Comment Report

Project Name:	2019-04 Modifications to PRC-005-6 | Standard Authorization Request (Third Posting)
Comment Period Start Date:	1/14/2021
Comment Period End Date:	2/26/2021
Associated Ballots:	

There were 44 sets of responses, including comments from approximately 123 different people from approximately 93 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. 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 often measure the same quantities and respond similarly to protective relays. Do you agree that this definition creates confusion with regards to protective functions that behave similarly to protective relays but are embedded in control systems? If you do not agree, or if you agree but have comments or suggestions, please provide your recommendation or proposed modification in the comments section.

2. The SAR drafting team determined that BES protective functions that respond to electrical quantities inside excitation systems (including analog/digital AVRs) should be clarified as included in PRC-005, in addition to BES 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 BES protective functions for 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, please provide your recommendation or proposed modification in the comments section.

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 alternative 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, please provide your recommendation or proposed modification in the comments section.

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, please provide your recommendation or proposed modification below.

5. Are there any logistical or cost considerations that would add significant burden to equipment owners trying to confirm BES 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?

6. Please provide any additional comments for the SAR drafting team to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
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
Santee Cooper	Chris Wagner	1,3,5,6		Santee Cooper	Rene' Free	Santee Cooper	1,3,5,6	SERC
					Debbie Schneider	Santee Cooper	1,3,5,6	SERC
					Paul Camilletti	Santee Cooper	1,3,5,6	SERC
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
					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
					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
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	Kim Thomas	1,3,5,6	FRCC,RF,SERC,Texas RE	Duke Energy	Laura Lee	Duke Energy	1	SERC
					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	1,3,4,5,6		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF

					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Ann Carey	FirstEnergy - FirstEnergy Solutions	6	RF
					Mark Garza	FirstEnergy- FirstEnergy	4	RF
Southern Company - Southern Company Services, Inc.	Pamela Hunter	1,3,5,6	SERC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Jim Howell	Southern Company - Southern Company Services, Inc. - Gen	5	SERC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC Regional Standards Committee	Guy V. Zito	Northeast Power Coordinating Council	10	NPCC
					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 Solutions International Inc.	5	NPCC
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 Edison Co. of New York	6	NPCC
Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC

					Nurul Abser	NB Power Corporation	1	NPCC
					Randy MacDonald	NB Power Corporation	2	NPCC
					Michael Ridolfino	Central Hudson Gas and Electric	1	NPCC
					Vijay Puran	NYSPS	6	NPCC
					ALAN ADAMSON	New York State Reliability Council	10	NPCC
					Sean Cavote	PSEG - Public Service Electric and Gas Co.	1	NPCC
					Brian Robinson	Utility Services	5	NPCC
					Quintin Lee	Eversource Energy	1	NPCC
					Jim Grant	NYISO	2	NPCC
					John Pearson	ISONE	2	NPCC
					John Hastings	National Grid USA	1	NPCC
					Michael Jones	National Grid USA	1	NPCC
					Nicolas Turcotte	Hydro-Qu?bec TransEnergie	1	NPCC
					Chantal Mazza	Hydro-Quebec	2	NPCC

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

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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 often measure the same quantities and respond similarly to protective relays. Do you agree that this definition creates confusion with regards to protective functions that behave similarly to protective relays but are embedded in control systems? If you do not agree, or if you agree but have comments or suggestions, please provide your recommendation or proposed modification in the comments section.

Donald Lock - Talen Generation, LLC - 5	
Answer	No
Document Name	

Comment

Talen Energy is of the opinion that the Protection System definition is not changing, just being clarified to note that a relay as defined in the dictionary is merely a switch – any type of switch - and can consist of a discrete device with the name "relay," a discrete device with a different name, or a line of code in the AVR or other control element. This is nothing new; the relays in a microprocessor multifunction protection unit are after all just programming, not separate physical devices. The reason that PRC-005 needs to be revised is that this point was previously excessively obscure. Making references to protective relays and separately to protective functions adds to the confusion, rather than diminishing it. All PRC-005 needs is the addition of a definition for "relay," per the first sentence above.

Likes 0	
Dislikes 0	

Response

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	No
Document Name	

Comment

Duke Energy does not agree that there is sufficient confusion to cause the Glossary Definition to be revised. As long as the scope of equipment to be included in the PSMP is clear in the PRC-005 Standard itself, we do not feel that the Glossary Definition needs to be revised at this time.

Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 3,5,6	
Answer	No
Document Name	
Comment	

For reasons expressed in the previous comment period (which are provided again in this response), AEP strongly encourages the Standards Drafting Team to abandon the scope, direction, and path proposed in the two most recent versions of this SAR, and to instead pursue the scope and direction as originally proposed in the first draft of the SAR presented to industry in July 2019. While the “Background Information” section of the project comment forms continue to reference the efforts-of and authorship-by the North American Generator Forum on the proposed SAR, it should be noted that only the very first draft of the SAR was fully authored by these subject matter experts. Since then, the SAR has been rewritten by the Standard Drafting Team in a way that AEP believes deviates from both the spirit and intent of its original authors, and which in turn, would fundamentally change the intended purpose of PRC-005. In fact, the NAGF in their previously submitted comments state that they can “no longer support” the most recent drafts of the SAR. AEP’s core concerns have been provided once again in the corresponding sections of this comment form.

As AEP has previously stated, we do 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 specifically tasked with maintaining system stability. AEP thanks the current SDT for their willingness to share our comments with a future SDT, as noted in their previous response.

Likes 0	
Dislikes 0	
Response	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No
Document Name	
Comment	

American Transmission Company (ATC) finds the existing definition of Protection System to be adequate. No confusion exists regarding protective functions inside excitation systems and control systems that are not stand-alone relays but otherwise performas a Bulk Electric System (BES) Protection System.

Likes 0	
Dislikes 0	
Response	

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 a protection function. If protection functions in generator exciter controls need to be added to the PRC-005 standard that should be dealt with outside of the definition, similar to how synchro check, 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	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
There is no confusion. The NERC definition of Protection System is clear in that it specifically states protective relays. If the intent of the SAR drafting team is to redefine Protection System, then it should persue formally redefining Protection System instead of editing its own modified definition into PRC-005. By the SAR drafting team's logic, applying this modified definition of Protection System only to PRC-005 could create equal confusion in the other standards where the NERC defined Protection System term is used.	
Likes 0	
Dislikes 0	
Response	
Chris Wagner - Santee Cooper - 1,3,5,6, Group Name Santee Cooper	
Answer	No
Document Name	
Comment	
Santee Cooper does not agree that the NERC Glossary definition of Protection System should be changed. A change to the NERC Glossary definition of Protection System could have unintended or unnecessary impact to other NERC standards and support documents that would be outside of the scope of this SAR.	

Applicability should be explicitly clarified within the PRC-005 standard, with consistent supporting guidance in the Supplementary Reference and FAQ document.	
Likes 1	Snohomish County PUD No. 1, 3, Chaney Holly
Dislikes 0	
Response	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
While Tacoma Power agrees that the Protection System definition is currently limited to “relays” responding to electrical quantities and other systems associated with “relays” and that there may be value in revisiting the definition of Protection System and review as to whether it should include other physical assets that replicate the functionality of “relays” in protecting the BES. However, the impact of changing the definition may have consequence on Standards beyond PRC-005. Since this SAR was initiated from the perspective of explicitly including protection within the exciter that are duplicating relay functions, Tacoma Power does not support using this PRC-005 platform/ forum to recommend a definition change. Tacoma Power recommends a separate SAR to update the NERC Glossary definition, appropriately scoped to include all applicable PRC Standards (not limited to PRC-005). This approach is consistent with Project 2016-02 that’s holistically addressing impacts of definition changes to multiple CIP Standards.	
Likes 0	
Dislikes 0	
Response	
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. The NERC Protection System definition is used throughout many NERC Standards and the scope of the SAR does not include verification of the proposed Protection System definition and its impact on other Standards.	
Likes 0	
Dislikes 0	
Response	

Joe McClung - JEA - 1,3,5	
Answer	No
Document Name	
Comment	

These comments have been endorsed by LPPC and APPA:

Changes to the Definition to the Protection System should not be expanded to include the protective functions of excitation or other control systems. PRC-005-6 as a standard is expressly designed for protection systems that already include generator protection.

Expanding the definition of Protection Systems only serves to broaden the definition to include numerous new pieces of equipment to test that do not provide a great deal of value to increasing reliability.

A change to the NERC Glossary definition of Protection System could have unintended or unnecessary impact to other NERC standards and support documents that would be outside of the scope of this SAR.

Applicability should be explicitly clarified within the PRC-005 standard, with consistent supporting guidance in the Supplementary Reference and FAQ document.

Likes 2	Snohomish County PUD No. 1, 3, Chaney Holly; Joe Tarantino, N/A, Tarantino Joe
Dislikes 0	

Response

Greg Davis - Georgia Transmission Corporation - 1	
Answer	No
Document Name	
Comment	

Comments: No, the Protection System definition defines a set of parameters that are known and understood within the industry. Additionally, this term is used in multiple other standards and modifying such an important definition can affect those standards in ways which the SAR drafting team has either not considered or is failing to publicly document. If any items need clarification or addition to, we recommend adding it to the standard as stand alone items (see Automatic Reclosing within the standard as an example). Otherwise, request for clarification from electric utility entities for those items under question. The applicability of the standard adequately defines the aspects of a Protective System. Industry cannot define all specific terms in a standard, as it will become to onerous and demanding of participants in applying compliance. As NERC said in its response to Xcel's RFI to this question in 2016, this is unnecessary because "the meaning of the Reliability Standard is plain on its face":

https://www.nerc.com/pa/Stand/SARandRFI/SC%20Response%20to%20Xcel%20RFI%20-%20PRC-005-6.pdf.

