	Yes
Document Name	

Comment	
CHPD recognizes that there are Registered Entities that are currently using batteries and other DC supply methods (for Protection System DC supply) that are not covered by Table 1-4 (DC Supply/Battery/Battery Charger Table) of the standard. Any change to Table 1-4 should be very clear as to what DC supply equipment, applicability, and what maintenance activities are expected. Performance-based alternative approaches should be included consistent with IEEE standards.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. The SAR drafting team will forward your comments to the future SDT.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Since “Station” is not defined in the NERC Glossary, it should not be capitalized.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team has updated the SAR to reflect the suggested change.	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

Additional information is required regarding the specific DC supply technologies proposed for addition.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. The SAR drafting team has updated the SAR to replace the term “emerging” with the more accepted term “alternative” battery Protection System Station DC supplies (e.g., lithium ion, flow).	
Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 - NPCC	
Answer	Yes
Document Name	
Comment	
We agree with the comments submitted by NPCC RSC. Furthermore, the current Standard is not technology neutral regarding batteries associated with the Protection System Station dc supply. Requirement R1 part 1.1 of the current PRC-005-6 standard requires: “All batteries associated with the station dc supply Component Type of a Protection System shall be included in a time-based program as described in Table 1-4 and Table 3”. Table 1-4(d) provides requirements for Non Battery Based Energy Storage, but for a battery technologies that are not covered in Tables 1-4(a) to 1-4(c) there is no alternatives provided in Table 1-4. Thus entities with battery technology that are not covered by Table 1-4 cannot apply time-based interval of requirement R1. The Standard does not allow for performance-based maintenance activities to ensure that the intend of the Standard is met for the Protection System Station dc supply. Currently, Hydro-Quebec and other entities are considering the replacement of existing battery with new battery technology based on Lithium-ion and sodium-nickel-chloride for example. These new batteries chemistry are not identified in PRC-005-6 and compliance concerns due to technology-specific tables are causing undue restrictions and adverse impact on the competitiveness as defined in section 2.3 of the Standards Processes Manual.	

Hydro-Québec is considering using lithium-ion batteries, specifically LFP type (lithium ferrophosphate) in 5 of its substations in the short term. Since there is no long-term data on the performance to define time-base intervals, the battery will be monitored with a Battery Management System (BMS).	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see response to NPCC RSC comments. The SAR drafting team will forward your comments to the future SDT.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
BPA believes testing of proven, acceptable, Protection System Station DC supply technology is good practice. If NERC proceeds, BPA recommends that any equipment included have its own table in PRC-005, with maintenance tasks and cycles, that are supported by data on failure modes, level of risk to the BES systems, and best practices for these specific Protection System Station DC supply technologies (battery-based and non-battery-based).	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. The SAR drafting team will forward your comments to the future SDT. The current maintenance tables in PRC-005 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team is to review and consider modifications to PRC-005 Table 1-4, including maintenance activities for alternative battery Protection System Station DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.	
Robert Hirchak - Cleco Corporation - 1,3,5,6	

Answer	Yes
Document Name	
Comment	
Thank you for your support.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Laura Nelson - IDACORP - Idaho Power Company - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Thank you for your support.	
Wayne Guttormson - SaskPower - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Fannie Champagne - Hydro-Qu?bec Production - 1,5 - NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for your support.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Randy Cleland - GridLiance Holdco, LP - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you for your support.	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	
Comment	
No comment	
Likes 0	
Dislikes 0	
Response	

4. Entities registered as ULFS-only DPs have PRC-005-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. Project 2017-07 Standards Alignment with Registration Do you agree with adding UFLS-only DPs as a Functional Entity applicable to PRC-005 to align with registration? If you do not agree, or if you agree but have comments or suggestions, provide your recommendation or proposed modification below.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
This question raises a question. How many of these entities exist and how much impact do they have on the BES? Would it be burdensome to add them to the applicability list if they do not have components that trip BES elements? Does their distribution level system trip large amounts of BES equipment or is it localized? This seems to be a question of impact on the BES and also on the DP's who would be impacted by the change.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. From page 98 of Supplementary Reference and FAQ PRC-005-6 Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance and Testing: "While UFLS and UVLS equipment are located on the distribution network, their job is to protect the Bulk Electric System. This is not beyond the scope of NERC's Section 215 authority. FPA section 215(a) definitions section defines bulk power system as: "(A) facilities and control Systems necessary for operating an interconnected electric energy transmission network (or any portion thereof)."	

That definition, then, is limited by a later statement which adds the term bulk power system "…does not include facilities used in the local distribution of electric energy." Also, Section 215 also covers users, owners, and operators of bulk power Facilities. UFLS and UVLS (when the UVLS is installed to prevent system voltage collapse or voltage instability for BES reliability) are not "used in the local distribution of electric energy," despite their location on local distribution networks. Further, if UFLS/UVLS Facilities were not covered by the reliability standards, then in order to protect the integrity of the BES during under- frequency or under-voltage events, that Load would have to be shed at the Transmission bus to ensure the Load-generation balance and voltage stability is maintained on the BES."	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	No
Document Name	
Comment	
Project 2017-07 appears to specify replacing Distribution Providers (DP) with the more-limited UFLS-only DP to the Applicability Section of PRC-005, as opposed to simply adding it.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. UFLS-only DPs would be added to the Applicability Section to avoid any confusion and to be consistent with the FERC-approved RBR registration changes.	
Colleen Campbell - AES - Indianapolis Power and Light Co. - 3	
Answer	No
Document Name	
Comment	
Not applicable to IPL.	

Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Robert Blackney - Edison International - Southern California Edison Company - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Please see comments submitted by the Edison Electirc Institute.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to EEI.	
Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 - NPCC	
Answer	Yes
Document Name	
Comment	
Yes, this change should be made to correspond with the NERC's Rules of Procedure Appendix 5B: Statement of Compliance Registry Criteria.	
Likes 0	
Dislikes 0	

Response	
Thank you for your support.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee	
Answer	Yes
Document Name	
Comment	
Yes, this change should be made to correspond with the NERC's Rules of Procedure Appendix 5B: Statement of Compliance Registry Criteria.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Yes, provided that there are not any DPs with UFLS systems for which PRC-005-6 is not applicable. If there are, then the addition of this entity to the applicability will cause confusion and is not recommended.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment.	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Tacoma Power supports adding the “DP - UFLS Only” registered function to the Applicable Entities in Section 4.1.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
mark fowler - Ameren - Ameren Services - 1 - SERC	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Gladys DeLaO - CPS Energy - 1,3,5	

Answer	Yes
Document Name	
Comment	
CPS Energy agrees that 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.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Donald Lock - Talen Generation, LLC - 5	
Answer	Yes
Document Name	

Comment	
Talen Energy supports the comments of the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see responses to NAGF comments.	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Kevin Salsbury - Berkshire Hathaway - NV Energy - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for your support.	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
Thank you for your support.	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you for your support.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Douglas Webb - Westar Energy - 1,3,5,6 - MRO, Group Name Westar-KCPL	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Randy Cleland - GridLiance Holdco, LP - 1	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Fannie Champagne - Hydro-Qu?bec Production - 1,5 - NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Thank you for your support.	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 3,5,6, Group Name Dominion	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for your support.	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Wayne Guttormson - SaskPower - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you for your support.	
Rahn Petersen - PNM Resources - Public Service Company of New Mexico - 5 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Laura Nelson - IDACORP - Idaho Power Company - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Robert Hirchak - Cleco Corporation - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	
Document Name	
Comment	
DTEE abstains on commenting related to the applicability of entities registered as ULFS-only DPs.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	
Document Name	
Comment	
Not applicable to CHPD as we are not registered as a UFLS only DP.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment.	
M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	
Document Name	
Comment	
TVA has no comment related to the applicability of entities registered as ULFS-only DPs and abtains on this question.	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
This is beyond the scope of interest (and expertise) of many of the members of the IEEE Energy Storage and Stationary Battery (ESSB) Committee. As a result we will abstain from a Yes or No Vote or comment on this point.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	

LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	
Document Name	
Comment	
NA	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	
The NAGF does not have an opinion or comment related to the applicability of entities registered as ULFS-only DPs.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	
Answer	
Document Name	

Comment	
Basin Electric has no opinion.	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Sandra Shaffer - Berkshire Hathaway - PacifiCorp - 6	
Answer	
Document Name	
Comment	
PacifiCorp has no answer for this question	
Likes 0	
Dislikes 0	
Response	
Thank you.	

5. Are there any logistical or cost considerations that would add significant burden to equipment owners trying to confirm protective functions in an exciter, inverter, or other control system? If so, do you have a more cost effective suggestion to accomplish the objective of the SAR that the drafting team should consider?	
Donald Lock - Talen Generation, LLC - 5	
Answer	No
Document Name	
Comment	
Talen Energy supports the comments of the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to NAGF.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	No
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	

Thank you.	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	No
Document Name	
Comment	
Reclamation recommends providing language to clarify what is meant by “control system;” e.g., “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…”. Reclamation also recommends that the SAR Drafting Team perform a cross-walk between PRC-005-6, PRC-019-2, MOD-025, and MOD-026 to ensure that efforts concerning voltage regulator testing are not duplicated across multiple standards.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. Although PRC-019, MOD-025 and MOD-026 are not maintenance standards, the SAR drafting team will forward your comments to the future SDT.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	No
Document Name	
Comment	

Although the cost consideration is unknown at this time, AZPS requests that the drafting team consider whether the component attribute is monitored or unmonitored when determining the maintenance frequency, which is consistent with the treatment of other components currently applicable to PRC-005-6.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Robert Hirchak - Cleco Corporation - 1,3,5,6	
Answer	No
Document Name	
Comment	
Thank you.	
Likes 0	
Dislikes 0	
Response	
Laura Nelson - IDACORP - Idaho Power Company – 1	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you.	
Rahn Petersen - PNM Resources - Public Service Company of New Mexico - 5 - WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Sandra Shaffer - Berkshire Hathaway - PacifiCorp – 6	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
LaTroy Brumfield - American Transmission Company, LLC – 1	
Answer	No
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Joshua Andersen - Salt River Project - 1,3,5,6 – WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thank you.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Thomas Foltz - AEP - 3,5	
Answer	Yes
Document Name	
Comment	

Protection functions within these suggested systems have designs which can be very specialized and contain confidential design information that may allow only specific parties to work-on and maintain with a high degree of accuracy. Such constraints would likely lead not only to logistical challenges, but quite possibly cost impacts as well due to the confidential and specialized knowledge requirements necessary to work on the equipment. The SDT will need to consider how such specialized, proprietary designs could be properly maintained for those functions in a way that would not be unduly burdensome in effort or cost.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Aligning maintenance requirements so the frequencies are multiples of each other will reduce station visits. For example VLA batteries have a 4 month interval for specific checks, then a 18 month interval for more detailed checks. The two checks don't align and the result is additional station visits and costs.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Wayne Guttormson - SaskPower – 1	
Answer	Yes
Document Name	

Comment	
Due to the potential for significant cost and resource demands, would recommend consideration of a longer implementation plan.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Gladys DeLaO - CPS Energy - 1,3,5	
Answer	Yes
Document Name	
Comment	
Yes, there will be significant logistical and cost consideration burdens to CPS Energy GO to confirm protective funtions in the automatic voltage regulator systems. In order to confirm the protective functions, the owners will require outages and coordination with OEM vendors. As the number of subject matter experts and available technicians continue to decrease, it could become increasingly difficult to schedule these activities in timelines established by any revisions that are made. In order to ensure a cost effective solution, CPS Energy recommends that any activities for confirming protective functions in automatic voltage regulator systems have a maximum maintenance interval of 12 yrs. In addition, any recent commissioning or maintenance performed on automatic voltage regulators that meet the required maintenance activities should be allowed to count towards meeting any implementation plans established.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
mark fowler - Ameren - Ameren Services - 1 – SERC	
Answer	Yes