Also, from this same document, NERC stated "it is clear that these embedded protective functions, if enabled, would be included in the scope of Reliability Standard PRC-005-6 as set out in the Applicability section of the standard."

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
Xcel Energy does not believe the definition of Protection System should be changed. Any additional clarity needed could be added in the applicability section.	
Likes 0	
Dislikes 0	
Response	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
Changing a definition has greater ramifications than just in this standard. If other systems need to have designated maintenance activities or intervals then those should be specified rather than trying to add them to the definition of Protection Systems.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF does not agree that the existing Protection System definition creates confusion with regards to protective functions that behave similarly to protective relays but are embedded in control systems. Any modification to the Protection System definition or creation of a new term needs to be carefully considered with regard to the use and applicability of the definition in other Reliability Standards. Evaluation of impacts to other Reliability Standards is beyond the scope of this project. Generic modification of the Protection System definition with broad control system terms may serve to propagate and worsen the apparent confusion over whether or not protective functions used in excitation control systems are included in the scope of PRC-005. It does not specifically address the issue that initiated the SAR and, worse, it leaves open to the imagination which control systems used at generating facilities would then be considered to be in scope where the word protection may be included somewhere in the description of the control system's functionality. To cause all GOs in North America to have to consider all of those other generating plant control systems in their evaluation of compliance with all NERC standards that use the defined term is neither necessary nor warranted. Therefore, we recommend that the existing PRC-005	

Supplementary Reference and FAQ be clarified to note that a relay is merely a switch, which can consist of a discrete device or a line of code, and give examples of such in-scope relays being in AVRs or other control systems. With this one clarification the existing Protection System definition is complete and readily comprehensible. We also recommend that the SDT avoid use of words such as, “like,” “similarly to,” or “the same as” traditional relays, due to risk of misinterpretation. It would be wrong, for example, to think that that a Multilin that trips an ID fan motor is part of the Protection System, because loss of this fan will take the unit offline “similarly to” a relay that opens the generator breaker.

The NAGF does not support development of a new definition for Protective Functions as we believe that it would not provide clarification as intended, instead it will contribute to more uncertainty.

Likes 0	
Dislikes 0	

Response

Christopher McKinnon - Eversource Energy - 1,3

Answer	No
Document Name	

Comment

Eversource recommends modifying the NERC Glossary of Term, 'Protection System Maintenance Program ' instead of the term 'Protection System'. Adding in Excitation systems to that definition would be consistent with NERC including ‘Automatic Reclosing, and Sudden Pressure Relaying Components’ to that definition.

Likes 0	
Dislikes 0	

Response

M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority

Answer	No
Document Name	

Comment

The existing definition of Protection Systems creates confusion only when attempting to apply it to digital AVRs or other control systems. TVA could support the definition of an additional term, such as “BES Protective Function,” provided the following is encompassed:

1. The fundamental measured quantity is electrical;
2. Secondary electrical signal(s) produced or transduced in the sensing circuits do not qualify for applicability;
3. A breadth of examples of non-applicable control functions are provided;
4. Applicable functions are those that would otherwise be implemented in a protective relay; and
5. Applicable functions are installed or configured to

a. Detect faults on non-generating BES Elements (from section 4.2.1 in PRC-005- 6); or

b. Act upon generator Facilities that are part of the BES (from sections 4.2.5 and 4.2.6 in PRC-005 -6).

For example, a control function that responds to a thermocouple input would not be a “BES Protective Function.” The thermocouple produces an electrical signal that responds to temperature. The thermocouple’s fundamental measurement is temperature, therefore the thermocouple and any relay or control system that acts upon a BES element in response to the thermocouple, would not a BES Protection Function.

The basic criteria for applicability of a digital AVR or other control system should be restricted to include only the functions in such systems that qualify as a “BES Protection Function.” Phrases such as “may measure similar quantities and may yield a similar outcome” introduce unacceptable ambiguity to the process of determining applicability.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC

Answer	No
Document Name	

Comment

BPA suggests that the SDT reviews the defintion to allow for emerging technologies which integrate control and protective functions within the same system.

Likes 0	
Dislikes 0	

Response

Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC

Answer	Yes
Document Name	

Comment

BHC agrees there is a potential to interpret the existing wording in different ways for different systems that could be doing similar functions.

Likes 0	
Dislikes 0	

Response

Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6

Answer	Yes
Document Name	
Comment	

I suggest changing to “protective **devices** which respond to electrical quantities” and “communications systems necessary for correct operation of protective **devices**” for example. Basically everywhere there is relay or function in the definition change it to device so it is more generic. There is no need, nor is it practical, to include each individual device such as exciter, control system, sudden pressure relay, etc. especially as technologies evolve over time. Instead of trying to include excitation systems, control systems, etc. if a good definition for **protective device** is in the NERC glossary it would make the standard much more simple. IEEE C37.2 which defines protective device function numbers uses the word “device” rather than “relay” and is more inclusive which is the direction PRC-005 should go in order to simplify the standard.

Likes 0	
Dislikes 0	
Response	

Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF

Answer	Yes
Document Name	
Comment	

The definition of a Protection System does not include protection functions inside of a control system. We believe that this gap results in confusion.

Likes 0	
Dislikes 0	
Response	

Kristina Marriott - First Solar, Inc. - 5

Answer	Yes
Document Name	
Comment	

We ask the SDT to take into consideration that exemption of wind turbines, as it may cause some further confusion on how to maintain certain systems. Ex: GE Wind turbines are equipped with a solid-state AC excitation system. The AC excitation is supplied through an AC-DC-AC converter, and depending on the wording that is used, it could bring these systems into scope.

Likes 0	
Dislikes 0	
Response	

Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
Reclamation supports clarifying the scope of PRC-005 to include BES protective functions enabled 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. Reclamation also recommends the SDT provide additional clarification in the PRC-005 Supplementary Reference and FAQ document.	
Likes 0	
Dislikes 0	
Response	
Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF	
Answer	Yes
Document Name	
Comment	
If the Standard Drafting Team chooses to revise the definition of Protective System, then as promised in the SAR, please carefully review other standards to determine the impact of the new definition.	
Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Yes
Document Name	
Comment	
A clear definition needs to be provided for “other control systems”, without it there is no limit to what could be included.	
Likes 0	
Dislikes 0	
Response	

Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
We feel this definition does omit protective functions in the excitation and other control systems that respond to electrical quantities and would need to be clarified toward expectations.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	

The MRO NSRF understands that additional clarity may be needed due to evolving technologies. The MRO NSRF remains concerned about burdensome scope creep into non-electrical systems, systems that don't trip BES generators directly, non-BES transmission systems and distributed generation systems below the point of interconnection or aggregation.

The MRO NSRF recommends any changes be specific, narrow and designed to avoid unintended expansions. The NERC Protection System definition is used throughout NERC standards or is used as a scope reference throughout the NERC standards. Expanding PRC-005-6 testing into distributed generation would be inefficient, cost prohibitive and would not provide a reasonable reliability improvement compared with the burden imposed. A suggested revision is as follows:

The SAR team indicated they were interested in various options.

Option 1 – Add one or more Facility Applicability criteria entries in PRC-005-6 to specifically add what the SAR drafting team believe is causing confusion. Those entries can be:

4.2.8 Protective devices and controls that perform one or more of the IEEE C37.2 listed protective function as a protective relay, which respond to measured protective electrical signals (not just any electrical sensor) and trip BES generators directly.

4.2.9 Protection System Exclusions:

- Protective devices and control systems listed above below the point of aggregation.
- Protective devices and control systems listed above affecting aggregate plants less than 75 MVA.
- Protective devices and control systems listed above on collectors systems with less than 75 MVA of aggregate generation.
- Protective devices and control systems listed above less than a 20 MVA single shaft generator.
- Protective devices and control systems listed above for non-electricals systems.
- Protective devices and control systems listed above that don't trip plants generators directly.
- Protective devices and control systems listed above for DER that aggregate to less than 75 MVA at a single Point Of Interconnection

Option 2

Modify the Protection System definition directly.

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

Protection System Exclusions:

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- Protective devices and control systems listed above less than a 20 MVA single shaft generator.
- Protective devices and control systems listed above for non-electricals systems.
- Protective devices and control systems listed above that don't trip plants generators directly.
- Protective devices and control systems listed above for DER that aggregate to less than 75 MVA at a single Point Of Interconnection

Examples of unintended consequences:

Protection System is used several times in the TPL-001-5 standard and specifically references in Footnote 13. Without clear boundaries the expansion of the Protection System definition could drive:

- The required duplication of all BES generator AVR, excitation, and controls.
- Redundant protection systems in individual generating resources, meaning every individual solar inverters and wind turbines.

Questions for the MRO NSRF?

- Should the MRO NSRF request a definition for "**Protective Device**" in the NERC glossary?
- Would a NERC glossary definition make the standard simpler or more effective?
- Should the Protective Device definition align with the IEEE C37.2 which defines protective device function numbers uses the word
- Should the MRO NSRF suggest a "**Protection System**" definition or a NERC glossary "device" rather than "relay"? Would such an IEEE C37.2 definition be better or worse?
- Is there a connection between PRC-004 and PRC-005 through the Protection System definition and interrupting devices? Could this expand the Protection System definition further and should something be added to the Protection Definition to clarify there is a connection?
- For PRC-004, when a BES interrupting device operates, and this "interrupting device" can operate via a protective device, in a control system, or by a DC technology does that open a risk of increased Protection System PRC-005-6 testing?
- Should the Protection System definition role in language that states you should maintain equipment that would operate a BES interrupting device?