Document Name	
Comment	
Measuring DC quantities in an excitation system can be problematic due to the high voltage conditions. Excitation systems with PLC-type controls, which do not easily facilitate reading settings as with relays, require special software for verifying inputs. We look forward to the Standard Drafting Team's considerations for testing strategies of excitation systems and we recommend a separate table entry for AVR devices specifically.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Colleen Campbell - AES - Indianapolis Power and Light Co. – 3	
Answer	Yes
Document Name	
Comment	
This would involve both a feasibility study followed by actual data gathering activities. Both draw a financial and logistical burden for any utility. IPL does not agree with the inclusion of these protective functions.	
Likes 0	
Dislikes 0	
Response	
While the protective functions are already applicable in PRC-005, the SAR drafting team is considering clarifying defining terms to ensure that BES protective functions that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay are included in the maintenance activities.	
Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	

Answer	Yes
Document Name	
Comment	
Basin Electric supports comments drafted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to NAGF's comments.	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
If the scope is expanded to "other control systems" the NAGF is concerned with the significant impact to the GO/GOP maintenance and testing programs. The NAGF submitted the SAR in an attempt to provide clear guidance on applicability of AVR protective functions and to request clarity on what testing is acceptable to meet the maintenance activities prescribed by PRC-005-6. By expanding into control systems, battery-based station DC technologies and other "emerging technologies" the SAR drafting team has created more ambiguity and will create significant burden to equipment owners attempting to implement the Standard requirements.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES	

elements directly or via lockout or auxiliary tripping relay. The intent of adding additional DC technologies is to provide clarity for entities using battery-based DC station-supply technologies (e.g., lithium ion) that at are not currently specified.	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
These protective functions could be embedded in the control systems for assets that are managed by manufacturers under maintenance contracts (such as SVCs). Understanding and the testing of these functions will involve the manufacturers. These systems are significantly more complicated than traditional BES protection systems.	
Likes 0	
Dislikes 0	
Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 – WECC	
Answer	Yes
Document Name	
Comment	
When drafting the phased implementation schedule, the SDT should provide sufficient time to develop appropriate testing methods and execute the testing especially for those exciters/ AVRs where testing the protective functions could be a challenge. Tacoma Power recommends providing five to six years for the implementation period.	
Likes 0	
Dislikes 0	

Response	
Thank you for comments. Your comments will be forwarded to the future SDT.	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	Yes
Document Name	
Comment	
Significant financial burden will be added due to the fact that AVR equipment is usually proprietary in nature. Any servicing or testing requires manufacturer's mobilization. It is unsured what would be required for testing these control system, in many cases the protective functions are buried within the code of control systems and we cannot simply inject signals to test individual functions like what is done on traditional protective systems.	
Likes 0	
Dislikes 0	
Response	
While the protective functions are already applicable in PRC-005, the SAR drafting team recognizes your concerns and will forward to the future SDT.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	Yes
Document Name	
Comment	
Cost analysis and length of the implementation period should be assessed within the scope of the SAR to allow applicable entities to determine accurate implementation cost. The following are factors for consideration:	

- Identifying all the applicable elements by GOs will require additional evaluation and creation of compliance documentation to address the newly identified elements. Considering the global pandemic and prolonged uncertainty, industry resources are even more constrained, and implementing the suggested changes without a proper detailed implementation plan will take additional time and incur additional costs, which have yet to be defined or even understood.
- Testing protection systems oftentimes requires units to go offline. Therefore, the scope should define what course of time and period the implementation of the revised standard will be applied.
- Due to GOs' limited resources and complexity with the implementation of the proposed SAR, outside resources and engineering firms will likely be required to assist GOs with testing and implementation of the standard. Reliable outside resources are limited and often costly.

Likes 0	
Dislikes 0	

Response

While the protective functions are already applicable in PRC-005, the SAR drafting team recognizes your concerns and will forward to the future SDT. The Implementation Plan for a new standard would be a function of the future SDT.

Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	Yes
Document Name	

Comment

Certainty on the cost affect of changes to PRC-005 cannot be realized until the scope of the changes is determined. For entities not already including digital excitation control system with microprocessor based protection funnctions in their Protection System Maintenance Program will certainly incur additional costs for including the maintenance activities for those pieces of equipment during outages. The assimilation of that equipment into the maintenance cycles will have to be allowed to be done over the normal coarse of the maintenance interval periods - up to 6 years for those entities who may have just completed a maintenance outage. Otherwise, the requirement for an immediate outage solely to perform maintenance on this equipment for compliance with PRC-005 can be expensive due to lost generation revenue and start up costs.

Likes 0	

Dislikes 0	
Response	
While the protective functions are already applicable in PRC-005, the SAR drafting team recognizes your concerns and will forward to the future SDT. The Implementation Plan for a new standard would be a function of the future SDT.	
Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 – MRO	
Answer	Yes
Document Name	
Comment	
Minnkota Power Cooperative supports comments submitted by the MRO NERC Standards Review Forum.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see response to MRO NERC Standards Review Forum.	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	Yes
Document Name	
Comment	
Testing of protective functions within exciters, inverters, and other control systems is frequently not accessible to the owner or operator. Adding these to periodic testing requirements will force us to use service calls by the supplier for the needed testing, adding cost and burden. We suggest that if the function is tested and set by the supplier at commissioning, and the software and setting are not changed, that a simple attestation to this is sufficient confirmation in lieu of a retest or examination of the code to confirm the setting.	
Likes 0	

Dislikes 0	
Response	
While the protective functions are already applicable in PRC-005, the SAR drafting team recognizes your concerns and will forward your comments/recommendations to the future SDT.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee	
Answer	Yes
Document Name	
Comment	
The drafting team should avoid treating these control systems as relays since they do not function in the same way as a protective relay. Therefore the methods of testing and maintaining this equipment will require careful consideration and may not align with the current requirements of relay maintenance. Considerations should be made to ensure that it is not cost-prohibitive or introduce the risk of damage to test and maintain this equipment.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. Your comments will be forwarded to the future SDT.	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	
Comment	

We echo AEP's comment (.a-b-48760)	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see response to AEP's comments.	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
If the scope is expanded to "other control systems" Exelon is concerned with the impact to the an entities maintenance and testing programs. The NAGF submitted the SAR in an attempt to provide clear guidance on applicability of AVR protective functions and to request clarity on what testing is acceptable to meet the maintenance activities prescribed by PRC-005-6. By expanding into control systems, battery-based station DC technologies and other "emerging technologies" the SAR drafting team has created more ambiguity and will create significant burden to applicable entities attempting to implement the Standard requirements.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. The intent of adding additional DC technologies is to provide clarity for entities using battery-based DC station-supply technologies (e.g., lithium ion) that at are not currently specified. Your comments will be forwarded to the future SDT.	

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Yes
Document Name	
Comment	
DTEE supports comments submitted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your support. Please see response to NAGF comments.	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
The proposed scope expansion could require entities to carve out additional resources from existing groups or form entirely new ones to accomplish maintenance, as well as possibly involve contractors. In addition to organizing group resources, entities would have to develop training and tools with protection and plant personnel. As verifying the functionality of AVR is currently covered in MOD-026-1, it could be more cost-effective to expand that Standard as opposed to adding AVR testing to PRC-005.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions	

inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. Although MOD-026 is not a maintenance standard, the SAR drafting team will forward your comments to the future SDT.	
Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 – NPCC	
Answer	Yes
Document Name	
Comment	
We agree with the comment submitted by NPCC RSC. In addition, any maintenance activities are required on an AVR or control system, it should be coordinated with MOD-026 activities. In addition, even if no BES protective functions are within the AVR, the SDT should consider if there will be a benefit to the reliable operation of the BES to verify that settings are as specified (no BES protection functions are enabled) and that measurement of power system input and output values are acceptable. Acceptable AC/DC voltage and current measurements are essential to proper AVR control and its verification is not specifically covered in MOD-026-1. The settings changes are covered by R4 of MOD-026-1, as it is in R3 of PRC-001-1.1(ii) for protection relays. MOD-026-1 verification is performed every 10 years whereas PRC-005-6 tables 1-1 is 12 years, SDT should consider coordinating time interval with MOD-026-1 period if a new table is added specifically for the AVR.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. Although MOD-026 is not a maintenance standard, the SAR drafting team will forward your comments to the future SDT.	
Kevin Salsbury - Berkshire Hathaway - NV Energy – 5	
Answer	Yes

Document Name	
Comment	
NV Energy believes there will be an undue financial burden to Generation Owners and Operators if excitation systems are included in PRC-005 scope. Some excitation systems have proprietary control systems, and thus, cannot be internally maintained by an Entity's current staff due to inability to access system equipment to conduct maintenance testing. Therefore, Entities will be required to contract out services from the vendor to conduct the maintenance testing. The procurement of these services can be costly and time consuming. AVR testing is not a widespread knowledge-based for protection and control technicians, due to the proprietary nature of the equipment, thus these personnel are not trained in AVR testing, which again will force Entities to contract the testing to specialized companies and a considerable cost.	
Likes 0	
Dislikes 0	
Response	
The current scope is to clarify BES protective functions within Other Control Systems that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. The SAR drafting team will forward your comments regarding maintenance testing to the future SDT.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 – WECC	
Answer	Yes
Document Name	
Comment	
As noted in response 1 - by adding the AVR and other controls systems into the PRC-005-6 mix there are then changes being made that could precipitate the need to do generator testing, modeling and validation on schedules that are outside the normal for entities. This drives costs up and could hurt small entities. Also - there is a need to provide additonal training to relay crews to work in this non-	

protective equipment systems and will probably annoy generation engineers who now have less qualifed people making changes to their equipment.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. Please see responses to your comments in Question 1.	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	

BC Hydro's interpretation is that the protective functions within excitation systems refer to Field over current, Field over voltage, V/Hz protection, Converter fault detection, Field ground fault detection and Crowbar. BC Hydro does not rely on these protective functions within excitation controller; generator Protection System is used instead. Most of generation exciters have electrical trip functions disabled during commissioning, and BC Hydro does not plan to include such protective functions in the future.

BC Hydro's view is that including protective functions that respond to electrical quantities inside excitation systems and other control systems in PRC-005 does not provide sufficient clarity on the on the impact to the scope of the BC Hydro's PRC-005 maintenance and testing program.

The addition of testing excitation systems' protective functions requires fleet-wide review of exciters to confirm where these protective functions within exciters are enabled. The level of effort required to maintain excitation and other control systems' protective functions is deemed substantial.

Implementation of maintenance requirements and changes to preventative maintenance programs will also have additional costs deemed significant for the BC Hydro generation fleet.

Additionally, some of the digital exciter maintenance testing may require complex software modification to enable these protective functions verifications, as the current software may not have built-in functionalities for testing purposes.	
Likes 0	
Dislikes 0	
Response	
In regards to your comments about specific functions, the SAR drafting team is developing the outline of what should be clarified for inclusion. The future SDT would address any more-detailed applicability. Your comments will be forwarded to the future SDT. Existing standards MOD-026 and PRC-019 may assist in identifying any applicable settings that you have applied.	
Fannie Champagne - Hydro-Qu?bec Production - 1,5 – NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for your support.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	
Document Name	
Comment	
The NSRF has concerns that there may be a significant amount of time and resources required to evaluate all applicable generation assets for their functions and limiter points. Additionally, all GOs would need to develop procedures to test (verify) the protective functions of	