Likes 0	
Dislikes 0	

Response

Douglas Webb - Great Plains Energy - Kansas City Power and Light Co. - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Evergy incorporates by reference the Edison Electric Institute's response to Q1.	
Likes 0	
Dislikes 0	
Response	

Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Texas RE agrees the definition of Protection System should be clarified. Texas RE recommends the SDT clarify section 4.2.1 of the Applicability section. As currently stated, it limits the applicability of PRC-005-6 to Protection Systems that detect faults. Those Protection Systems may not cover all Protection Systems that can trip the AVR, which should be applicable. Additionally, the currently ERO-endorsed Implementation Guidance for PRC-005-2 includes a statement that supports the need for clarification within the standard: "A control system that acts to trip the generator is excluded from PRC-005-2. A control system is not considered a Protection System and it does not detect BES faults." As a side note, the Implementation Guidance will need to be updated to address the changes that take place as a result of this SAR.	
Likes 0	
Dislikes 0	
Response	

Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	
Comment	

Modifying the current NERC definition could have unforeseen implications to other standards not under this SAR.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005

Answer	Yes
Document Name	

Comment

The SAR description and need should expain why a change in the Glossary of Terms is not a sufficient way to clarify the need for a change to the standard. It is our understanding from the NERC Webinar that the drafting team believes a change in the Glossary may conflict with how the term “protective systems” is applied in other standards.

Likes 0	
Dislikes 0	

Response

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

Answer	Yes
Document Name	

Comment

AZPS agrees that the standard is ambiguous and should be clarified. Protective functions in the excitation, DCS, and other control systems should be clearly called out and defined. AZPS reads the current intent of the standard to apply to primary generator protection only and recommends that protections in excitation, DCS, and other control systems should only be included in circumstances where it is the primary protection and not secondary or backup systems as they do not require the same rigor of maintenance.

AZPS recommends that Plant controls, lower voltage protection systems, and excitation control systems (“AVR”) that exclusively control the exciter of a generator should not be considered a protective device. Additionally, the scope of the standard should be limited to the functionality of the specific protective functions within the control system, and not pull the entirety of the control system into the standard. An excitation system that does not have specific primary protective functions should not be considered a protection system. (AZPS has provided additional details regarding this in our response to question 2 below).

Additionally, our operating experience has not shown that improperly set or malfunctioning excitation control system protection has caused any significant reliability problem. Our existing practice of maintaining robust primary generator protection has been adequate for protecting our units and has not compromised the security of the BES.

Likes 0	

Dislikes 0	
Response	
Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) feedback.	
Likes 0	
Dislikes 0	
Response	
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	
Protective relay functionally equivalent devices or systems should be added to the definition. NPCC Regional Standards Committee (RSC) recommends modifying the NERC Glossary of Term, 'Protection System Maintenance Program ' instead of the term 'Protection System.' Adding in Excitation systems to that the definition would be consistent with NERC including 'Automatic Reclosing, and Sudden Pressure Relaying Components' to that definition.	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI supports revising the current definition to clarify that protection functions supporting BES Reliability that are contained within excitation systems and certain control systems, as necessary. We offer the following modification as a possible solution to the currently approved definition for Protection System (changes shown in bold face).	

Protection System –

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

Likes 0	
Dislikes 0	

Response

Constantin Chitescu - Ontario Power Generation Inc. - 5

Answer	Yes
Document Name	

Comment

OPG concurs with the NPCC Regional Standards Committee's comments.

OPG has the following additional comment: Clarification is required regarding standard applicability to the Composite Protection Systems.

Likes 0	
Dislikes 0	

Response

Anthony Jablonski - ReliabilityFirst - 10

Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	

Response

Dan Roethemeyer - Vistra Energy - 5

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
Because the original SAR specifically requested a ruling on the applicability of PRC-005 to protection function which may be used in the digital excitation control systems on synchronous generators, an explicit response stating that inasmuch as the program code of the microprocessor based	

excitation control system may include generator protection functions which operate similar to, or functionally equivalent to, multi-function microprocessor based protective relays, they are subject to the same maintenance activities and intervals as the microprocessor based protective relays in Table 1.1 of PRC-005.	
Likes 0	
Dislikes 0	
Response	

2. The SAR drafting team determined that BES protective functions that respond to electrical quantities inside excitation systems (including analog/digital AVRs) should be clarified as included in PRC-005, in addition to BES 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 BES protective functions for 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, please provide your recommendation or proposed modification in the comments section.

Constantin Chitescu - Ontario Power Generation Inc. - 5

Answer	No
Document Name	

Comment

OPG concurs with the NPCC Regional Standards Committee's comments.

Likes 0	
Dislikes 0	

Response

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	No
Document Name	

Comment

The use of "other control systems" is too broad. Generating plant protection is not applied in wind and solar power plant controllers (PPCs) and does not need to be drawn in to the scope. Individual inverter controllers are not in the scope of controllers either according to the SAR drafting team chairman, so eliminating "other control systems" serves to clarify the scope.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	

Comment

While EEI supports modifications to PRC-005 to include protection functions within analog/digital AVRs, clarity is needed in this area as well as what is intended by "other" control systems". EEI recommends the following changes to the Scope to address AVRs.

SAR Project Scope (second paragraph suggested modification in bold):

The clarifying changes would apply to BES Protection Systems and BES protective functions applied on generators, (**REMOVE**: ***dispersed power-producing resources from the point of aggregation (greater than 75 MVA) to the point of Interconnection***) ADD: **except for those resources identified through Inclusion I4 of the BES definition**, static and synchronous condensers and other BES elements as defined. (Note: *This change should clarify that applying AVR requirements to individual aggregated resources that would not impact BES Reliability would not be required. This would also ensure consistency with the currently approved PRC-005 reliability Standard. See 4.2.5*)

Additionally, EEI recommends the phrase “other control systems” be clarified to address what is intended by “other” or “other” should be deleted.

Likes 0	
Dislikes 0	

Response

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

Please provide clarification regarding the reference to, “other control systems.”

While NPCC RSC agrees, this should be limited to only excitation systems.

Likes 0	
Dislikes 0	

Response

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

Answer	No
Document Name	

Comment

AZPS agrees that the standard is ambiguous and should be clarified but does support the generality as expressed above. Protective functions in the excitation and other control systems should be clearly called out and defined. This needs to specifically include what devices are included in the term “other control systems”. AZPS has outlined below our recommendation for defining what should be included and excluded in a control system.

1. The excitation, DCS, or other control system should only be defined as a protection system if the following conditions are met:

a. The active protection functions replicate protection that is typically provided by the primary generator protection relaying. (These functions must be specifically defined; differential protection that wraps the GSU or line distance protection would be examples of this type of function.)

b. The active protection functions in the control are used for primary protection of the unit. (Secondary or tertiary protection functions in the control system, when properly coordinated with PRC-019, would only be relied on after the failure of the primary generator protection. It would not significantly increase system reliability to include these backup systems in regular testing when the primary protection systems are typically redundant and already subject to stringent oversight.)

AZPS recommends that control systems that do not meet these criteria be excluded from being considered a protection system even if it has the capability of tripping the unit.

2. The following typical exciter, DCS, or control functions should be excluded from the scope of the standard:

a. Exciter-specific trips, such as overexcitation, underexcitation, field ground protection, component or hardware failure trips. (Including a bridge failure trip in this standard would be analogous to including things such as pump failure. The exciter itself and its internal protective functions should be considered plant hardware and outside the scope of this standard, even if those functions can trip the unit.)

b. Offline protection functions

c. Excitation system limiters

d. Exciters that only trip a unit's excitation

e. DCS and turbine control related trips, such as overspeed, and normal startup/shutdown sequences

If a GO is using an excitation system as primary generator protection, it makes sense that this system would be considered a protection system for the purposes of the standard. However, in a typical plant where excitation system trips are limited to excitation specific malfunctions or backup functions, this is unnecessary do to the minimal added reliability.

Excitation systems are unique. Unlike generator protection, a malfunctioning excitation system itself can prevent a unit from being started at all. While a protective relay can fail silently, this is less likely in an active control system that is necessary for running a unit.

Likes 0	
Dislikes 0	

Response

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. TVA does not agree with expanding applicability to include analog AVRs.

TVA disagrees with the expansion of scope in the modified SAR and the departure from existing criteria language in version 6. Specifically, the SAR broadens the application of the phrase “directly trip or trip via a lockout or auxiliary tripping relays” to include all BES Elements, instead of only generator Facilities as currently stated in PRC-005-6, and in the associated version 6 Supplementary Reference.

The 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. Applying the direct trip criteria to non-generator BES Elements represents a significant and inappropriate expansion to the applicability scope of PRC-005.

TVA supports comments by the NAGF regarding emphasis in the Supplementary Reference on the preservation of PRC-005- 6 paragraph 4.2.5.1, the qualifying criteria of the measurement of electrical quantities (the fundamental measured quantity), and the inclusion of examples.

Likes 0	
Dislikes 0	

Response

Joshua Andersen - Salt River Project - 1,3,5,6 - WECC

Answer	No
Document Name	

Comment

More data is needed to support any revision to include AVR protective functions. A lack of clarity does not necessitate its inclusion.

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	No
Document Name	

Comment

We support the comments of AEP.

Likes 0	

Dislikes 0	
Response	
Douglas Webb - Great Plains Energy - Kansas City Power and Light Co. - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	
Evergy incorporates by reference the Edison Electric Institute's response to Q2.	
Likes 0	
Dislikes 0	
Response	
Joe McClung - JEA - 1,3,5	
Answer	No
Document Name	
Comment	

These comments have been endorsed by LPPC and APPA:

No. We believe that the evolution of this SAR from its original posting to its second posting was a significant and unintended expansion. The third iteration has addressed some concerns related to that second posting, but still misses the initial purpose which was merely to clarify the applicability of PRC-005-6 to the protective functions within an Automatic Voltage Regulator (AVR) and provide the prescribed maintenance activities.