the exciter, inverter, or other control systems (AVR) and identify test equipment that could be used to inject signals to simulate high and low conditions. The fact that it does not seem practical to test/trigger the protections with the unit running also adds to the complexity and cost. Many small GOs would have to depend on outside resources (engineering consultants) to perform these tests with an unknown cost. Due to the significant cost and resource demands required by this change, we would recommend the consideration of a longer implementation plan. There is another potential significant burden associated with the explicit inclusion of Automatic Voltage Regulation (AVR) or its equivalent wind / solar voltage regulation protection systems. The explicit inclusion of these protection systems into PRC-005-6 potentially ties these systems into the TPL-001-5 redundancy requirements. The MRO NSRF recommends the SAR scope clearly exempt synchronous and asynchronous AVR protection systems from TPL-001-5 due to the unnecessary burden it would impose. The redundancy burden is significant and would not significantly impact BES reliability. The MRO NSRF isn't aware of any BES events where non-redundant AVR protection was the root cause.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. The purpose of the SAR drafting team is to capture all elements of scope for the future SDT consideration. The specific requirements and language of the standard will be developed by the future SDT. Your comments will be forwarded to the future SDT and the future SDT will address any potential impact a proposed PRC-005 modification would have on current standards.	
Larry Heckert - Alliant Energy Corporation Services, Inc. – 4	
Answer	
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	

Response	
Thank you for your comment. Please see response to MRO NSRF comments.	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
This is beyond the scope of interest (and expertise) of many of the members of the IEEE Energy Storage and Stationary Battery (ESSB) Committee. As a result we will abstain from a Yes or No Vote or comment on this point.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	
Document Name	
Comment	
A significant burden to equipment owners will result from confirmation of applicability of PRC-005 to protective relay functions in the broad grouping of exciter, inverter, or other control systems. Based on the breadth of exciter/AVR, inverter, and control system technologies in service today, and the equally diverse methods of testing likely required, significant training hours will be required to prepare existing and new resources to perform the required tests, especially for legacy systems. Additional burden will be required to evaluate all applicable configurations, develop test procedures that will satisfy new standard requirements, and develop necessary associated training content. Implementation of newly required maintenance activities will invariably be scheduled concurrent with unit outages. Due to these and other unexpected logistical challenges, along with the implied	

acknowledgement that the existing confusion has made prior exclusion of these imbedded functions likely, TVA cannot support any proposed revision of PRC-005-6 without a staged implementation approach for any new requirement or any specific components added to the applicability tables. The duration and milestones of this staged implementation should be commensurate with those of the existing PRC-005-6 implementation plan.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. Your comments will be forwarded to the future SDT. The Implementation Plan for a new standard would be a function of the future SDT.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	
Comment	
No comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. – 10	
Answer	
Document Name	
Comment	

Texas RE suggests the drafting team consider aligning the timing of periodic requirements to other standards that are connected with the review of settings or testing of the performance of protective functions not directly associated with relays which have their own time frames. For example, PRC-019-2 Requirement R1 requires coordination every five calendar years, while PRC-005 requires maintenance activity every 6 calendar years. It may be helpful for these to be in aligned.

Likes 0	
Dislikes 0	

Response
Thank you for comments. Your comments will be forwarded to the future SDT.

Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group

Answer	
Document Name	

Comment
No comment

Likes 0	
Dislikes 0	

Response

6. Provide any additional comments for the drafting team to consider, if desired.	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 – WECC	
Answer	
Document Name	
Comment	
This SAR likely causes more burden than benefit to the protection and control of our BES assets. If there is sufficient evidence to show that AVR trips are causing havoc across the interconnections perhaps it is worth further consideration. However as it is currently written this SAR seems to add little value for the amount of effort it would entail to employ.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4, Group Name FE Voter	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	

Chantal Mazza - Hydro-Qu?bec TransEnergie - 1 - NPCC	
Answer	
Document Name	
Comment	
We agree with the comments submitted by NPCC RSC except for item number 5 regarding the PRC-005-6 Supplmentary Reference and FAQ.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response ot NPCC RSC.	
Quintin Lee - Eversource Energy - 1,3, Group Name Eversource Group	
Answer	
Document Name	
Comment	
No comment	
Likes 0	
Dislikes 0	
Response	
Glenn Barry - Los Angeles Department of Water and Power - 1,3,5,6	

Answer	
Document Name	
Comment	
As MOD-026-1 currently verifies AVR functionality on a periodic basis, there would be questionable benefit to requiring a separate maintenance window for AVR maintenance. In addition, it is useful to consider that the original intent of the SAR, as developed by NAGF, was to be limited to synchronous generating units with installed digital AVRs.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The intent of the SAR is to clarify inclusion of BES protective functions that are included in the control system (that trip the generator or element when outside the limits of the machine). These are often in place of, or as a backup to, the standalone protective relays. These functions would not be applicable to MOD-026 as they operate outside the control system parameters, and they provide functionality similar or identical to protective relays, which is why their maintenance falls into the scope of PRC-005.	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	
Document Name	
Comment	
DTEE supports comments submitted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see response to NAGF comments.	

Daniel Gacek - Exelon - 1,3,5,6	
Answer	
Document Name	
Comment	

Exelon concurs with the comments provided by the EEI and offers the following additional feedback.

The expansion of scope to "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" could have an impact to maintenance and testing programs without any explained reliability benefit. Exelon requests that if the scope is to be expanded in this manner that the SAR drafting team provide justification to support.

The expansion into "battery-based station DC technologies" or "other emerging technologies" is also not supported by Exelon given there is no definition for either term and therefore no limit on the interpretation of such technologies.

Likes 0	
Dislikes 0	

Response

Thank you for your comments. Please see responses to EEI comments. The SAR drafting team has updated the SAR to read: “BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System.” Further, the SAR drafting team has updated the SAR to read: “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 alternative technologies, both battery-based and non-battery-based.”

Rachel Coyne - Texas Reliability Entity, Inc. - 10

Answer	
Document Name	
Comment	
Since the PRC-005-6 Supplementary Reference and FAQ document was written prior to the Compliance Guidance Policy, Texas RE recommends the drafting team conduct a thorough review of the document. The determination may need to be made as to whether or not the document should be split into an implementation guidance document and a technical rationale document rather than simply be updated to address the issues in this SAR.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. The SAR drafting team will forward your comments to the future SDT.	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	
Document Name	
Comment	
Currently the SAR includes the following wording: *"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."* I would like to suggest the addition of the phrase "based on those electrical quantities" between the words "and" and "act" to clarify the intention of the paragraph. The revised paragraph would read:	

"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, based on those electrical quantities, act to cease injecting current or trip BES elements either directly or via lockout or auxiliary tripping relays."

Likes 0	
Dislikes 0	

Response
Thank you for your comment. The SAR drafting team has updated the SAR to read: "PRC-005 will be revised to provide clarity that the BES protective functions enabled within excitation systems (including analog/digital Automatic Voltage Regulators (AVRs)), and BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System." In addition, the SAR drafting team has updated the SAR to read: "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."

Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	
Document Name	

Comment
Currently the SAR includes the following wording: *"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."*

I would like to suggest the addition of the phrase “based on those electrical quantities” between the words “and” and “act” to clarify the intention of the paragraph.

The revised paragraph would read:

“*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, based on those electrical quantities, act to cease injecting current or trip BES elements either directly or via lockout or auxiliary tripping relays.”*

Likes 0	
Dislikes 0	

Response

Thank you for your comment. The SAR drafting team has updated the SAR to read: “PRC-005 will be revised to provide clarity that the BES protective functions enabled within excitation systems (including analog/digital Automatic Voltage Regulators (AVRs)), and BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System.” In addition, the SAR drafting team has updated the SAR to read: “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.”

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee

Answer	
Document Name	

Comment

Please consider changing the “SAR Type” to read as “Revision to Existing Standard” instead of “New Standard.”

1. In the "Industry Need" section, the SAR states: "… and other control systems, that respond to electrical quantities and act to cease injecting current (75 MVA or greater)…" Does this include BES Definition Inclusion 2 generation? If so, this would already be addressed in the applicability statements in PRC-005-6.

2. In the "Industry Need" section, the SAR states: "Without clear applicability…". This needs to be re-stated. Applicability refers to entities. The purpose of the SAR is to define what components are considered "Relays" within the definition of Protection System, or redefining what a Protection System is and is in section 4.2 "Facilities".

3. The project scope states the following: "Modify PRC-005 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. 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."

It will be extremely difficult to appropriately capture "control systems that respond to electrical quantities and act to cease injecting current…" Momentary cessation occurs at individual inverters. The standard is limited to only controls that impact 75MVA or greater as it is understood that individual dispersed resources do not have a significant impact on BES reliability. Due to the sheer number of these devices that may be embedded in dispersed generation resources, Maintenance and testing activities for these entities could potentially be cost-prohibitive.

4. The above statement also mentions "… also include defining terms, revising applicability, modifying maintenance activities and intervals, or other appropriate modifications needed to provide clarity." If this is the case, then the appropriate boxes will need to be checked in the "SAR Type".

5. The statement to modify the PRC-005-6 Supplementary Reference and FAQ should not be included in the SAR. This activity would be done outside the SAR.

6. It is important for the SAR language to allow flexibility for the SDT. Currently, the SAR uses language such as "…provide clarity that the protective functions…" which leads to a presupposed position. The SDT should conduct the technical analysis to make the determinations of applicability to the standard. The SAR should be modified in recognition of the SDT purpose.	
Likes 0	
Dislikes 0	

Response

Thank you for your comments. 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.

Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay.

The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR.

The SAR drafting team has updated the SAR to read: "BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System." Further, the SAR drafting team has updated the SAR to read: "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 alternative technologies, both battery-based and non-battery-based.”	
Ginette Lacasse - Public Utility District No. 1 of Chelan County - 1,3,5,6, Group Name Ginette Lacasse on behalf of PUD #1 Chelan County	
Answer	
Document Name	
Comment	
The need is to resolve the confusion regarding electrical protection functions performed by digital voltage regulators. Expansion may be needed as other digital control systems implement more protective functions, but doing so at this time will delay the resolution of the primary question raised with little benefit.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	
Comment	
We thank the drafting team's responses to our last comments submitted	
Likes 0	
Dislikes 0	
Response	

Thank you for your comment.	
Douglas Webb - Westar Energy - 1,3,5,6 - MRO, Group Name Westar-KCPL	
Answer	
Document Name	
Comment	
Westar Energy and Kansas City Power & Light, Evergy Companies, incorporate by reference, Edison Electric Institute's response to Question 6.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
The Project Scope, as currently written, appears to expand on what is meant by the undefined term “protective function.” While the defined term Protection System includes protective functions associated within control circuitry, it does not clearly identify those protective functions. More importantly, control circuitry is generally understood by the Industry to mean control wiring, not control systems. While it is reasonable to accept that protective relays and protective functions are synonymous, control functions have a very different meaning. While we recognize that improvements to the definition of Protection System may be beneficial, it should not include control functions in that definition.	

It is also important to recognize that the proposed SAR goes well beyond what the NAGF originally intended. It is this expansion that we believe could result in the blurring of the lines between protection and control functions having many unintended long-term consequences.

EEI also cautions against modifying NERC Reliability Standards to address “emerging technologies” until it has been demonstrated that those technologies have been adopted by the industry and are not already adequately addressed in the current body of NERC Reliability Standards. Emerging technologies is also an undefined term that could have wide and varied interpretations resulting in a broad and unbounded scope that should not be approved.

EEI recognizes that industry guidance is needed to support GOs in developing PRC-005 maintenance programs, given the advances in control systems and the merging of protection functions within generator control systems. However, the problem does not lie within the existing definition of Protection Systems.

EEI additionally notes that the SAR has been incorrectly identified as developing a “New Standard” while the language contained in the SAR indicates a “Revision to Existing Standard”.

Likes 0	
Dislikes 0	

Response

Thank you for your comments. 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.