Since this was the initial clarification being sought, we believe that the scope set forth in the SAR should be limited to minor modifications on the original wording of:

"Revise PRC-005-6 to clearly define the applicability of Protection Systems associated with AVR protective functions. In addition, revise the PRC-005-6 Supplementary Reference and FAQ to provide additional guidance related to AVR protective functions and acceptable methods of testing to meet PRC005-6 required maintenance activities."

We understand that since the original posting there have been many comments and feedback associated with those comments, but we believe that a consideration of comments relating to minor modifications to the original posting would be more appropriate.

For example, specific AVR protective functions that are similar to electric protective relay functions could be included but not internal AVR or exciter functions not detected by conventional protective relays even if they can open breakers or trip generators.

We believe that this could be accomplished by way of a table modification or Applicability section revision to include any actively used protective relaying functions contained within the program logic of the excitation control system on a synchronous generator as NAGF (the originator of this SAR) has suggested in the last comment period.

However, more data is needed to support any revision to include AVR protective functions. A lack of clarity does not necessitate its inclusion.

Many of the responses in previous Consideration of Comments have dismissed these concerns, with the SAR Drafting Team taking the position that AVR protective functions are already included. Thus, the SAR Drafting Team seems to have pre-determined the end result of a clarification whereas the original scope from NAGF was to define applicability.

Where synchronous generators are fully protected with relays (in some cases redundant relays), the benefit of including BES protective functions that are enabled to trip within AVRs/control systems in PRC-005 is marginal, and does not justify the added cost to industry. Relays considered to be complete generator protection are maintained and tested per PRC-005 to prove that they will trip as needed under fault, addressing the greatest risk to the BES which would be a failure to trip under fault. Alternately, there has been insufficient evidence provided to indicate that the BES protective elements within AVRs/control systems are causing inadvertent trips that would impact the BES.

By adding the AVR protection features, to PRC-005-6, how much additional protection does that really offer? How much of an industry problem exists by AVR protection system failures? And of those failures, how many escape the Protection Systems designed to protect the generator that is already in place?

In the evaluation of risk we need to consider the probability of an event and multiply it by the impact. So what is the probability of an AVR protection feature failing? And further, what is the impact of that? Our assumption is that these failures in the AVR protection features are relatively infrequent. And as discussed above the loss is one generator. Because the failure in one AVR does not mean that there will be failures in all of them. Thus this does not pencil out as a large amount of benefit to reliability for the cost that it would take to do the maintenance.

What is that cost? The current iteration of the SAR says that we are only to consider the protective features of an AVR and not those that affect dynamic response. But what is the chance of scope creep if the industry allows control systems to be married to Protection Systems by way of definition? If the maintenance ever expands into the realm of modifying gains on the AVR or adjusting the limiters then it will require generation validation testing to be necessary. While that is improbable it is still a risk. In essence, it does not make sense to have relay technicians working in the AVR's which is the realm of protection engineers.

And to further this point – how feasible is it to do this maintenance anyway? Some of the equipment is quite old in the field. This extra maintenance may place undue stress on it in order to test it. Additionally, who would do this testing? My SME suggested that he would likely defer this maintenance to a consultancy because of the complicated matter of performing it. This would cause our utility to incur a large cost if this testing was necessary across our entire generation fleet.

By expanding the definition of Protection Systems it may be possible to cover every single eventuality of what may trip a generator offline, but at what cost? Do we eventually reach a point of diminishing returns by adding all of these components to the standard? Do we eventually make the standard so complicated that the act of carrying it out is more detrimental than valuable to reliability? In my opinion adding to the definition of Protection Systems leads us down a path that we cannot take back while offering us only marginal value to reliability. Where would the definition eventually stop? What are the boundaries of this new definition?

Likes 2	Snohomish County PUD No. 1, 3, Chaney Holly; Joe Tarantino, N/A, Tarantino Joe
Dislikes 0	

Response

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

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

Answer	No
Document Name	

Comment

Including the text "other BES element control systems…" makes the scope open ended and vague for the Standards Drafting Team. Tacoma Power recommends that the SAR limit in-scope protective functions within the AVR to electrical quantities measured at the generator terminals. Other protection functions such as those associated with the field (e.g. field ground, field current which may not be feasible to measure) and internal AVR protection (e.g. failure of the thyristor, controller failure) should be explicitly excluded.

Likes 0	
Dislikes 0	

Response

Chris Wagner - Santee Cooper - 1,3,5,6, Group Name Santee Cooper

Answer	No
Document Name	

Comment

Where synchronous generators are fully protected with relays (in some cases redundant relays), the benefit of including BES protective functions that are enabled to trip within AVRs/control systems in PRC-005 is marginal, and does not justify the added cost to industry. Relays considered to be complete generator protection are maintained and tested per PRC-005 to prove that they will trip as needed under fault, addressing the greatest risk to the BES which would be a failure to trip under fault. Alternately, there has been insufficient evidence provided to indicate that the BES protective elements within AVRs/control systems are causing inadvertent trips that would impact the BES.

Likes 1	Snohomish County PUD No. 1, 3, Chaney Holly
Dislikes 0	

Response

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
The wording of this question contradicts statements made by the SAR drafting team in the Industry Webinar on February 4, 2021. During the webinar, the SAR drafting team stated that only AC electrical quantities were within the intended scope, however in the SAR and this Comment Form, the broader term 'electrical quantities' is used. The inclusion of the broader term would greatly increase the impact of this modification and could have other unintended consequences.	
Likes 0	
Dislikes 0	
Response	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No
Document Name	
Comment	
ATC has reviewed this SAR and would like calrification added as it relates to its applicability to Generation vs. Tansmission facilitites.	
Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 3,5,6	
Answer	No
Document Name	
Comment	
As stated in AEP's previous comments, 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	
Kristina Marriott - First Solar, Inc. - 5	
Answer	No
Document Name	
Comment	
Taking into account renewable energy, we do not believe AVR's (or Automatic Voltage Controlers) should be included as part of PRC-005.	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
BPA believes these quantities are already included in PRC-005 and is performing the appropriate maintenance on them.	
Likes 0	
Dislikes 0	
Response	
Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Minnesota Power supports MRO’s NERC Standards Review Forum’s (NSRF) feedback.	
Likes 0	
Dislikes 0	

Response	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	
Comment	
Although we agree there should be clarification on this issue, there is concern with adding in those protective functions to PRC-005. Representatives from major manufacturers of such devices should be consulted to gain input as to how those functions could be tested as required by NERC. It may be more difficult than testing a traditional relay causing a great burden on the utilities to meet the requirements. Further, if added, it needs to specifically identify which functions are required to be tested/maintained as there could be several functions that the AVRs and Excitation systems perform that one may consider need to be included but do not need to be part of PRC-005. We have a concern of this scope being too broad causing other generator protective functions of the AVR to be included that should not be applicable to PRC-005, such as overspeed protection as one example.	
Likes 0	
Dislikes 0	

Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	Yes
Document Name	
Comment	
While Eversource agrees, this should be limited to only excitation systems.	
Likes 0	
Dislikes 0	

Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
The NAGF agrees that BES protective functions that respond to electrical quantities inside excitation systems should be included in PRC-005. We recommend that the existing PRC-005 Supplimentary Reference document be revised to address BES protective functions for other control systems,	

and that the draft update be issued for comments at the same time as the proposed standard PRC-005-7. Voters will then have a clear idea of what is intended by the changes being made. The Supplementary Reference document should emphasize the following points:

- Para. 4.2.5.1 of PRC-005-6 is not changing. A relay that sets in motion a chain of events leading to opening of a generator breaker is not in-scope. It must do so directly or via a lockout or auxiliary tripping relay to be part of the Protection System. An AVR V/Hz relay that opens only the excitation breaker is out-of-scope, for example, though the loss-of-excitation relay that is then triggered is a PRC-005 device. The same AVR V/Hz element would be in-scope, however, if it trips the generator breaker directly or through a lockout.

- The electrical quantities qualifier is not changing. Relays that respond to binary inputs (e.g. loss of outlet) or mechanical quantities are not part of the Protection System, even if transducers convert the mechanical signal to electrical form (e.g. speed pickups, thermocouples, vibration detectors).

The revised Supplementary Reference document should additionally include examples of Protection System relays being in devices other than traditional relays and AVRs; the NAGF has not been able to identify any such instances.

Likes 0	
Dislikes 0	

Response

Teresa Cantwell - Lower Colorado River Authority - 1,5

Answer	Yes
Document Name	

Comment

Conditional Comment: Any protective function embedded into the Excitation Controls should be coordinated with and not substituted for external protective functions. The basic fundamental of protective systems which monitor the condition of the system under control must be preserved in order to ensure the balance of reliability and safety.

Likes 0	
Dislikes 0	

Response

Greg Davis - Georgia Transmission Corporation - 1

Answer	Yes
Document Name	

Comment

As stated in denying Xcel's RFI on this topic in 2016, "it is clear that these embedded protective functions, if enabled, would be included in the scope of Reliability Standard PRC-005-6 as set out in the Applicability section of the standard." https://www.nerc.com/pa/Stand/SARandRFI/SC%20Response%20to%20Xcel%20RFI%20-%20PRC-005-6.pdf. The only caveat to adding it separately and explicitly to the existing standard would be a specification of the components addressed within proposed modification should be identified to

properly encapsulate the intent of the proposed modification and prevent unnecessary additional items from inclusion into scope outside the bounds of the original intent. The definition needs to be stand alone and added to Facilities as a defined item.	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Any protective function embedded into the Excitation Controls should be coordinated with and not substituted for external protective functions. The basic fundamental of protective systems which monitor the condition of the system under control must be preserved in order to ensure the balance of reliability and safety.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
Same resonse as in item 1 above.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	

The term “Protection Systems” should be specific in what would be applicable.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	Yes
Document Name	

Comment

We support the SAR. We suggest that maintenance frequencies are based on technology types (similar to PRC-005 eg. Monitored and unmonitored exciter control systems, 12 years vs 6 years etc.).

Implementation timeframe should be at least 2-3 years.

For digital exciters, please confirm if setting file comparison would meet maintenance requirements.

Likes 0	
Dislikes 0	

Response

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric

Answer	Yes
Document Name	

Comment

DTEE agrees that AVRs with protective functions should be included within PRC-005, however direction needs to be given as to what constitutes adequate testing for integrated systems like AVRs. Many AVR systems are built in a manner that full functional testing risks irreparable damage to the equipment, which is counterproductive to the intent of performing maintenance on these systems. Should AVRs be part of PRC-005 if the equipment has no protective function or if the protective function is disabled? A definition needs to be provided on “other BES element control systems” and “other control systems”, without a clear definition there is not a limit to what could be included by these terms.

Likes 0	
Dislikes 0	

Response

Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF

Answer	Yes
Document Name	
Comment	
Typically, excitation system testing is done by the excitation system manufacturer. It may be that the folks completing this comment form don't know what is required for testing. It would be wise to include excitation system manufacturers in the Standard Drafting Team to assure that any mandated testing can be done at a reasonable cost.	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
Reclamation supports the addition of specific protective functions outlined in the supporting tables of PRC-005 for excitation systems (including analog/digital AVRs). Reclamation recommends the SDT identify the intended components in a Table and describe the component attributes, maintenance activities, and maximum maintenance intervals. This should be documented in such a way that it clarifies the scope of other tables that some in industry believe already cover excitation system components.	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Duke Energy agrees with the SAR's scope and agree that the inclusion of this equipment in the scope of the SAR provides needed clarity. Duke suggests that the Standard Drafting Team may consider detailing the specific BES protective functions are applicable to be included an Entity's PSMP when the PRC-005 Standard is revised (i.e., which specific IEEE elements within excitation systems or other BES controls systems are applicable).	
Likes 0	
Dislikes 0	
Response	

Donald Lock - Talen Generation, LLC - 5	
Answer	Yes
Document Name	
Comment	
Please however don't call them functions, as opposed to relays - see our comments for question #1 above. Also, adding the reference to functions requires every entity to revise its procedures for PRC-005, PRC-004 etc, turning a simple clarification into a meaningful and unnecessary burden.	
Likes 0	
Dislikes 0	
Response	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
We recommend revising the Protection System definition to include these other protection functions and re-evaluate the applicability of the PRC standards.	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
They should be included by updating the NERC Glossary of Terms for Protect Systems. The individual devices should not be listed in the PRC-005 standard.	
Likes 0	
Dislikes 0	
Response	

Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
BHC would also ask for clarification regarding if limiters are considered to be a protective function. If AVR/PSSs within the generator exciters have the capability of both performing protective functions and operational limiting functions, but only use the limiting functions, would they be included in PRC-005 scope?	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
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 alternative 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, please provide your recommendation or proposed modification in the comments section.

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric

Answer	No
Document Name	

Comment

More clarity is needed on “alternative Protection System Station DC supply technology”, the standard already addresses “emerging technology”. An explanation is needed on where the confusion is that requires changes to the standard.

Likes 0	
Dislikes 0	

Response

LaTroy Brumfield - American Transmission Company, LLC - 1

Answer	No
Document Name	

Comment

ATC does not support proposed modifications to the “PRC-005-6 applicability to AVR protective functions” SAR, because the description of technologies and associated reliability gaps have not been adequately defined in the SAR and as a result, ATC does not understand the impact that the revision may have on the scope of PRC-005. When alternative battery technologies are identified and requirements can be defined with some prescriptiveness, ATC would likely support adding such alternative battery technologies to existing Table 1-4(d) or a new table with similar requirements.

Likes 0	
Dislikes 0	

Response

Bruce Reimer - Manitoba Hydro - 1,3,5,6

Answer	No
Document Name	

Comment

We think that 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

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	No
Document Name	

Comment

This issue seems fall outside the original subject of the SAR, relating to protection functions within AVRs, and should be separated into its own SAR.

Likes 0	
Dislikes 0	

Response

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

Answer	No
Document Name	

Comment

Tacoma Power agrees that PRC-005 should be expanded to include alternative Protection System Station DC supply technologies (battery-based and non-battery-based). However, as noted by other commenters, a separate SAR should be initiated to address these changes.

Likes 0	
Dislikes 0	

Response

Joe McClung - JEA - 1,3,5

Answer	No
Document Name	

Comment

These comments have been endorsed by LPPC and APPA:

This part of the SAR seems to be the most logical addition to PRC-005-6 because it does talk about adding technologies that pertain to the existing definition of Protection Systems. There is surely a need to modify the tables in the existing standard so that it will include the new technology of batteries – such as Lithium Ion – that currently are not given guidance on how to maintain them. Additionally, the charging systems for those units may need additional clarity for maintenance. Adding this information to the existing standard only aims to strengthen a current weakness and will add value.

However, as it is lumped into the SAR with the proposed changes to the Protection System definition it kind of has the feeling of a “poison pill”, in that to accept and implement the necessary changes to DC systems and accompanying technologies the industry in theory has to accept the changes to the Protection System definition. This may not be by design, but it certainly complicates that matter. With that said the proposal to include new battery technologies should be in its own SAR, separate from the other pressing matters at hand.

Likes 2	Snohomish County PUD No. 1, 3, Chaney Holly; Joe Tarantino, N/A, Tarantino Joe
Dislikes 0	

Response

Greg Davis - Georgia Transmission Corporation - 1

Answer	No
Document Name	

Comment

Is this request based on known technologies? If we do not have experience or recommendations for testing, the devices should not be included. In addition, if this is not a technology that the industry, as a majority, is accepting then the request should not be granted in this SAR. Dictating maintenance procedures on a technology that most entities have no experience with is jumping the gun. Guidelines on how these devices should perform in various scenarios should be the focus (of other standards, not PRC-005) until more experience is gained on their performance and maintenance needs.

Likes 0	
Dislikes 0	

Response

Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC

Answer	No
Document Name	

Comment

Xcel Energy believes this significant expansion of the original SAR is problematic. These DC technologies should be addressed in a seperate SAR.

Likes 0	
Dislikes 0	

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

TVA does not support inclusion of this scope in the proposed changes in the SAR at this time. The description of the potential new technology and any associated reliability gaps have not been adequately stated and explained in the SAR.

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 activates 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 maintenance requirements.

TVA supports the NAGF comments that the standard should not implicitly prohibit the use of alternative Protection System Station DC Supply technologies (battery-based and non-battery-based), but should ensure that they are subject to maintenance requirements in a technology neutral manner to the extent possible.

Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	No
Document Name	
Comment	

The expansion of the scope of the SAR to include the mentioned direct current (DC) supply technologies is not necessary. The standard does not need to specifically address battery-based station DC technologies which are not currently specified by PRC-005 and does not need to consider other emerging technologies, both battery-based and non-battery-based for the following reasons:

1) The protection system covered by the existing PRC-005 standard applies to the portion of the generating plant protection system which, when it operates, will remove from service either a single generator whose MVA capability is > 20MVA or an aggregate loss > 75 MVA. This specification already covers any plant type or configuration, regardless of the generation technology being used.

2) As the generating plant power collection design includes the aggregation of inverter-based power conversion elements into a common collection point, the total possible power may exceed 75MVA at some point in the aggregation. The protection systems and the maintenance required for those protection systems are already included in the scope of PRC-005. Any new technology would also be included, regardless of the type of technology or the mention of specific technology within PRC-005.

3) Beginning to itemize the types of generation technologies, which continually evolve, in a standard causes the standard to continually be in need of revision to add/remove technologies as the evolution occurs. This is not necessary – the topic of the protection system and its maintenance can, is, and should be addressed in a generation technology independent manner.	
Likes 0	
Dislikes 0	
Response	
Kristina Marriott - First Solar, Inc. - 5	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
DC systems should be included but more in general and remove specific requirements for specific types of batteries. The intent is that protective devices operate for a fault to isolate them from the BES. The DC testing requirements for specific battery types should be removed and the requirements made more generic. For example, “test DC supply system to ensure it is capable of supplying power to the protective devices for a minimum of 30 seconds* in the event of a power failure”. It is impractical to try and list all of the possible types of batterries/technologies and dictate the testing requirements for each type of technology out there. (*The time of 30 seconds is just an example, but requiring a long time period is unnecessary since sensing and tripping times for an event are typically fractions of a second.)	
Likes 0	
Dislikes 0	
Response	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes

Document Name	
Comment	
We agree that all DC supply technologies should be included in the standard. Since the standard is otherwise prescriptive in its requirements, general catchall requirements must be flexible on testing and maintenance expectations.	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
For the forthcoming Standard Revision, PSMP requirements for alternative Protection System Station DC supply technologies (battery-based and non-battery-based) should consider IEEE recommendations.	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
The term “alternative” does not provide sufficient clarity. It is still unclear which technologies that do not use conventional batteries are intended to be included. Reclamation recommends the SDT identify the specific technologies that are intended to be included and define these in the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 3,5,6	
Answer	Yes

Document Name	
Comment	
As stated in AEP's previous comments, the drafting team may wish to also consider how their proposed revisions may or may not be impacted by continuing, future innovations in technology. AEP thanks the current SDT for their willingness to share our comments with a future SDT, as noted in their previous response.	
Likes 0	
Dislikes 0	
Response	
Chris Wagner - Santee Cooper - 1,3,5,6, Group Name Santee Cooper	
Answer	Yes
Document Name	
Comment	
Santee Cooper agrees that PRC-005 should address all implemented Protection System Station DC supply technologies and include required maintenance activities applicable per technology. However for voting purposes, the additional SAR that was submitted regarding battery maintenance for non-traditional battery technologies should be separate from the original SAR submitted by the NAGF requesting clarity within PRC-005 regarding protective functions within AVRs.	
Likes 1	Snohomish County PUD No. 1, 3, Chaney Holly
Dislikes 0	
Response	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	Yes
Document Name	
Comment	
WEC Energy Group supports the development of NERC Reliability Standards that are technology neutral.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	

Answer	Yes
Document Name	
Comment	
Same resonse as in item 1 above.	
Likes 0	
Dislikes 0	
Response	
Douglas Webb - Great Plains Energy - Kansas City Power and Light Co. - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Evergy incorporates by reference the Edison Electric Institute’s response to Q3.	
Likes 0	
Dislikes 0	
Response	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Any DC supply system technology should have to meet the same reliability as tradition DC systems.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	

Comment
The NAGF agrees that the standard should provide for the use of alternative Protection System Station DC supply technologies (battery-based and non-battery-based), and ensure that they are subject to maintenance requirements. However, addressing such alternative technologies in PRC-005 standard should be performed in a technology neutral manner to the extent possible.