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Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO

Answer	
Document Name	
Comment	
Minnkota Power Cooperative supports comments submitted by the MRO NERC Standards Review Forum.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Marsha Morgan - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	

Document Name	
Comment	
The SAR needs to be revised to match the original SAR produced by the NAGF and address only the issues raised in that version. 1. The SAR type should be "Revision to Existing Standard" rather than "New Standard" 2. The scope of the SAR should be limited to the initiating source of the reason for the SAR and not widened to other topics. 3. The revision can sufficiently address the question of applicability of the standard to excitation control systems by either a) footnoting "Protection Systems" to indicate that this includes any actively used protective relaying functions contained within the program logic of the excitation control system or b) by modifying the Facilities section 4.2.5.4 to indicate the same. The following action is recommended to address the maintenance activity request in the SAR: Since the programming, testing, and functionality of generator protective relaying elements in use within excitation control systems is essentially identical to that provided by multi-function microprocessor-based discrete protective relaying, the appropriate maintenance activities match those for microprocessor relays found in the existing Table 1-1 of PRC-005-6. These 6 calendar year activities are: 1) verify that the settings in the device, 2) verity the digital inputs & outputs are functional, 3) verify that the analog inputs are transduced properly (analog/digital conversion). We believe that no additional discussion or specification of the myriad of possible protective relaying functionality and testing methods is necessary or needed. The test methods are similar to those used for microprocessor-based protective relays. As with other discrete multi-function microprocessor-based protective relaying, only those elements that are chosen to be used in the protective device should be in the scope of maintenance activities required by PRC-005. No revision to the Supplementary Reference and FAQ document is needed because the existing sections addressing microprocessor-based protective relaying already covers that functionality which *may exist within* excitation control systems *rather than within* free-standing, discrete, multi-function, microprocessor-based protective relaying solutions.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comments. 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.	

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Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,Texas RE,SERC,RF, Group Name ACES Standard Collaborations	
Answer	
Document Name	
Comment	
Thank you for the opportunity to comment.	
Likes 0	

Dislikes 0	
Response	
Thank you.	
M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority	
Answer	
Document Name	
Comment	

TVA finds the additional scope and the associated ambiguity of the modified SAR unacceptable. Specifically, use of the following has departed from the original intent of the NAGF/NEI proposal and would create more ambiguity, confusion, and burden on all BES equipment owners, not just GO/GOP entities, if not extensively moderated to a more narrow scope or eliminated altogether:

- "*Other control systems*"

1. This was not included in the scope or intent of the original NAGF/NEI SAR.
2. This phrase is over-inclusive and ambiguous. Consideration of such a change in scope should be part of a subsequent revision so that the industry will have adequate time for consideration and participation in developing another SAR. Prerequisite to such consideration would be establishment of a bright line between control functions and protective functions in a control system. Consequently, TVA supports NAGF's request to revert back to the scope of the original SAR submitted on May 9, 2019.

- "*Excitation systems (including analog/digital AVRs*)"

3. Expansion of the original scope which did not include analog AVRs is unacceptable. Any requirement to inject signals and activate outputs is widely recognized as being very difficult, of not prohibitively infeasible.

- "*May measure and utilize similar quantities as protective relays and may perform similar functions as protective relays"* (in the SAR);

"*Protective functions that are typically (but not always) associated with relays*" (in the SAR);

"*May measure similar quantities and may yield similar outcome*" (in this form)

1. Use of these or similar phrases in the revised standard would increase ambiguity and confusion significantly over what exists today in PRC-005-6. The potential breadth of interpretations would create an intolerable environment for compliance, especially in conjunction with "other control systems."
- "*Act to cease injecting current*"
2. Without further specificity, TVA cannot support the use of this phrase in lieu of existing applicability criteria.
- "*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."

1. At first glance, the drafting team's intention seemed to be to focus on generation elements, but the generic term of BES Elements again represents a significant expansion of scope. This is unacceptable in that it would unnecessarily blend the non-generator applicability criteria with the generator applicability criteria, confusion and inconsistency would ensue, all without improvement to reliability.
2. One might assume "greater than 75 MVA" is a reference to the entirety of Inclusion I4 of the BES definition, but taken with the overwhelming ambiguity in the rest of the document, could the SAR team be suggesting elimination of the 100kV or higher criteria for dispersed generation?

Finally, why is the "New Standard" box checked on the modified SAR form? Isn't the SAR proposing a revision of PRC-005-6?

Likes 0	
Dislikes 0	

Response

Thank you for your comments. 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.

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Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	

Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	

It is the judgment of the IEEE Energy Storage and Stationary Battery (ESSB) Committee Task Force that a potentially liable situation exists with the requirements for proving the “battery can perform as manufactured. . .” in Tables 1-4 (a) and 1-4 (b) of PRC 005-6. There is substantial industry documentation that confirms that ohmic measurement testing is not a reliable or proven means to confirm the battery can perform as manufactured.

Therefore we propose that references to the suggested means to prove the battery will perform as manufactured should be eliminated and allow the FAQ and Supplemental Guide to inform the user (functional entity) on the accepted means to prove performance "as manufactured” until more data is provided to show that ohmic measurement data or other alternaive means alone prove the battery can perform as manufactured.

Implication: The standard then only states that the user (functional entity) must prove the battery will perform as manufactured. This corrects an implication in the standard that ohmic measurements or float current readings are an assured means for proving capacity or reliability of the battery. The FAQ and Supplemental Guide provides solid reference to the issues associated with ohmic measurements and other methods to prove “battery performance as manufactured," including the most reliable method used by the stationary battery industry to prove the requirement. By removing the relative particulars from the tables, the responsibility for determining the method to prove the Table 1-4 (a) and Table 1-4 (b) requirements is put on the functional entity.

The standard is then clear of any liability for prescribing the accuracy (or inaccuracy) of any stated means as a requirement while sustaining the intended actual requirement of proving the battery will perform as manufactured.

The IEEE ESSB Committee offers to provide a knowledgeable member or two with seasoned BESS experience from its Committee to assist the SAR drafting team in appropriately working on the two dc power related issues addressed above (Questions 3 & 6).

Likes 0	

Dislikes 0	

Response

Thank you for your comments. 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.

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Fannie Champagne - Hydro-Qu?bec Production - 1,5 - NPCC

Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - NAGF - 1,2,3,6 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	

The project scope of the updated SAR as written has expanded the scope significantly from the original wording of the NAGF SAR and evolved into a draft that the NAGF can no longer support. The expansion of scope to "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" will likely have significant impacts to GO/GOP maintenance and testing programs without any explained reliability benefit.

The expansion into "battery-based station DC technologies" or "other emerging technologies" is also not supported by the NAGF given there is no definition for either term and therefore no limit on the interpretation of such technologies.

Likes 0	
Dislikes 0	

Response

Thank you for your comments. 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.

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Jerry Horner - Basin Electric Power Cooperative - 1,3,5,6	
Answer	
Document Name	
Comment	
Basin Electric supports comments drafted by the NAGF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see responses to comments by NAGF.	
Colleen Campbell - AES - Indianapolis Power and Light Co. - 3	
Answer	
Document Name	
Comment	
IPL appreciates the efforts of the SAR drafting team and offers no further comments.	
Likes 0	

Dislikes 0	
Response	
Thank you.	
mark fowler - Ameren - Ameren Services - 1 - SERC	
Answer	
Document Name	
Comment	
n/a	
Likes 0	
Dislikes 0	
Response	
Gladys DeLaO - CPS Energy - 1,3,5	
Answer	
Document Name	
Comment	
CPS Energy recommends that NERC considers limiting the PRC-005-6 revision scope to only automatic voltage regulators that perform protective functions similar to stand alone protective relays that are already defined in PRC-005-6. Limiting the scope, along with making considerations to the value and effectiveness of periodic maintenance on the microprocessor based automatic voltage regulator systems, will minimize the cost and logistical burden on the owners to maintain reliable protection systems.	
Likes 0	
Dislikes 0	

Response
Thank you for your comment. 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. Thank you for your comment. The current scope is to clarify BES protective functions within Control Systems (including AVRs) that 1.) respond to electrical quantities and 2.) trip BES elements either directly or via lockout or auxiliary tripping relay. In other words, this seeks clarity regarding protective functions inside control systems which are not stand-alone relays, but otherwise meet the definition of a Protection System by tripping BES elements directly or via lockout or auxiliary tripping relay. This has been clarified in the SAR. The standard should be technology-neutral, and the SAR drafting team determined that only addressing traditional synchronous generator excitation systems was not fully addressing the potential reliability gaps in the interpretations of PRC-005 applicability to protective functions in all control systems. The wording regarding "cease injecting current" has been removed since IBRs today do not typically provide protective functions at the point of aggregation that cause momentary cessation, but rather they trip breakers either directly or via lockout or auxiliary tripping relay. The current maintenance tables in PRC-005-6 contain activities for traditional batteries, and for alternative non-battery DC supplies. The intent of the SAR drafting team was to include maintenance activities for alternative battery DC supplies (e.g., lithium ion, flow). This has been clarified in the SAR. The SAR drafting team has updated the SAR to read: “BES protective functions enabled within other control systems, that respond to electrical quantities and trip BES elements either directly or via lockout or auxiliary tripping relays are within the scope of the standard. The clarity that is needed is regarding protective functions inside excitation systems and control systems which are not stand-alone relays, but otherwise perform as a BES Protection System.” Further, the SAR drafting team has updated the SAR to read: “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 alternative technologies, both battery-based and non-battery-based.”
Sean Bodkin - Dominion - Dominion Resources, Inc. - 3,5,6, Group Name Dominion

Answer	

Document Name	
Comment	
Dominion Energy agrees with the comments submitted by EEI and is of the opinion that the new prioposed SAR is speculative and premature.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see responses to comments submitted by EEI.	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	
Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment. Please see responses to comments submitted by MRO NSRF.	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	
Document Name	
Comment	

The SAR Drafting Team may need to review VAR-002-4.1, to address the situation where a generator is exempt from having an AVR in-service and clarifying if the verification of limiter points and exciter functions would be required	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	
Document Name	
Comment	

Reclamation recommends expanding the scope of the SAR to specify a process for carrying out maintenance that is missed during equipment overhauls or other unavailability during the required maintenance interval. Confusion has occurred on the method for performing online or energized testing when returning a unit to service. The revised standard should address the testing requirements and allowable timelines to perform the required maintenance. The timelines should permit the missed maintenance to be performed prior to returning the equipment to Commercial Operation. The measure for Requirement R3 should be updated to include documentation that allows for extension of the maintenance interval while the equipment is not connected to the BES.

Reclamation also recommends expanding the scope of the SAR to clarify the language used in R5 for corrective maintenance activities. Specifically, Reclamation recommends the Measure M5 state the information required to be documented for each Unresolved Maintenance Issue. Examples of documentation may include, but are not limited to work orders, invoices, project schedules with completed milestones, purchase orders, procedure and/or test results.

Reclamation requests the SDT clarify the first sentence in the “Industry Need” section. Reclamation is unsure what the present statement means; specifically, any intended correlation between the reference to “act to cease injecting current” and AVRs. Does it mean tripping the regulator? In AVR mode the regulator works by maintaining terminal voltage, not so much of injecting current. Reclamation recommends this sentence be revised and simplified for clarification.

Likes 0	
Dislikes 0	

Response

Thank your for your comment. 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.

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Robert Hirchak - Cleco Corporation - 1,3,5,6	
Answer	
Document Name	
Comment	
"Protective Functions" is used through the SAR and the current PRC-005 standard. For clarity purposes, protective function(s) should be defined.	
Likes 0	
Dislikes 0	
Response	
Thank you for your comment.	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Donald Lock - Talen Generation, LLC - 5	
Answer	

Document Name	
Comment	
Talen Energy support the comments of the NAGF.	
Likes 0	
Dislikes 0	
Response	

End of Report