Likes 0	
Dislikes 0	

Response

Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	

Comment
We agree on inclusion; however, we have concern of the inclusion being too broad and open for interpretation. The addition should allow for such inclusion but have some specifics as to provide clarity.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	Yes
Document Name	

Comment
PRC-005-6 Table 1-4(d) currently includes station DC supply that is not a battery: “Any Protection System station dc supply not using a battery and not having monitoring attributes of Table 1-4(f).” The SAR should clarify why this Table does not include non-battey based DC supplies.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI supports the development of NERC Reliability Standards that are technology neutral.	
Likes 0	
Dislikes 0	
Response	
Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
Maintenance issues for alternative to lead-acid and nickel cadmium batteries are being considered for installation in protection and control environments within functional entities transmitting electricity to and through the grid. This standard addresses minimal maintenance requirements for the dc power supplies including the traditional electrochemical technology used to provide critical backup power when AC electricity that permits the critical loads to function fails. If alternative technologies are permitted to engage in this function, minimal maintenance functions should be identified and included in this standard. Additionally, there is a very misleading and thereby a potentiall liable situation with in which Table 1.4.a and 1.4.b is published. This needs to be addressed and clarified in such a way as to make the requirements within the table accuarate. To establish a seperate SAR when this drafting team will function to update the standard, both of these issues need to be addressed within the required tasks of this drafting team.	
Likes 0	
Dislikes 0	
Response	
William Cantor - Test Products, Inc. - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	

The current battery requirements are very specific to lead-acid and nickel-cadmium batteries only. When other technologies are used (and they are being used today), some or most of the current battery maintenance requirements will be not applicable and critical maintenance activities specific to other battery technologies will be completely overlooked.

In addition, there are requirements in the existing tables (Table 1-4(a), 1-4(b), 1-4(f)) that are being misinterpreted. This misinterpretation may have serious implications to the reliability of the station batteries. As someone who helped develop the original wording, the intent of the requirements is clear when interpreted in conjunction with the supplemental materials. However, it appears that the supplemental materials are being ignored which enables the misinterpretation. It would take a minimal effort to adjust the wording in the aforementioned tables to make it clearer to the true intent.

Likes 0	
Dislikes 0	

Response

Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC

Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	

Response

Anthony Jablonski - ReliabilityFirst - 10

Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	

Response

Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF

Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
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	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
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	

Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	
Document Name	
Comment	
Minnesota Power supports MRO’s NERC Standards Review Forum’s (NSRF) feedback.	
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, please provide your recommendation or proposed modification below.

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	No
Document Name	
Comment	
This issue seems fall outside the original subject of the SAR, relating to protection functions within AVRs, and should be separated into its own SAR.	
Likes 0	
Dislikes 0	
Response	

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
UFLS systems are critical to the reliability of the BES and should therefore be maintain under this Reliability Standard. For this reason, we are supportive of adding UFLS only DP as an Applicable Functional Entity.	
Likes 0	
Dislikes 0	
Response	

Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Minnesota Power supports MRO’s NERC Standards Review Forum’s (NSRF) feedback.	
Likes 0	

Dislikes 0	
Response	
Greg Davis - Georgia Transmission Corporation - 1	
Answer	Yes
Document Name	
Comment	
Since NERC approved this registration, adding it as a Functional Entity applicable with this standard makes sense.	
Likes 0	
Dislikes 0	
Response	
Douglas Webb - Great Plains Energy - Kansas City Power and Light Co. - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Evergy incorporates by reference the Edison Electric Institute’s response to Q4.	
Likes 0	
Dislikes 0	
Response	
Thomas Breene - WEC Energy Group, Inc. - 3,4,5,6	
Answer	Yes
Document Name	
Comment	
No comments	
Likes 0	
Dislikes 0	
Response	

Thomas Foltz - AEP - 3,5,6	
Answer	Yes
Document Name	
Comment	
AEP concurs that this class of Distribution Providers should be listed as Applicable Entities since their ULFS-enabled equipment can contribute to positive system frequency corrections during broader transmission network under frequency events, and are understood to be a planned part of certain Emergency Operating Plans. Further, the Drafting Team may need to give consideration to UVLS assets that are owned by the Distributon Providers as well.	
Likes 0	
Dislikes 0	
Response	
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	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
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	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Joe McClung - JEA - 1,3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Kristina Marriott - First Solar, Inc. - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	
Comment	
The IRC Standards Review Committee defers comment on this question to asset owners.	
Likes 0	
Dislikes 0	
Response	
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.	
Likes 0	

Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	
No comments.	
Likes 0	
Dislikes 0	
Response	
Chris Wagner - Santee Cooper - 1,3,5,6, Group Name Santee Cooper	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	

5. Are there any logistical or cost considerations that would add significant burden to equipment owners trying to confirm BES 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?

Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF

Answer	No
Document Name	

Comment

These elements are generally managed through vendor contracts. As such, the technical expertise for these systems lies with the manufacturer. This will result in a new way of managing and ensuring compliance with Protection Systems for some entities. However, this is not an insurmountable obstacle that should prevent the inclusion of these technologies in the Protection System definition.

Likes 0	
Dislikes 0	

Response

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy

Answer	No
Document Name	

Comment

Duke suggests that the Standard Drafting Team may consider detailing the specific BES protective functions are applicable to be included an Entity's PSMP when the PRC-005 Standard is revised (i.e., which specific IEEE elements within excitation systems or other BES controls systems are applicable). If these protective functions are well-defined in the forthcoming Standard Revision and there is a sufficiently lengthy implementation timeline for the Standard Revision, then Duke does not forsee any logistical or cost considerations that would add significant burden.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5

Answer	No
Document Name	

Comment

Many entities will need to hire a contractor for AVRs and the like, while they handle relays with in-house personnel, but this is just a normal part of running a power plant.	
Likes 0	
Dislikes 0	
Response	
Maryanne Darling-Reich - Black Hills Corporation - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Greg Davis - Georgia Transmission Corporation - 1	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Amy Casuscelli - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	No
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
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	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	Yes
Document Name	
Comment	
This will increase the cost and burden for those wishing to keep these protective devices in service. Realistically, most will remove the tripping capabiltity of these devices in order to remove the liability with this standard and just have them alarm. Typical contractors that test relays are not the same contractors that would typically test exciters, control systems, etc. This means that companies will have to hire individual contractors for each type of system to validate each of these devices which increases the cost to companies to have this work completed.	
Likes 0	
Dislikes 0	
Response	
Kristina Marriott - First Solar, Inc. - 5	
Answer	Yes
Document Name	
Comment	

Only require these for facilities that have a particular impact, exceed a particular MW value, or are considered Black Start facilities.

Likes 0	
Dislikes 0	

Response

Richard Jackson - U.S. Bureau of Reclamation - 1,5

Answer	Yes
Document Name	

Comment

Reclamation recommends that having specific protective functions for excitation systems (including analog/digital AVRs) outlined in the supporting table would minimize the logistic and cost effects of this revision.

Likes 0	
Dislikes 0	

Response

Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric

Answer	Yes
Document Name	

Comment

AVR integrated systems make it difficult to test the protection functions without risking damage to the system. This is counterproductive to the intent of performing maintenance work on equipment. There is significant impact on the logistics and cost for maintaining this equipment without directions for testing procedures for this equipment. DTEE suggests a meter check (validate current and voltage values) is performed and validate that the DC control circuit operates correctly. Additionally, “other control system” requires further definition.

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 3,5,6

Answer	Yes
Document Name	

Comment

As stated in AEP's previous comments, 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. AEP thanks the current SDT for their willingness to share our comments with a future SDT, as noted in their previous response.

Likes 0	
Dislikes 0	

Response

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

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	Yes
Document Name	

Comment

While the newest excitation systems may have a maintenance or a test mode where tripping functions can be forced, it is very likely that testing of tripping functions on older excitation systems will not be able to be conducted with the unit offline. A functional test will be exceedingly difficult to coordinate and conduct, causes unnecessary wear on the unit, and risks damage. If testing is even possible, many Generator Owners will be forced to rely upon expensive third party consultants to conduct it. Testing may also require temporary settings adjustments, including disabling limiters, that introduce unnecessary risk.

Likes 0	
Dislikes 0	

Response

Chris Wagner - Santee Cooper - 1,3,5,6, Group Name Santee Cooper	
Answer	Yes
Document Name	
Comment	

Excitation System testing is not a skill found in most medium to small entity's own toolset. This means that a large number of Generator Owners will be competing for the same few capable vendors or a smaller number of OEMs.. The industry can't get a jump start on performing the testing because the requirements have not been identified..

Testing Excitation systems and similar elements in control systems while the unit is operating carries significant risk. For this reason outage schedules must be considered during any implementation plan.

Vendor performed testing for a generation fleet can be a significant cost. In addition to the cost of a vendor, personnel from multiple departments may be required to manage logistics and risk of a vendor performing testing in protection circuits. Not for profit entities must budget these expenses in advance which can take up to 2 years.

All of the items above must be taken into consideration during the consideration of an implementation plan.

Likes 1	Snohomish County PUD No. 1, 3, Chaney Holly
Dislikes 0	
Response	

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.

Likes 0	
Dislikes 0	
Response	

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

If the scope of PRC-005 is expanded to include “other BES element control systems,” then there are significant cost implications. Limiting the scope of protective functions within the AVR to electrical quantities measured at the generator terminals would minimize the cost impacts.

Likes 0	
Dislikes 0	

Response

Joe McClung - JEA - 1,3,5

Answer	Yes
Document Name	

Comment

These comments have been endorsed by LPPC and APPA:

By adding the AVR protection features, to PRC-005-6, how much additional protection does that really offer? How much of an industry problem exists by AVR protection system failures? And of those failures, how many escape the Protection Systems designed to protect the generator that is already in place?

Furthermore how many of these AVR failures cause the entire power plant to go into an outage? If the AVR protection system fails then the generation relaying will certainly open the circuit breaker and leave the remaining generation online. In effect this extra maintenance will only benefit the power plant and likely have little or no impact on the reliability of the larger BES.

In the evaluation of risk we need to consider the probability of an event and multiply it by the impact. So what is the probability of an AVR protection feature failing? And further, what is the impact of that? Our assumption is that these failures in the AVR protection features are relatively infrequent. And as discussed above the loss is one generator. Because the failure in one AVR does not mean that there will be failures in all of them. Thus this does not pencil out as a large amount of benefit to reliability for the cost that it would take to do the maintenance.

What is that cost? The current iteration of the SAR says that we are only to consider the protective features of an AVR and not those that affect dynamic response. But what is the chance of scope creep if the industry allows control systems to be married to Protection Systems by way of definition? If the maintenance ever expands into the realm of modifying gains on the AVR or adjusting the limiters then it will require generation validation testing to be necessary. While that is improbable it is still a risk. In essence it does not make sense to have relay technicians working in the AVR’s which is the realm of protection engineers.

And to further this point – how feasible is it to do this maintenance anyway? Some of the equipment is quite old in the field. This extra maintenance may place undue stress on it in order to test it. Additionally who would do this testing? My SME suggested that he would likely defer this maintenance to a consultancy because of the complicated matter of performing it. This would cause our utility to incur a large cost if this testing was necessary across our entire generation fleet.

By expanding the definition of Protection Systems it may be possible to cover every single eventuality of what may trip a generator offline, but at what cost? Do we eventually reach a point of diminishing returns by adding all of these components to the standard? Do we eventually make the standard so complicated that the act of carrying it out is more detrimental than valuable to reliability? In my opinion adding to the definition of Protection Systems leads us down a path that we cannot take back while offering us only marginal value to reliability. Where would the definition eventually stop? What are the boundaries of this new definition?

Likes 2	Snohomish County PUD No. 1, 3, Chaney Holly; Joe Tarantino, N/A, Tarantino Joe
Dislikes 0	

Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	

There are serious logistical cost impacts. The cost and burden could easily double or more as contractors that test relay are typically different from generator excitation and controls testing contractors.

Increased cost and burden could result in the removal of tripping capability of these devices in order to remove the cost and burden with the Protection System definition clarification and expansion. Alternately, companies could be forced to hire specialized personnel to test.

Alternately, modifying the NERC Protection System definition could have far ranging impacts on all NERC standards. Expanding PRC-005-6 testing into distributed generation would be inefficient, cost prohibitive and would not provide a reasonable reliability improvement compared with the burden imposed. Specific exclusions are needed to keep the Protection System definition from applying to distributed generation systems below the point of aggregation.

Likes 0	
Dislikes 0	
Response	
Douglas Webb - Great Plains Energy - Kansas City Power and Light Co. - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	

Evergy incorporates by reference the Edison Electric Institute's response to Q5.

Likes 0	
Dislikes 0	
Response	
Dan Roethemeyer - Vistra Energy - 5	
Answer	Yes
Document Name	
Comment	

Depending on equipment or technology, testing of these additional protective functions could require a different skill set than is typical for a GO (i.e. exciter/AVR manufacturer expertise could be needed at significant additional cost).	
Likes 0	
Dislikes 0	
Response	
Joshua Andersen - Salt River Project - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
The excitation systems have voltage limits that drop the unit. Those elements are coordinated with traditional protection functions but are not protection devices or serve as a protection system. The relays are the devices that are set to prevent damage to the generator not the limits within the excitation system. They are a control system that will limit the capability of the generator. SRP does not consider other systems that are used in automatic voltage regulation to be a protective function either.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
There are the potential logistical issues and expenses associated with the use of OEM services to verify settings for AVR and other control systems as generation facility personnel may not have the knowledge to perform such activities on proprietary equipment.	
Likes 0	
Dislikes 0	
Response	
Scott Langston - Tallahassee Electric (City of Tallahassee, FL) - 1,3,5	
Answer	Yes
Document Name	

Comment
The SAR drafting team should get input from the industry on the difficulties to perform such tests. See comment from (.a-b-50972). Also see comment related to cost (.a-b-50966)

Likes 0	
Dislikes 0	

Response

M Lee Thomas - Tennessee Valley Authority - 1,3,5,6, Group Name Tennessee Valley Authority

Answer	Yes
Document Name	

Comment
A significant burden to equipment owners will result from the expansive applicability of PRC-005 to protective relay functions within the broad groups 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 the necessary associated training content. Implementation of newly required maintenance activities will invariably be scheduled concurrent with generating unit or other Facility outages. Due to these and other unexpected logistical challenges, coupled with the existing confusion regarding these imbedded protective functions, 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 based on component maintenance intervals, commensurate with those of the existing PRC-005-6 implementation plan, but starting with a new baseline date related to the effective date of the new version of PRC-005.

Likes 0	
Dislikes 0	

Response

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

Answer	Yes
Document Name	

Comment
The costs will depend on the degree of PRC-005 changes made. If the testing scope is defined to a narrow bandwidth such as checking contacts and verifying trip string continuity costs will be minor. If the scope is broadened to include AVR's as a protection device then substantial costs and engineering re-designs will be expected.

AZPS recommends that the SAR scope be limited to excitation, DCS, and other control systems that are used as primary generator protection. Existing excitation systems, especially for smaller units, are not engineered to the level of redundancy that is typical of BES station equipment. Unlike protective relays, an excitation control system is typically distributed across several physical devices. It expects to monitor all aspects of a running generator, not simply line voltage and current. Depending on how the standard is written, testing would typically be significantly more complex than bench testing a standalone relay. Additionally, depending on the design of the system, testing may be very invasive and involve system modifications and settings changes to make offline testing possible. Mistakes during this process could directly result in damage to the unit, while the testing itself would only provide a small reliability benefit. These modifications themselves introduce the potential for error and reduced reliability.

Properly set generator protection is adequate to provide the necessary protection to a generator. Including all or most excitation control systems in this standard would create a significant amount of work and expense for minimal reliability benefit.

In addition, 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

Jamie Monette - Allete - Minnesota Power, Inc. - 1

Answer	Yes
Document Name	

Comment

Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) feedback.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	Yes
Document Name	

Comment

EEI member companies are unable to address whether there are any logistical or cost consideration because the current scope is not clear. (see our comments for Question 2).

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
BPA believes the scope of this SAR, and subsequent Standard revision(s), could have additional cost and logistical tasks depending on how the Generator interpretes the requirements of PRC-005.	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF	
Answer	
Document Name	
Comment	
Typically excitation system testing is done by the excitation system manufacturer. This may not be a significant burden but will likely result in a cost that is much higher than the cost of testing relays.	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE does not have comments on this question.	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	
Comment	

No response provided	
Likes 0	
Dislikes 0	
Response	

6. Please provide any additional comments for the SAR drafting team to consider, if desired.

Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	
Document Name	

Comment

OPG concurs with the NPCC Regional Standards Committee's comments.

OPG has the following additional comment: In line with the latest revision of this SAR the following paragraph from page #3 should be corrected as follows: "PRC-005 will be modified to provide clarity on the inclusion of BES protective functions enabled within excitation systems (analog/digital AVRs), and BES protective functions enabled within other control systems, that respond to electrical quantities and ***or*** (delete"or") trip BES elements either directly or via lockout or auxiliary tripping relays."

The word "OR" could only be used if other protection methods are being considered in addition to tripping.(i.e. current limitation).

Likes 0	
Dislikes 0	

Response

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

The project scope should be modified to clearly identify the intent as it relates to generation with is determined to be BES under Inclusion I2 of the BES definition and those that are considered to be captured under I4 of the BES definition. Specifically, the following section should be modified:

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

The section "BES protective functions applied to generators" could be interpreted to capture the individual generation resources of a dispersed power facility as these resources are technically captured under the I4 inclusions of the BES Definition. Clarification can be provided as follows:

"The clarifying changes would apply to BES Protection Systems and BES protective functions applied on generators *identified as applicable to Inclusion I2 of the BES Definition*, 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.

Likes 0	

Dislikes 0	

Response

Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	
Document Name	

Comment
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) feedback.

Likes 0	
Dislikes 0	

Response

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

Comment
AZPS recommends that any changes to PRC-005 provide specification on the type of testing that is acceptable to meet the requirement.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2, Group Name SRC PRC005	
Answer	
Document Name	

Comment
If the SAR is to be pursued then this sentence in the Detailed Description Section on Page 3 should be changed as follows "PRC-005 will be modified to provide clarity on the inclusion of BES protective functions enabled within excitation systems (analog/digital AVRs), and BES protective functions enabled within other control systems, that respond to electrical quantities and or trip BES elements either directly or via lockout or auxiliary tripping relays."

As written that wording doesn't conform with the description in the industry need section.

Likes 0	
Dislikes 0	

Response

Christopher Searles - IEEE Energy Storage and Stationary Battery Committee - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

Please give serious consideration to the information contained in my comment to Question 3. There is a positive solution that will eliminate the controversy that exists over the actual requirements that are inaccurate within the tables. And if the DC power supply issues are on the table for inclusion (newer technologies that are working there way into this revision), then to ignore this critically important issue borders on a disservice to the functional entities that rely on this standard for accurate and reliable requirements.

Likes 0	
Dislikes 0	

Response

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 proposal and, if transcribed into the resulting standard, would create more ambiguity, confusion, and burden on all BES equipment owners, not just GO/GOP entities, without extensive clarification of applicability or complete elimination:

- "*Other control systems*"

This phrase is unnecessarily expansive and ambiguous. Prerequisite to including this phrase in a revised standard would be establishment of a bright-line between out-of- scope control functions and the applicable protective functions (BES Protective Functions) potentially im plemented within in a control system.

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

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

- "***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):

Use of these or similar phrases in the revised standard would increase ambiguity and confusion. The potential breadth of interpretations would create an intolerable environment for compliance, especially in conjunction with "other control systems."

- *"**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**."*

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 without any improvement to reliability. For example, 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 or an override of the 100kV or higher criteria for dispersed generation?

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	
Document Name	

Comment

The NAGF does not support the development of a new definition for Protective Functions. We believe that that such a definition will have the opposite effect intended; leading to more confusion within industry.

Likes 0	
Dislikes 0	

Response

Greg Davis - Georgia Transmission Corporation - 1

Answer	

Document Name	
Comment	
One option, if we insist on making a modification despite the previous clarification from the 2016 RFI, is to create a definition under facilities in the standard for generator (generator, generators and generator bus controls included in BES) that contain protections system functions or elements and other control systems that contain protection system functions or elements installed for the purpose of detecting Faults on a generator or BES elements (lines, buses, transformers, etc.).	
Likes 0	
Dislikes 0	
Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	
Document Name	
Comment	
Hydro-Quebec Production have no comments.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	
Document Name	
Comment	
The MRO NSRF requests that the detailed information within this Comment form be passed to the soon to be developed Standard Drafting Team.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	

Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	
Document Name	
Comment	
The rejiggering of the Protection System definition to include the AVR protective functions will not add measurabe reliability value to the standard and will likely lead to issues unforseen by the SDT. The fact that there are already generator protective relays in place that catch the largest majority of faults is sufficient for the needs of the BES. A fault in one AVR will not spread to other generators and so the loss of one unit would not justify the complexity involved of performing maintenance on these very limited protective functions. This does not make sense in any way. Regarding the battery and DC items listed in the SAR - they do increase value to PRC-005-6 because they affect actual protection systems. That should be moved to a different SAR to allow that to pass without issue. By having it tied to the attempt to change Protection System definition it is a compounded issue, one cannot pass without the other. Please separate them.	
Likes 0	
Dislikes 0	
Response	
Karie Barczak - DTE Energy - Detroit Edison Company - 3,4,5, Group Name DTE Energy - DTE Electric	
Answer	
Document Name	
Comment	
If additional systems (e.g. AVRs and “other control systems”) are to be added into PRC-005, then the protective function within the devices should be identified along with scope and guidance for testing the devices to meet PRC-005 requirements.	
Likes 0	
Dislikes 0	
Response	

Jeanne Kurzynowski - CMS Energy - Consumers Energy Company - 3,4,5 - RF	
Answer	
Document Name	
Comment	
In both Project Scope and Detailed Description of the SAR, it seems the intent is to include the new “protective functions” for only the generating facilities currently listed in 4.2.5 & 4.2.6. This intent was clearly stated in the webinar when discussing concerns raised about the possible inclusion of generators identified through Inclusion I4 of the BES definition. Please clearly define the applicable facilities in the SAR to make it obvious the individual dispersed power producing resources identified through Inclusion I4 will not be brought into PRC-005 scope as part of this project. Also in the Detailed Description, the second paragraph includes the text “and or trip BES elements”. Please remove “or”.	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	
Document Name	
Comment	
Reclamation recommends the following edits to the Industry Need section of the SAR: Change from: Without clear applicability, the industry is struggling with how to implement PRC-005 and what testing is acceptable to meet the required maintenance activities prescribed by PRC-005. The lack of clarity presents a reliability gap in the application of PRC-005. To: "With clearer applicability, the industry can improve its implementation of PRC-005 and what testing is acceptable to meet the required maintenance activities prescribed by PRC-005. Improved clarity helps mitigate the reliability gap in the application of PRC-005.”	
Likes 0	
Dislikes 0	
Response	
Kristina Marriott - First Solar, Inc. - 5	
Answer	
Document Name	

Comment
We ask the SDT to take into consideration that exemption of wind turbines, as it may cause some further confusion on how to maintain certain systems. Ex: GE Wind turbines are equipped with a solid-state AC excitation system. The AC excitation is supplied through an AC-DC-AC converter, and depending on the wording that is used, it could bring these systems into scope.

Likes 0	
Dislikes 0	

Response

Donald Lock - Talen Generation, LLC - 5	
Answer	
Document Name	

Comment
Talen Energy suggests that, in making explicit the fact that PRC-005 covers relays in AVRs and the like, the SDT should avoid referring to devices that operate “like,” “similar to,” or “the same as” traditional relays, due to risk of misinterpretation. It would be wrong, for example, for an entity or auditor to think that that a Multilin that trips an ID fan motor is part of the Protection System, because loss of this fan will take the unit offline just “like” a relay that opens the generator breaker. The same is true for saying that an AVR relay that opens only the excitation system breaker is in-scope, because the generator breaker will immediately open due to operation of the loss-of-excitation relay, “the same as” if the AVR relay did so directly. It would be better to stress three guiding principles: • The Protection System definition is not changing, just being clarified to note that a relay is merely a switch – any type of switch - and can consist of a discrete device with the name “relay,” a discrete device with a different name, or a line of code in the AVR or other control element. • Para. 4.2.5.1 of PRC-005-6 is not changing. A relay that sets in motion a chain of events leading to opening of a generator breaker is not in-scope. It must do so directly or via a lockout or auxiliary tripping relay to be part of the Protection System. • The electrical quantities qualifier is not changing. Relays that respond to binary inputs (e.g. loss of outlet) or mechanical quantities are not part of the Protection System, even if transducers convert the mechanical signal to electrical form (e.g. speed pickups, thermocouples, vibration detectors).

Likes 0	
Dislikes 0	

Response

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	
Document Name	

Comment
No further comments, thank you.

Likes 0	

Dislikes 0	
Response	
Stephanie Burns - International Transmission Company Holdings Corporation - 1 - MRO,RF	
Answer	
Document Name	
Comment	
Protection functions outside of traditional protective relays are also an issue for PRC-004 and MIDAS reporting where these protection functions misoperate.	
Likes 0	
Dislikes 0	
Response	
Lindsay Wickizer - Berkshire Hathaway - PacifiCorp - 6	
Answer	
Document Name	
Comment	
While PRC-005 may be a bit unclear right now, it is believed that updating the NERC Glossary definition for Protective Systems would better serve to clarify most of these issues. Also, trying to include all of the different devices and technologies will make PRC-005 much more complex and confusing. This should be avoided and the standard simplified to be more generic while avoiding scope creep into unrelated systems.	
Likes 0	
Dislikes 0	
Response	
Jeremy Lorigan - Seminole Electric Cooperative, Inc. - 1,3,4,5,6	
Answer	
Document Name	
Comment	
My only concern is same as many other PRC-005 elements, which is the details. Specifically, if we are expected to test something it would be nice to have exactly what attributes and maintenance activity will be required. Basically, we need to know the bounderies of equipment tested, what is to be tested and what is not in scope. My fear is a lack of clarity from NERC on what all is included in an AVR and Excitation system, that fall into scope.	

Likes 0	
Dislikes 0	
Response	

Additional comments received from Daniel Gacek/Exelon

Questions

1. 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 often measure the same quantities and respond similarly to protective relays. Do you agree that this definition creates confusion with regards to protective functions that behave similarly to protective relays but are embedded in control systems? If you do not agree, or if you agree but have comments or suggestions, please provide your recommendation or proposed modification in the comments section.

   ☒ Yes
   ☐ No

   Comments: Exelon concurs with the comments submitted by the EEI.
   On behalf of Exelon, Segments: 1, 3, 5, 6.

2. The SAR drafting team determined that BES protective functions that respond to electrical quantities inside excitation systems (including analog/digital AVRs) should be clarified as included in PRC-005, in addition to BES 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 BES protective functions for 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, please provide your recommendation or proposed modification in the comments section.

   ☐ Yes
   ☒ No

   Comments: Exelon concurs with the comments submitted by the EEI.

On behalf of Exelon, Segments: 1, 3, 5, 6.

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 alternative 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, please provide your recommendation or proposed modification in the comments section.

   ☒ Yes
   ☐ No

   Comments: Exelon concurs with the comments submitted by the EEI.
   On behalf of Exelon, Segments: 1, 3, 5, 6.

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, please provide your recommendation or proposed modification below.

   ☒ Yes
   ☐ No

   Comments: Exelon concurs with the comments submitted by the EEI.
   On behalf of Exelon, Segments: 1, 3, 5, 6.

5. Are there any logistical or cost considerations that would add significant burden to equipment owners trying to confirm BES 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?

   ☒ Yes
   ☐ No

   Comments: Exelon concurs with the comments submitted by the EEI.
   On behalf of Exelon, Segments: 1, 3, 5, 6.

6. Please provide any additional comments for the SAR drafting team to consider, if desired.

   Comments: