NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project 2010-13.2 Phase 2 of Relay Loadability: Generation PRC-025-1

The Standard Drafting Team thanks all commenters who submitted comments on the PRC-025-1 standard. There were 55 sets of comments, including comments from approximately 175 different people from approximately 102 companies representing 8 of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the standard's project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Mark Lauby, at 404-446-2560 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

Summary Consideration

The generator relay loadability standard drafting team ("SDT") has revised the proposed the draft of PRC-023-3 – Transmission Relay Loadability based on stakeholder comments received during the Standard Authorization Request (SAR) 45-day formal posting of the SAR which included a redline to the PRC-023-2 standard. The SAR was not modified by the standard drafting team. Contemporaneously with the SAR posting, the SDT has revised the proposed draft of PRC-025-1 – Generator Relay Loadability during its 45-day formal comment posting of the standard and initial ballot which received 54.65% stakeholder approval. The following narrative is a summary of the significant improvements made to the above standards in response to industry stakeholder comments.

Standard (PRC-023-3)

- Applicability
  - The phase "at the terminal of the" was inserted in for each applicable entity of the standard to create a bright light between the proposed PRC-023-3 and PRC-025-1 standards
  - References to the two new Requirements (R7 and R8) was inserted for the applicable Distribution Provider and Transmission Owner
  - References to the two new Applicability for Circuits (4.2.3 and 4.24) were inserted for the applicable Distribution Provider and Transmission Owner

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

  - Applicability 4.2.3 – Circuits Subject to Requirement R7 was added to create a bright line between the proposed PRC-023-3 and PRC-025-1 standards for the Distribution Provider and Transmission Owner regarding generator interconnection Facilities
  - Applicability 4.2.4 – Circuits Subject to Requirement R8 was added to create a bright line between the proposed PRC-023-3 and PRC-025-1 standards for the Distribution Provider and Transmission Owner regarding generator step-up (GSU) transformers
- Requirements
  - Requirement R1, Criterion 6 was removed and replaced by two new proposed Requirements R7 and R8
  - New Requirement R7 applicable to the Distribution Provider and Transmission Owner regarding generator interconnection Facilities to create a bright line between the proposed PRC-023-3 and PRC-025-1 in applying settings to load-responsive protective relay for loadability
  - New Requirement R8 applicable to the Distribution Provider and Transmission Owner regarding generator step-up (GSU) transformer to create a bright line between the proposed PRC-023-3 and PRC-025-1 in applying settings to load-responsive protective relay for loadability
- Measures
  - New Measure M7 was inserted to correspond to the new Requirement R7
  - New Measure M8 was inserted to correspond to the new Requirement R8
- Compliance
  - The Compliance Monitoring Responsibility section text was updated to current NERC Reliability Standards language
  - Requirements R7 and R8 were added to the Data Retention section
  - The reference to “Compliance Monitor” was updated to the more correct term, “Compliance Enforcement Authority”
- Violation Severity Levels
  - New VSL was inserted for Requirement R7
  - New VSL was inserted for Requirement R8
  - Removed references to Requirement R1, Criterion 6 because it is no longer used
- Attachment A
  - Revised criterion 2.4 to address relays applied at the terminals of generation Facilities in accordance with NERC Reliability Standard PRC-025-1 for the Planning Coordinator pursuant to Requirement R6
- Attachment C
  - Inserted new attachment to address relay loadability described in Requirements R7 and R8
  - Includes Table 1, Relay Loadability Evaluation Criteria which is the same as the criteria proposed in PRC-025-1 for generator interconnection Facilities and generator step-up (GSU) transformers

Implementation Plan (PRC-023-3)

- Updated to reflect known milestone dates based on the approvals of the current version two
- Added the implementation period for the two new Requirements (R7 and R8) to align with the same implementation period proposed in PRC-025-1

VRF/VSL Justifications (PRC-023-3)

- Provided justification for VRF/VSL for the two new Requirements R7 and R8

Standard (PRC-025-1)

- Purpose
  - Revised to remove the first occurrence of "generator"
  - Other minor revisions to provide clarity in the scope of the standard
- Applicability
  - Inserted section 3.2.5 to provide applicability to Facilities that address Elements utilized in the aggregation of dispersed power producing resources.
- Requirements
  - No change
- Measures
  - No change
- Compliance
  - No change
- Violation Severity Levels
  - No change
- Attachment 1
  - General text revisions
  - Included language to note that the standard does not require the use of any of the protective functions list in Table 1, Relay Loadability Evaluation Criteria
  - Removed the Planning Coordinator and inserted the Regional Reliability Organization to comport with the anticipated retirement of MOD-024-1 and MOD-025-1 and the approval of MOD-025-2 in both the text and Table 1
  - Inserted language to address situations where the Generator Owner may combine both asynchronous and synchronous generators on a generator interconnection Facility to provide direction on the evaluation of relay loadability
  - Update the references to no-load tap changes (NLTC) and on-load tap changers (OLTC) to the generally accepted use of the IEEE terms, deenergized tap changers (DETC) and load tap changers (LTC)
  - Added an exception to the standard for Protection Systems that detect generator overloads
  - Added an exception to the standard for Protection Systems that detect transformer overloads
  - Made minor editorial edits to Table 1 text for clarity such as replacing "connected to" with "aggregate" for consistency with other uses

- Made minor editorial edits to remove hyphens and inserting the word “connected” (e.g., Generator step-up transformer [connected] to asynchronous generators)
- For the application of generator interconnection Facility, reduced the Reactive Power output calculation from 150% to 120% for consistency with the previous PRC-023-2, Requirement R1, Criterion 6

Implementation Plan (PRC-025-1)

- Minor editorial edits for clarity
- Updated the implementation information to mimic the table provided in the current PRC-023-2 and proposed PRC-023-3 to delineate the implementation for jurisdictions where regulatory approval is required and in jurisdictions where no regulatory approval is necessary
- Inserted language concerning who the Real and Reactive Power is reported to by the Generator Owner to allow a transition from reporting to the Regional Reliability Organization to the Transmission Planner rather than having the Planning Coordinator as identified in the previous posting of the PRC-025-1 standard

VRF/VSL Justifications (PRC-023-3)

Inserted references to the two new Requirements R7 and R8 proposed in PRC-023-3 to support reasoning for assigning of a VRF/VSL

Index to Questions, Comments, and Responses

The Industry Segments are:

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

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	David Thorne	Pepco Holdings Inc	X		X							

	Additional Member	Additional Organization	Region	Segment Selection
1.	Carl Kinsley	Delmarva Power & Light Co.	RFC	1, 3
2.	Alvin Deper	Pepco Holdings Inc	RFC	1, 3

2.	Group	Colby Bellville	Duke Energy	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Doug Hils	Duke Energy	RFC	1
2.	Lee Schuster	Duke Energy	FRCC	3
3.	Dale Goodwine	Duke Energy	SERC	5
4.	Greg Cecil	Duke Energy	RFC	6

3.	Group	Guy Zito	Northeast Power Coordinating Council										X

Additional Member	Additional Organization	Region	Segment Selection

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10
1. Alan Adamson	New York State Reliability Council, LLC	NPCC	10									
2. Carmen Agavriloai	Independent Electricity System Operator	NPCC	2									
3. Greg Campoli	New York Independent System Operator		2									
4. Sylvain Clermont	Hydro-Québec TransÉnergie	NPCC	1									
5. Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1									
6. Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10									
7. Mike Garton	Dominion Resources Services, Inc.	NPCC	5									
8. Kathleen Goodman	ISO - New England	NPCC	2									
9. Michael Jones	National Grid	NPCC	1									
10. David Kiguel	Hydro One Networks Inc.	NPCC	1									
11. Christina Koncz	PSEG Power LLC	NPCC	5									
12. Randy MacDonald	New Brunswick Power Transmission	NPCC	9									
13. Bruce Metruck	New York Power Authority	NPCC	6									
14. Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5									
15. Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10									
16. Robert Pellegrini	The United Illuminating Company	NPCC	1									
17. Si-Truc Phan	Hydro-Québec TransÉnergie	NPCC	1									
18. David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5									
19. Brian Robinson	Utility Services	NPCC	8									
20. Brian Shanahan	National Grid	NPCC	1									
21. Wayne Sipperly	New York Power Authority	NPCC	5									
22. Donald Weaver	New Brunswick System Operator	NPCC	2									
23. Ben Wu	Orange and Rockland Utilities	NPCC	1									
24. Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3									
4. Group	Charles Yeung	SRC		X								

	Additional Member	Additional Organization	Region	Segment Selection
1.	Greg Campoli	NYISO	NPCC	2
2.	Matthew Goldberg	ISO NE	NPCC	2
3.	Ben Li	IESO	NPCC	2
4.	Bill Phillips	MISO	MRO	2
5.	Tom Bowe	PJM	RFC	2
6.	Charles Yeung	Southwest Power Pool	SPP	2

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10
	RTO											
5. Group	Brenda Hampton	Luminant Energy Company LLC						X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Rick Terrill	Luminant Generation Company LLC	ERCOT	5

6. Group	Jonathan Hayes	Southwest Power Pool	X	X	X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Jonathan Hayes	Southwest Power Pool	SPP	NA
2.	Robert Rhodes	Southwest Power Pool	SPP	NA
3.	John Allen	City Utilities of Springfield	SPP	1, 4
4.	Chandler Brown	Sunflower Electric	SPP	1
5.	Anthony Cassmeyer	Western Farmers Electric Cooperative	SPP	1, 3, 5
6.	Gary Condict	Sunflower Electric	SPP	1
7.	Karl Diekevers	NPPD	MRO	1, 3, 5
8.	Tiffany Lake	Westar Energy	SPP	1, 3, 5, 6
9.	Valerie Pinamonti	AEP	SPP	1, 3, 5
10.	Paul Reynolds	Sunflower Electric	SPP	1
11.	Jerry White	Cleco	SPP	1, 3, 5
12.	Don Schmit	NPPD	MRO	1, 3, 5
13.	Paul Von Hersenberg	Westar Energy	SPP	1, 3, 5, 6
14.	Bo Jones	Westar Energy	SPP	1, 3, 5, 6
15.	Lynn Schroeder	Westar Energy	SPP	1, 3, 5, 6
16.	Brian Holmes	General Gentleman Station	SPP	NA

7. Group	David Greene	SERC RRO										

	Additional Member	Additional Organization	Region	Segment Selection
1.	Paul Nauert	Ameren		
2.	John Miller	Georgia Transmssion		
3.	Bridget Coffman	Santee Cooper		
4.	Steve Edwards	Dominion		
5.	David Greene	SERC		
6.	Russ Evans	SCE&G		
7.	Phil Winston	Southern Company		

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
8.	Group	Joseph DePoorter	Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)										X

	Additional Member	Additional Organization	Region	Segment Selection
1.	Alice Ireland	XCEL	MRO	1, 3, 5, 6
2.	Chuck Lawrence	ATC	MRO	1
3.	Dan Inman	MPC	MRO	1, 3, 5, 6
4.	Dave Rudolph	BEPC	MRO	1, 3, 5, 6
5.	Kayleigh Wilkerson	LES	MRO	1, 3, 5, 6
6.	Jodi Jenson	WAPA	MRO	1, 6
7.	Joseph DePoorter	MGE	MRO	3, 4, 5, 6
8.	Ken Goldsmith	ALT	MRO	4
9.	Lee Kittleson	OTP	MRO	1, 3, 5
10.	Mahmood Safi	OPPD	MRO	1, 3, 5, 6
11.	Marie Knox	MISO	MRO	2
12.	Mike Brytowski	GRE	MRO	1, 3, 5, 6
13.	Scott Bos	MPW	MRO	1, 3, 5, 6
14.	Scott Nickels	RPU	MRO	4
15.	Terry Harbour	MEC	MRO	1, 3, 5, 6
16.	Tom Breene	WPS	MRO	3, 4, 5, 6
17.	Tony Eddleman	NPPD	MRO	1, 3, 5
18.	Joseph DePoorter	Madison Gas and Electric Company	MRO	3, 4, 5, 6

9.	Group	Mike Garton	Dominion Resources Services, Inc.	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Louis Slade	Dominion Resources Services, Inc.	RFC	5, 6
2.	Randi Heise	Dominion Resources Services, Inc.	MRO	5, 6
3.	Connie Lowe	Dominion Resources Services, Inc.	NPCC	5, 6
4.	Michael Crowley	Virginia Electric and Power Company	SERC	1, 3, 5, 6

10.	Group	Brandy Spraker	NERC Compliance	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Ian Grant		SERC	3
2.	Marjorie Parsons		SERC	6

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10
3. Daivd Thompson		SERC 5										
4. DeWayne Scott		SERC 1										
5. Tom Vandervort		SERC 5										
6. Annette Dudley		SERC 5										
7. Paul Palmer		SERC 5										
8. Daniel McNeeley		SERC 1										
11. Group	Ben Engelby	ACES						X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Megan Wagner	Sunflower Electric Power Corporation	SPP	1
2.	Mike Brytowski	Great River Energy	MRO	1, 3, 5, 6
3.	Tom Alban	Buckeye Power, Inc.	RFC	3, 4
4.	Mark Ringhausen	Old Dominion Electric Cooperative	SERC	3, 4
5.	Chris Bradley	Big Rivers Electric Corporation	SERC	
6.	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1

12.	Group	Stephen J. Berger	PPL Generation, LLC on behalf of its Supply NERC Registered Entities	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Brenda L. Truhe	PPL Electric Utilities Corporation	RFC	1
2.	Brent Ingebrigtson	LG&E and KU Services Company	SERC	3
3.	Annette M. Bannon	PPL Generation, LLC on behalf of its Supply NERC Registered Entities	RFC	5
4.			WECC	5
5.	Elizabeth A. Davis	PPL EnergyPlus, LLC	MRO	6
6.			NPCC	6
7.			SERC	6
8.			SPP	6
9.			RFC	6
10.			WECC	6

13.	Group	Larry Raczkowski	FirstEnergy Corp	X		X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	William Smith	FirstEnergy Corp	RFC	1

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10
2. Cindy Stewart	FirstEnergy Corp	RFC	3									
3. Doug Hohlbaugh	Ohio Edison	RFC	4									
4. Ken Dresner	FirstEnergy Solutions	RFC	5									
5. Kevin Querry	FirstEnergy Solutions	RFC	6									
14. Group	Terry L. Blackwell	SC Public Service Authority	X		X		X	X				
Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
1. S. Tom Abrams	Santee Cooper	SERC	1									
2. Rene' Free	Santee Cooper	SERC	1									
3. Paul Camilletti	Santee Cooper	SERC	5									
4. Bridget Coffman	Santee Cooper	SERC	1									
15. Group	Jamison Dye	Transmission Reliability Program	X		X		X	X				
Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
1. Dean Bender	Technical Svcs	WECC	1									
2. Sandra Takabayashi	Federal Hydro Projects	WECC	5									
3. Erika Doot	Generation Services	WECC	3, 5, 6									
4. Deanna Phillips	FERC Compliance	WECC	1, 3, 5, 6									
5. Jim Burns	Technical Operations	WECC	1									
16. Individual	Ryan Millard	PacifiCorp	X		X		X	X				
17. Individual	Janet Smith, Regulatory Affairs Supervisor	Arizona Public Service Company	X		X		X	X				
18. Individual	Bob Steiger	Electric Reliability Compliance	X		X		X	X				
19. Individual	Ed Croft	Puget Sound Energy	X		X		X					
20. Individual	Pamela R. Hunter	Southern Company Operations Compliance	X		X		X	X				
21. Individual	Annamay Luyun	San Diego Gas & Electric					X					
22. Individual	Michael Falvo	Independent Electricity System Operator		X								
23. Individual	Nazra Gladu	Manitoba Hydro	X		X		X	X				
24. Individual	Patrick Brown	Essential Power, LLC					X					
25. Individual	Roger Dufresne	Hydro-Québec Production					X					
26. Individual	Wryan Feil	Northeast Utilities	X									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
27.	Individual	John Yale	Chelan County PUD No. 1					X					
28.	Individual	Oliver Burke	Entergy Services, Inc. (Transmission)	X									
29.	Individual	Mace Hunter	Lakeland Electric	X		X		X					
30.	Individual	NICOLE BUCKMAN	ATLANTIC CITY ELECTRIC			X							
31.	Individual	David Ramkalawan	Ontario Power Generation					X					
32.	Individual	Michelle D'Antuono	Ingleside Cogeneration LP					X					
33.	Individual	Dale Fredrickson	Wisconsin Electric Power Company			X	X	X					
34.	Individual	Mark Yerger	Potomac Electric Power Company			X							
35.	Individual	Kayleigh Wilkerson	Lincoln Electric System	X		X		X	X				
36.	Individual	John Bee	Exelon Corporation and its affiliates	X		X		X					
37.	Individual	Thad Ness	American Electric Power	X		X		X	X				
38.	Individual	Gregory LeGrave	WPS			X	X	X	X				
39.	Individual	Chris Plante	Wisconsin Public Service Corp			X	X	X	X				
40.	Individual	Michael Mayer	Delmarva Power & Light Company										
41.	Individual	David Jendras	Ameren	X		X		X	X				
42.	Individual	Anthony Jablonski	ReliabilityFirst										X
43.	Individual	Spencer	Tacke			X	X		X				
44.	Individual	Timothy Brown	Idaho Power Co.	X									
45.	Individual	Brett Holland	Kansas City Power & Light	X		X		X	X				
46.	Individual	Travis Metcalfe	Tacoma Power	X		X	X	X	X				
47.	Individual	John Seelke	Public Service Enterprise Group	X		X		X	X				
48.	Individual	Mike Hirst	Cogentrix Energy Power Management, LLC					X					
49.	Individual	Jonathan Appelbaum	The United Illuminating Company	X									
50.	Individual	Clay Young	SCE&G			X							
51.	Individual	Scott Berry	Indiana Municipal Power Agency				X						
52.	Individual	Kenneth A Goldsmith	Alliant Energy				X						

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
53.	Individual	Ed	O'Brien			X	X		X			X	
54.	Individual	Rich Salgo	NV Energy	X		X							
55.	Individual	Daniel Duff	Liberty Electric Power LLC					X					

If you support the comments submitted by another entity and would like to indicate you agree with their comments, please select "agree" below and enter the entity's name in the comment section (please provide the name of the organization, trade association, group, or committee, rather than the name of the individual submitter).

Summary Consideration:

Eleven commenters supported other groups. These comments are to extensive to summarize here and are summarized in the latter questions. Groups supported include Essential Power, LCC working through the North American Generator Forum, the Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF), the Northeast Power Coordinating Council (NPCC), Pepco Holdings, Inc. and Affiliates, SERC Reliability Corporation under the SERC Protection System Coordination (SERC RRO), and the Wisconsin Public Service Corporation.

Organization	Supporting Comments of "Entity Name"
Liberty Electric Power LLC	Essential Power
Response: The drafting team thanks you for your participation.	
Indiana Municipal Power Agency	Indiana Municipal Power Agency agrees with the comments submitted by the Generator Forum Group or Patrick Brown of Essential Power, LLC. **Response:** The drafting team thanks you for your participation; please see the response(s) for Essential Power, LLC. We also have one additional comment that we would like to submit under the last question of the comment form and will submit it here since the form does not allow for additional comments if we agree with other comments. For question 6 on the comment form, we would like to submit the following comment: The pick up setting criteria for 51V-R on synchronous generators (Pickup Setting Criteria column number (2)- Reactive Power Output) will probably be the one IMPA will be using to set its relays for its combustion turbines. We are very concerned about the

Organization	Supporting Comments of "Entity Name"
	current level setting that could be reached by using this pickup setting criteria (2) and if we are forced to use this setting, it would definitely overload our equipment (ie. Generator breaker) and our generator; causing generator and equipment damage with no possible restoration in the near future. IMPA believes it might be more realistic to use criteria (1) only for combustion turbines and doing away with (2) critiera that uses nameplate MVA rating - see page 10 of 18 on the draft standard. IMPA also feels that the same comment can be applied to the Phase time overcurrent relay (51) on the GSU. **Response:** The drafting team notes that criteria the two criteria noted collectively define the real and reactive power output during field-forcing. These criteria represent a natural behavior of the generator and its excitation system to abnormal system conditions. In this case, the generator is operating within its capability and is not at risk for damage. However, the drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made.
Response: The drafting team thanks you for your comment; please see the response(s) above.	
Lincoln Electric System	MRO NSRF
Response: The drafting team thanks you for your participation; please see the response(s) for the Midwest Reliability Organization NERC Standards Review Forum.	
FirstEnergy Corp	North American Generator Forum
Response: The drafting team thanks you for your participation; please see the response(s) for Essential Power, LLC.	

Organization	Supporting Comments of "Entity Name"
Chelan County PUD No. 1	North American Generator Forum Essential power, LLC
Response: The drafting team thanks you for your participation; please see the response(s) for Essential power, LLC.	
The United Illuminating Company	NPCC comments
Response: The drafting team thanks you for your participation; please see the response(s) for Northeast Power Coordinating Council.	
ATLANTIC CITY ELECTRIC	Pepco Holdings Inc and Affiliates.
Response: The drafting team thanks you for your participation; please see the response(s) for Pepco Holdings Inc. and Affiliates.	
Delmarva Power & Light Company	Pepco Holdings Inc. and Affiliates
Response: The drafting team thanks you for your participation; please see the response(s) for Pepco Holdings Inc. and Affiliates.	
Potomac Electric Power Company	Pepco Holdings, Inc. and Affiliates
Response: The drafting team thanks you for your participation; please see the response(s) for Pepco Holdings Inc. and Affiliates.	
SCE&G	SERC RRO
Response: The drafting team thanks you for your participation; please see the response(s) for the SERC Regional Reliability Organization (SERC RRO).	
Wisconsin Public Service Corp	Wisconsin Public Service Corp - Greg LeGrave
Response: The drafting team thanks you for your participation; please see the response(s) for WPS (Greg LeGrave).	

1. In the Applicability, section 3.2.4, "Generator interconnection Facility(ies)" was added to address potential overlap with the approved PRC-023-2. Also, the SDT has posted a draft SAR and redline proposed PRC-023-3 for consideration. Do the changes to PRC-023-2 and the proposed PRC-025-1 provide a bright line between the two standards? If not, provide specific suggestions to improve or clarify the performance between the standards.

Summary Consideration:

About three quarters of the individual commenters represented in the approximately 42 comments for Question 1 did not agree with the drafting teams revisions to the Applicability. This resulted in the drafting team including additional explanation in the Guidelines and Technical Basis document in addition to making a substantive change to the proposed PRC-023-3 and minor changes to the proposed PRC-025-1 to address these concerns.

Comments resulting in a change to the standard(s)

The majority concern was regarding the Applicability between the proposed standards PRC-023-3 and PRC-025-1 as represented by at least 21 comments supported by 74 individuals. Within these majority comments, at least ten commenters representing about 49 individuals disagreed that the phrasing "applied at the terminals of" alleviated the overlap. At least four suggested rewording the Applicability. Most noted that the proposed changed did not address conditions where the circuit terminal is the same as the generator step-up (GSU) transformer terminal. The drafting team determined the suggestions did not add clarity to the Applicability; therefore, retained the current proposed change. In keeping the phrase "at the terminals of" to remove ambiguity, the drafting team opted to propose two new Requirements, R7 and R8, to address these majority comments. Generator Owner was retained in the Applicability of PRC-023-3 to address configurations where the Generator Owner owns load-responsive protective relays on the terminals of network transmission lines. Specific criteria in the proposed PRC-025-1 have been duplicated in the proposed PRC-023-3 as new Requirements R7 and R8 in order to address configurations were the Distribution Provider and Transmission Owner own load-responsive protective relays on dedicated generator interconnection Facilities and/or generator step-up (GSU) transformers to address these concerns.

About four comments representing approximately 12 individuals either wanted the phrase "generator interconnection Facility(ies) defined or were confused by its intent. To alleviate the concerns and the need to define the phrase, the drafting team added figures in the Guidelines and Technical Basis document.

At least three comments supported by 12 individuals pointed out that the purposes statement in the proposed PRC-025-1 appeared to be more specific to generators and not the Facilities described in the Applicability. The drafting team removed the first occurrence of "generator" to provide a more general description of the standard's purpose. At least two comments representing about 11 individuals disagreed with the Generator Owner being retained the proposed PRC-023-3. Also, at least four commenters were

confused about the applicability to the Generator Owner in the proposed PRC-023-3 standard with a comment suggesting moving PRC-023-2, Requirement R1, Criterion 6 to the proposed PRC-025-1 standard.

One comment supported by at least two individuals suggested a different approach like what is used in PRC-006-1 regarding the ownership of load-responsive protective relays. Although a reasonable approach, the drafting team determined that such an approach would not achieve the reliability outcomes that the PRC-023 and PRC-025 standards are written to achieve. The drafting team considered varying scenarios of moving functions from one standard to the other, but determined that each presented different issues. Therefore, this specific suggestion did not result in a change. The current approach maintains a level of familiarity with the PRC-023 standard and does not introduce the Distribution Provider and Transmission Provider being applicable to a generator specific standard.

One comment supported by about 19 individuals questioned if the proposed PRC-025-1 standard was meant to apply to individual wind turbines or solar units. The drafting team did intend to apply PRC-025-1 to individual wind turbines or solar units themselves and instead for the aggregated generation to be associated. The Applicability was modified to reflect this intent. Approximately three comments supported by 12 individuals had concerns about the proposed PRC-025-1 standard Purpose statement "To set load-responsive [generator] protective relays…" that it is specific to generator protection and not the other listed Facilities. To address this concern, the drafting team removed the first occurrence of "generator" in the Purpose statement to provide a more general description of the standard's purpose.

One commenter observed a potential gap between the standards regarding Facilities between 100 and 200 kV. The drafting team agreed and with the inclusion of the new proposed Requirements R7 and R8, new Applicability criteria was established to close this gap. Refer to the summary of changes to the standard at the beginning of this document. Also, on comment noted a typographical error in the PRC-023-3 standard where the version number needed to be updated to version 3.

Other minority comments regarding the Applicability covered a broad range of issues. At least six commenters were concerned that Generator Owners needed assurance that load-responsive protective relays connected on the high voltage side of the generator step-up (GSU) transformer looking towards the transmission system are not within the scope of both PRC-023 and PRC-025. The drafting team modified the proposed PRC-023-3 Attachment A, Item 2.4 to address this concern.

The last of the minority comments included one commenter disagreeing with the Facilities defined in the Applicability of the proposed PRC-025-1. The drafting team responded that it is addressing regulatory directives for generator step-up (GSU) transformers and unit auxiliary transformers (UAT) from Order No. 733.

Comments not resulting in a change to the standard(s)

Two comments supported by eight individuals disagreed with the Facilities defined in the Applicability of the proposed PRC-025-1. The drafting team responded that it is addressing the regulatory directives for generator step-up (GSU) transformers and unit auxiliary transformers (UAT).

Organization	Yes or No	Question 1 Comment
SERC RRO	No	Facilities sections 3.2.2 and 3.2.3 seem to be out of scope given the purpose statement "generator protective relays". **Response:** The drafting team notes that the purpose statement is general, and is not intended to apply exclusively to generator relays. The drafting team has modified the purpose in response to your comment. Please refer to the revised purpose statement in draft 3 of the standard. Change made. We believe that Facilities section 3.2.3 does not belong in this standard, as they do not relate directly to the generator loadability. Addressing generating plant station service transformers does not have to translate into creating a standard requirement for that equipment. An investigation and evaluation of the protection system for unit auxiliary transformers should be considered by the standard drafting team and deemed to be not related to generator loadability. Providing a description of this dis-associated functionality fulfills the FERC order to address this subject. Further, there is confusion over which station service transformers, start-up transformers, or other auxilary transformers are included in the scope. In footnote 1, is the concern immediate or eventual trips of the generator with the loss of a station service transformer? Are station service bus overcurrent relays subject to minimum setting criteria specified in Table 1? **Response:** The drafting team has included the Applicability, Facilities sections 3.2.2 and 3.2.3 to be responsive to a regulatory directive in Order No. 733, Paragraph 104. Providing a description of this “dis-associated functionality” would not address FERC’s concern and would not be responsive to the directive. Inclusion of these two Facilities establishes

Organization	Yes or No	Question 1 Comment
		requirements for load-responsive protective relays on generator step-up (GSU) transformers and on unit auxiliary transformers (UAT) that supply station service power to support the on-line operation of generating plants. These transformers are variably referred to as station power, unit auxiliary, or station service transformer(s) used to provide overall auxiliary power to the generator station when the generator is running. The power transformers that are in-service when the unit is released to the dispatcher and, under normal plant operations, are capable for unit full load operation are considered. Only relays that trip the units via generator lockout action or directly trip of the generator breaker(s) are under the setting criteria. Startup/Standby transformers that are not required to keep the units running are excluded from the standard. Station service bus overcurrent relays are not subject to this standard. No change made. The inclusion of generating units and generating plants identified as Blackstart Resources in the Transmission Operator's system restoration plan is unnecessary and inappropriate. These units typically are the smaller units in a generating fleet and, alone, would not impact the ability to ride through the type of system excursion that is the concern of this standard. Further, providing protection system settings that are more conservative than these proposed in this standard will better protect these resources that are essential to recovering from a system blackout. **Response:** The drafting team believes that during Blackstart conditions the generator may experience extreme voltage and loading swings; therefore, Blackstart units are included and apply to the standard. If such generators are excluded from the applicability of the standard, they may not perform as expected to facilitate system restoration. Also, the drafting team notes that the standard only applies to those Blackstart resources identified in the Transmission Operator's system restoration plan (i.e., SRP) if identified as being BES. No change made.

Organization	Yes or No	Question 1 Comment
Response: The drafting team thanks you for your comments, please see the above responses.		
Manitoba Hydro	No	(1) In PRC-023-3 section 4.1.1, 4.1.2 and 4.1.3, the redlined part "at the terminals of" should be changed to "at the Transmission Owner terminals of", "at the generator owner terminals of" and "at the Distribution Owner terminals of". **Response:** The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made. Also, PRC-023-2 in section 4.1.2 should be changed to PRC-023-3. **Response:** The drafting team appreciates raising awareness to this oversight. The version number has been corrected from "-2" to "-3." Change made. (2) Under Section 3, "Applicability", the term "Generator Interconnection Facilities" is capitalized, yet not defined in the NERC Glossary. Although this term may be defined in the U.S. pro forma tariff, this term should be defined in the NERC Glossary, as not all Generator Owners are FERC jurisdictional or use similar tariffs in their Canadian jurisdictions. **Response:** The drafting team is not intending to use this term in accordance with any established pro forma tariff. Additional clarification has been added to the Guidelines and Technical basis document. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Ameren	No	(1) Introducing 'at the terminals of the' before 'circuits' is superfluous because each owner (TO, GO) is already responsible for the Protection System they own. Since PRC-023-3 is still applicable to the GO in your

Organization	Yes or No	Question 1 Comment
		proposal, we see little value or clarity realized. **Response:** The drafting team included the phrase "at the terminals of" to remove ambiguity. Some entities interpreted the phrase "applied on" to refer to the Facilities protected by a protective relay. The phrase "at the terminals of" provides clarity, for example, that the standard is applicable to a protective relay applied at the generator terminals regardless of whether it is applied to protect the generator step-up transformer or to provide protection for transmission lines terminating at the generating plant high-side switchyard. Generator Owner has been retained in the Applicability of PRC-023-3 to address configurations where the Generator Owner owns load-responsive protective relays on the terminals of network transmission lines. Specific criteria in PRC-025-1 have been duplicated as Requirements R7 and R8 in PRC-023-3 to address configurations were the TO and DP own protective relays on dedicated generator interconnection Facilities and/or GSU. Change made. (2) Generator interconnection Facilities is not a defined term, so before it is used in PRC-025 the SDT needs to define it for the NERC Glossary or it needs to be carried with this standard. **Response:** The drafting team has included additional explanation in the PRC-025-1 Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
ACES	No	(1) We disagree with including GOs as an applicable entity to PRC-023. In order to create a "bright line," the drafting teams should have separate standards. Have PRC-023 apply to transmission owners and PRC-025 to generators owners. It is a simple dividing line. If the team feels that any of

Organization	Yes or No	Question 1 Comment
		the loadability criteria from the transmission loadability standard should be included in PRC-025, then do so, but do not leave any reference to GOs in PRC-023.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Transmission Reliability Program	No	BPA suggests that the drafting team define the term "Generator interconnection Facility(ies)" to clear up any confusion between the two standards. For example, can a line be both a Generator interconnection facility and a transmission line, thus making it subject to both standards? If so, which standard would apply? BPA believes that the definition should be written in such a way that a given facility is subject to one standard or the other, not both.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Hydro-Québec Production	No	Comments: The references of the applicability of the GO in PRC-023-3 are confusing with the references to this standard.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
FirstEnergy Corp	No	FirstEnergy (FE) believes an overlap exists in applicable entity-assets related to "generator interconnection facilities" between the proposed PRC-025-1 standard and the proposed PRC-023-3 standard. The changes proposed in the applicability statements of PRC-023-3 to add the text "at the terminals"

Organization	Yes or No	Question 1 Comment
		does not alleviate the confusion. For example, a generator that may own sole use 230kV “generator lead” a.k.a. “generator interconnection facility” that extends from the high-side of its GSU to a point of interconnection on the transmission owner’s system (maybe even a few miles away) appears to be subject to PRC-023-3 applicability section 4.2.1.1 as well as PRC-025-1 applicability section 3.2.4. In FE’s opinion, the best path forward is to completely remove the generator owner applicability in PRC-023-2 and allow PRC-025-1 to be the sole NERC standard concerned with relay loadability settings for all generator owner facilities.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Wisconsin Electric Power Company	No	Generator Owners need to have assurance that load responsive relays connected on the high voltage side of the GSU transformer looking towards the transmission system are not within the scope of both PRC-023 and PRC-025. We recommend that Protection Systems for Generator Interconnection Facilities be more specifically identified as NOT APPLICABLE to PRC-023. For example, the exclusion in PRC-023 Attachment A item 2.4 could be modified to include generators, GSU’s, and Generator Interconnection Facilities.
Response: The drafting team has modified PRC-023-3 Attachment A, item 2.4 to address your concern. Change made.		
Ingleside Cogeneration LP	No	Ingleside Cogeneration, LP (“ICLP”) believes that in order to eliminate all confusion, it would be much more effective to include PRC-023-2 R1, criterion #6 in PRC-025-1. Based on our reading of the SAR, it is the only item in PRC-023-2 which still applies to Generator Owners. It seems that the

Organization	Yes or No	Question 1 Comment
		modifications would be relatively minor and would clearly dileneate responsibilities between TOs in PRC-023-3 and GOs in PRC-025-1.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
ReliabilityFirst	No	It is not clear where the dividing line is between the "Generator interconnecting Facilities" in PRC-025-1 and certain transmission lines and transformers in PRC-023-2. Perhaps the "Generator interconnecting Facilities" should be limited by specific parameters such as the high side GSU leads up to 1 mile. Perhaps a drawing or additional words would help clarify the dividing line.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Duke Energy	No	It is possible to have a load resoponsive relay at the terminals of a circuit which is also the terminal of a GSU.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address this concern. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Lincoln Electric System	No	LES recommends additional clarity be added to Applicability Section 3.2.4 to account for possible differences in configurations. As currently proposed, section 3.2.4 does not provide sufficient detail for entities to delineate which breakers and associated relaying constitute the Generator interconnection Facility(ies). As an example, in a typical unit-connected generator, the substation

Organization	Yes or No	Question 1 Comment
		breakers would clearly be included as part of the interconnection Facility(ies). However, in a scenario in which the generator is separated from the GSU by a breaker and the GSU separated from the substation by a plant site transmission breaker, the substation breakers would not typically be considered as part of the interconnection Facility(ies). For auditors unfamiliar with the difference in configurations, this could lead to confusion in terms of why an entity may include the substation breakers in one case but not the other. Additionally, in relation to the unit-connected generator scenario, another consideration would be if the substation breakers were in a ring bus configuration and would also be tripped by relays for an adjacent transmission line that are set as phase distance (21) relays - directional toward the Transmission System. Although these relays would not be associated with the generator, they could trip breakers considered to be a part of the interconnection Facility(ies). To alleviate the concern of which Facility(ies) should be included, recommend that at a minimum the drafting team incorporate additional guidance and/or diagrams within the Guidelines and Technical Basis document to further clarify the intent of Applicability Section 3.2.4.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Essential Power, LLC	No	Load-responsive protective relays installed on the high side terminals of the Generator Step-Up transformer looking towards the Transmission system appear to be clearly in scope for PRC-023-3 but are not clearly excluded from being applicable to PRC-025-1.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the		

Organization	Yes or No	Question 1 Comment
standard at the beginning of this document. Change made.		
Cogentrix Energy Power Management, LLC	No	Load-responsive protective relays installed on the high side terminals of the Generator Step-Up transformer looking towards the Transmission system appear to be clearly in scope for PRC-023-3 but are not clearly excluded from being applicable to PRC-025-1.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
PacifiCorp	No	PacifiCorp agrees with the addition of "Generator interconnection Facility(ies)" but affirms that verbiage should be added to PRC-023-3 that more clearly states that Generator Step-up transformers are only applicable to PRC-025-1.
Response: The drafting team has modified PRC-023-3 Attachment A, item 2.4 to address your concern. Change made.		
Northeast Power Coordinating Council	No	The applicability to the Generator Owner in PRC-023-3 overlaps the applicability to the Generator Owner in PRC-025-1. The draft SAR and proposed standards PRC-023-3, PRC-025-1 fail to provide a clear distinction as to whether the standard is meant to apply to the owner of a protection system designed to protect transmission elements (which we believe is the intent of PRC-023-3) or the owner of a protection system designed to protect generation elements (which we believe is the intent of PRC-025-1). An approach that could be considered is one similar to that used in PRC-006-1 where the SDT chose to create a 'standard specific entity'; UFLS entities. Alternatively, the applicability could be modified to more closely match the intent as indicated in the Applicability section of the Guideline and Technical Basis document, and in wording of the Supplemental SAR for Project 2010-13.2 Relay Loadability Order 733 Phase 2 (Relay Loadability: Generation).

Organization	Yes or No	Question 1 Comment
		Because there are instances where a Transmission Owner owns relays within a plant, combining these two Standards into one Relay Loadability standard would allow for wording to eliminate the overlap, and eliminate the double jeopardy possibility. The standard should be applied to the owner of the particular type of protection system, not applied to a particular function. There are circumstances where an entiy registered as a Transmission Owner owns the protection system that protects for faults on the element(s) owned by an entity registered as a Generator Owner which are solely used to interconnect their generator to the bulk power system. There are also circumstances where the Generator Owner owns not only the element(s) which are solely used to interconnect their generator to the bulk power system, but the protection system that protects for faults on those generator interconnection element(s) as well. In both of these cases, the protection system is designed to protect the bulk power system from the fault, not the generator itself. The changes in the proposed PRC-023-3 and PRC-025-1 attempt to establish a bright line, but the functional entity of Generator Owners is still included in PRC-023-3 so this results in confusion as to which standard applies for the elements that connect the generator to the BES. Some Transmission Owners own GSU assets, but in the new standard, and as stated on the Webinar, “leads assets” will fall under PRC-025-1. There is still confusion in this area so a bright line still has not been established.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Dominion Resources Services, Inc.	No	The draft SAR and proposed standards PRC-023-3, PRC-025-1 fail to provide a clear distinction as to whether the standard is meant to apply to the owner

Organization	Yes or No	Question 1 Comment
		of a protection system designed to protect transmission elements (which we believe is the intent of PRC-023) or the owner of a protection system designed to protect generation elements (which we believe is the intent of PRC-025). We believe this was the intent of the SDT but we don't believe the applicability section of either of the proposed standards clearly articulates that intent. We suggest the SDT consider an approach similar to that used in PRC-006-1 where the SDT chose to create a 'standard specific entity'; UFLS entities. Alternatively, the applicability could be modified to more closely match the intent as indicated in the Applicability section of the Guideline and Technical Basis document and the Supplemental SAR for Project 2010-13.2 Relay Loadability Order 733 Phase 2 (Relay Loadability: Generation). We believe the standard should be applied to the owner of the particular type of protection system, not applied to a particular function. We are aware of circumstances whereby an entiy registered as TO owns the protection system that protects for faults on the element(s) owned by an entity registered as a GO which are solely used to interconnect their generator to the bulk power system. We are also aware of circumstances whereby the GO owns both the element(s) which are solely used to interconnect their generator to the bulk power system as well as the protection system that protects for faults on those generator interconnection element(s). In both of these, the protection system is designed to protect the bulk power system from the fault, not the generator itself. Changes to proposed PRC 023-2 and PRC 025-1 attempts to establish a bright line but the functional entity of Generator Owners is still included in PRC 023 so this results in confusion as to what standard applies for the elements that connect the generator to the BES as some Transmission Owners own GSU assets but the new standard and as stated on the Webinar it implies that "leads assets" will fall under PRC 025. There is still confusion

Organization	Yes or No	Question 1 Comment
		in this area so a bright line still has not been established.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)	No	The NSRF believes that the standard is well written and developed, being based on existing IEEE guidelines and understood industry practices. However, the recent addition of individual wind turbines in the new BES definition could pose issues with individual wind turbines or solar units. The NSRF suggests that the drafting team consider revising the applicability criteria to clearly state that PRC-025-1 was not meant to apply to individual wind turbines or solar units themselves but to the aggregated generation associated. It is suggested that the following be added to the applicability section: 3.2.5 Elements utilized in the aggregation of dispersed power producing resources at the point where the gross individual name plate ratings of generation total greater than 75 MVA in aggregate to the common point of connection at 100kV or above, and not the individual dispursed resources. (Note: this would exclude individual dispursed power producing resources).
Response: The drafting team thanks you for your comments. The drafting team did not intend to apply PRC-025-1 to individual wind turbines or solar units themselves and intended it to apply to the aggregated generation instead. The Applicability has been modified to reflect this intent based on other comments. Change made.		
Tacoma Power	No	The phrase “at the terminals of the” used in PRC-023-3 does not seem to mitigate the potential overlap. Furthermore, it appears to be inconsistent with the term “generator interconnection Facility(ies)” used in PRC-025-1. Should not the distinction be drawn for generation interconnection Facility(ies) in both standards? In other words, it seems that transmission

Organization	Yes or No	Question 1 Comment
		lines only connecting generation would be subject to PRC-025-1 and that transmission lines that are part of the more interconnected transmission system would be subject to PRC-023-3. If the drafting team disagrees that the phrasing/terminology should be the same in both standards, additional clarification is requested.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
PPL Generation, LLC on behalf of its Supply NERC Registered Entities	No	The PPL Companies do not agree that a bright line has been established between the two standards. The PPL companies agree with the comments below from the North American Generators Forum standard review team: Load-responsive protective relays installed on the high side terminals of the Generator Step-Up transformer looking towards the Transmission system appear to be clearly in scope for PRC-023-3 but are not clearly excluded from being applicable to PRC-025-1.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
American Electric Power	No	The proposed changes in the draft PRC-023-3 create a bright line identifying the scope of PRC-023-3. However, the proposed draft of PRC-025-1 does not create a bright line identifying the scope of PRC-025-1. Load-responsive protective relays installed on the high side terminals of the Generator Step-Up transformer looking towards the Transmission system are clearly in scope for PRC-023-3 but are not clearly excluded from being applicable to PRC-025-1. AEP recommends including in PRC-025-1 verbiage clearly excluding load-responsive protective relays applicable to PRC-023-3 from

Organization	Yes or No	Question 1 Comment
		PRC-025-1.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Entergy Services, Inc. (Transmission)	No	The proposed revision of PRC-023-3 provides a clear line of separation. In PRC-025, 3.2.4 actually creates confusion. The SDT should define exactly where PRC-025 stops (example High side of the GSU or generator lead line connection) to provide a lot more clarity. This addition provides no value other that unsuccessfully trying to bridge the "potential overlap" with PRC-023-2.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Ontario Power Generation	No	The wording of section 3.2.4 of the draft standard PRC-025-1 should make it clear that in the case where the generator is the owner of both the Generator Interconnection Facility (GIF) and the relays that protect the GIF then the generator is responsible for setting the relays in accordance with Table 1 of PRC-025-1. In the case where the GIF and relays are owned by the Transmitter then the transmitter is responsible. There may be cases where the GIF is owned by one entity and the relays by another entity in such cases the relay owner shall have the responsibility.
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
Southern Company Operations	No	There is no confusion in our company concerning the scope of PRC-023-2

Organization	Yes or No	Question 1 Comment
Compliance		and the interconnect facilities that we own. Facilities sections 3.2.2 and 3.2.3 seem to be out of scope given the purpose statement "generator protective relays". **Response:** The drafting team notes that the purpose statement is general, and is not intended to apply exclusively to generator relays. The drafting team has modified the purpose in response to your comment. Please refer to the revised purpose statement in draft 3 of the standard. Change made. We believe that Facilities section 3.2.3 does not belong in this standard, as they do not relate directly to the generator loadability. Addressing generating plant station service transformers does not have to translate into creating a standard requirement for that equipment. An investigation and evaluation of the protection system for unit auxiliary transformers should be considered by the standard drafting teamd and deemed to be not related to generator loadability. Providing a description of this dis-associated functionality fulfills the FERC order to address this subject. Further, there is confusion over which station service transformers are included in the scope. In footnote 1, is the concern immediate or eventual trips of the generator with the loss of a station service transformer? Are station service bus overcurrent relays subject to minimum setting criteria specified in Table 1? **Response:** The drafting team has included in the Applicability, Facilities sections 3.2.2 and 3.2.3 to be responsive to a regulatory directive in Order No. 733, Paragraph 104. Providing a description of this “dis-associated functionality” would not address FERC’s concern and would not be responsive to the directive. Inclusion of these two Facilities establishes requirements for load-responsive protective relays on generator step-up (GSU) transformers and on unit auxiliary transformers (UAT) that supply station service power to support the on-line operation of generating plants. These transformers are variably referred to as station power, unit auxiliary, or station service transformer(s) used to provide overall auxiliary power to

Organization	Yes or No	Question 1 Comment
		the generator station when the generator is running. The power transformers that are in-service when the unit is released to the dispatcher and, under normal plant operations, are capable for unit full load operation are considered. Only relays that trip the units via generator lockout action or directly trip of the generator breaker(s) are under the setting criteria. Startup/Standby transformers that are not required to keep the units running are excluded from the standard. Station service bus overcurrent relays are not subject to this standard. No change made. The inclusion of generating units and generating plants identified as Blackstart Resources in the Transmission Operator's system restoration plan is unnecessary and inappropriate. These units typically are the smaller units in a generating fleet and, alone, would not impact the ability to ride through the type of system excursion that is the concern of this standard. Further, providing protection system settings that are more conservative than these proposed in this standard will better protect these resources that are essential to recovering from a system blackout. **Response:** The drafting team believes that during Blackstart conditions the generator may experience extreme voltage and loading swings; therefore, Blackstart units are included and apply to the standard. If such generators are excluded from the applicability of the standard, they may not perform as expected to facilitate system restoration. Also, the drafting team notes that the standard only applies to those Blackstart resources identified in the Transmission Operator's system restoration plan (i.e., SRP) if identified as being BES. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
SC Public Service Authority	No	We agree with the SERC Protection and Control Subcommittes's comments about auxiliary transformers and blackstart units. The Standard is Titled "Generator Relay Loadability" and the purpose states "to set load-

Organization	Yes or No	Question 1 Comment
		responsive generator protective relays...” Unit auxiliary, station service, startup, and other auxiliary transformers go beyond what should be titled as “generator protective relays.” If concerns over this equipment need to be addressed, they should be addressed separately from the “generator protective relays.”
Response: The drafting team thanks you for your comments; please see our responses to SERC Regional Reliability Organization’s (SERC RRO). The drafting team notes that the purpose statement is general, and is not intended to apply exclusively to generator relays. The drafting team has modified the purpose in response to your comment. Please refer to the revised purpose statement in draft 3 of the standard. Change made. The drafting team believes that during Blackstart conditions the generator may experience extreme voltage and loading swings; therefore, Blackstart units are included and apply to the standard. If such generators are excluded from the applicability of the standard, they may not perform as expected to facilitate system restoration. Also, the drafting team notes that the standard only applies to those Blackstart resources identified in the Transmission Operator’s system restoration plan (i.e., SRP) if identified as being BES. No change made.		
Alliant Energy	No	We believe that there will likely be gaps between PRC-025-1 and PRC-023-3 on facilities rated between 100 to 200kV. PRC-025-1 will require GO’s to perform the loadability calc’s on every registered generator connected at this voltage. A transmission line at this voltage level is only going to be verified for loadability if the Planning Coordinator determines it is necessary according to PRC-023-3. Therefore, you may have the GO’s spending dollars on compliance activities that are not matched by the TO’s. It doesn’t make sense to increase the loadability of a generator if the corresponding transmission element is not also checked for loadability. Why not synchronize PRC-025-1 to PRC-023-3 and only mandate generators connected at 200kV or higher and then any generator between 100-200kV if selected by the Planning Coordinator?

Organization	Yes or No	Question 1 Comment
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
NERC Compliance	No	We understand that the intent of PRC-023-3 is to ensure that protective relay settings shall not limit transmission loadability, however, it might be worth qualifying that this does not include generator step up units.
Response: The drafting team has modified PRC-023-3 Attachment A, item 2.4 to address your concern. Change made.		
Puget Sound Energy	Yes	For PRC-023-3, Section 4 - Applicability - take the Generator Owner out of the Functional Entity section
Response: The drafting team thanks you for your comment and notes that the Generator Owner has been retained in the Applicability of PRC-023-3 to address configurations where the Generator Owner owns load-responsive protective relays on the terminals of network transmission lines. Change made.		
Pepco Holdings Inc	Yes	The proposed changes to PRC-023-2 are appropriate and necessary to provide a bright line between the two standards. However, the new term "Generator Interconnection Facilities" is not defined in the NERC Glossary of terms, nor is it defined in the body of the standard. This term needs to be defined within the body of the standard, perhaps as a footnote similar to that used to define Unit Auxiliary Transformers. A proposed definition might be "Generator Interconnection Facility(ies) comprise those Elements owned by the Generator Owner located between the high voltage terminals of the Generator Step-up Transformer and the point of interconnection with Transmission Owner Facilities."
Response: The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.		

Organization	Yes or No	Question 1 Comment
SRC	Yes	
Luminant Energy Company LLC	Yes	
Southwest Power Pool	Yes	
Arizona Public Service Company	Yes	
Electric Reliability Compliance	Yes	
Independent Electricity System Operator	Yes	
Northeast Utilities	Yes	
Tacke	Yes	
Idaho Power Co.	Yes	
Kansas City Power & Light	Yes	
Public Service Enterprise Group	Yes	
MID	Yes	
NV Energy	Yes	

2. Does the restructured and reformatted PRC-025-1, Attachment 1: Relay Settings, Table 1: Relay Loadability Evaluation Criteria clearly identify the criteria for setting load-responsive protective relays for each Option 1 through 19? If not, provide specific detail that would improve the clarity of Table 1.

Summary Consideration:

Approximately 36 comments representing 110 individuals were evenly divided between about the improvements in restructuring and reformatting the proposed PRC-025-1, Attachment 1: Relay Settings, Table 1: Relay Loadability Evaluation.

Comments resulting in a change to the standard

In issues raised about Attachment 1, the majority grouping of comments came from four comments supported by at least 32 individuals raising a concern about generator protection. Five of those were from the previous comment period regarding the thermal overloading the generator. The drafting team reiterated that the draft standard is intended to prevent fault protective relays from tripping generators unnecessarily for loading conditions within the generator capability. The standard does not to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. To address this issue, Attachment 1 was revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006. The drafting team points out that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary.

At least one comment supported by 19 individuals was requested clarity about the location of the relays. The drafting team provided example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applied to relay's CTs connected to either the high-side or the low-side of the auxiliary transformer (UAT) transformer if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria.

Minority comments collectively suggested through four comments and individuals were non-substantive and pertained to mainly editorial and formatting concerns. Those suggestions resulted in; (1) removing the hyphen from the Table 1, Application column and replacing it with "connected to" for clarity, (2) replacing the word "connected" in the Table 1, Pickup Setting Criteria to "aggregate" for consistency with the uses elsewhere in Table 1, and correcting typographical errors.

About comments supported by eight individuals identified a concern about how to determine the location of the relays. For example, are the current transformers (CT) on the high-side or low-side of the generator step-up (GSU) transformers? To address this issue, the drafting team made several changes to the Guidelines and Technical Basis document which will be consolidated with the standard upon approval. Changes included adding at least one figure and correcting an invalid reference to the "high-side" of the GSU in the Option 8 discussion.

A single minority comment supported by five individuals was concerned about meeting protection goals with load encroachment. The drafting team notes that whether or not load encroachment or blinders are effective requires a case by case analysis. Clarifying changes were made to the Guidelines and Technical Basis document.

Although minority comments, these resulted in a change or enhancement to the standard which were important situations. At least one individual raised an issue about multi-winding generator step-up (GSU) transformers. The drafting team agreed this configuration presented a more complex situation; therefore, provided additional information in the Guidelines and Technical Basis document. Another individual questioned how to address configurations where both synchronous and asynchronous generation is aggregated to a common bus. The drafting team considered how to address such a scenario that is not typical of the industry. To address the issue, the drafting team appended additional information in PRC-025-1 Attachment 1, Relay Settings to explain how to apply Table 1, Relay Loadability Evaluation Criteria to such a configuration.

Most comments that resulted in a change or enhancement to the standard came from comments supported by two or fewer commenters. At least one commenter raised an issue about multi-winding generator step-up (GSU) transformers. The drafting team agreed this configuration presented a more complex situation; therefore, provided additional information in the Guidelines and Technical Basis document. Another single commenter questioned how to address configurations where both synchronous and asynchronous generation is aggregated to a common bus. The drafting team considered how to address such a scenario that is not typical of the industry. To address the issue, the drafting team appended additional information in Attachment 1, Relay Settings to address how to handle such a configuration.

Comments not resulting in a change or substantive change to the standard

A common theme of comments from approximately six comments supported by 15 individuals represents the majority comments that did not result in a change to the standard; however, these comments reveal there is continued confusion about the objectives of the proposed PRC-025-1 standard. There was confusion about the role of the MOD-025-2 standard which is verification of generator output for both Real Power and Reactive Power, and PRC-019-1 which focuses on coordination between the Automatic Voltage Regulator (AVR) control and its associated protection setting. A second point of confusion was the belief that use of a voltage test is meaningless in the standard. The drafting team noted that since apparent impedance is a function of both voltage and current, a voltage test is necessary. Translation of an operating point from the P-Q plane to the R-X plane is a function of voltage. One comment recommended using Transmission line limitations as a basis for the standard rather than generator limitations. The drafting team contended that the appropriate criteria to address the objectives of this standard are based on generator performance during stressed system conditions and not line limitations as suggested. Last, at least three commenters believed the standard is addressing an actual operating point of the generation. The drafting team noted that the Mvar performance specified within the criteria did not represent an intentional operating point but is instead a natural behavior of the generator and its excitation system to abnormal system conditions. The level of field forcing that will occur during abnormal system conditions is not

affected by compromised equipment. The Mvar capability is a function of the field-forcing capability of the exciter/field during a system disturbance. Also, the drafting team does not believe that an entity will change its settings when a unit is de-rated.

At least three comments supported by about 12 individuals expressed concern that voltage-restrained devices should not recommended and, where used, that these devices should be replaced. The drafting team noted that it cannot require that such relays be replaced; therefore, the standard has to account for voltage-restrained devices and provide criteria applicable them.

At least one comment supported by two individuals requested the drafting team to define "generator interconnection Facility(ies)." The drafting team agreed that defining this phrase would require significant work to evaluate the impacts to other standards. It is believed that the phrase is consist with its industry-wide understanding and use for lines that connect generator units or plants to the Transmission system.

One commenter questioned the basis for using the Mega-Watt (MW) value reported to the Planning Coordinator (i.e., now replaced by "or other entity as specified by the Regional Reliability Organization) or Transmission Planner. The drafting team considered this same concern in past meetings and concluded that the Mega-Watt (MW) value reported to the Planning Coordinator or Transmission Planner was the most practical approach for a basis in determining the required setting(s). The Generator Owner has flexibility in using a more restrictive setting, which would be the case of using the generator name plate. In option 1, for example, the requirement is to use 100% of the reported MW and 150% of the nameplate MW to arrive at the Mvar component of the complex power. The impedance element must be set less than the calculated impedance derived from 115% of the complex power, which is using criteria (1) and (2). The standard allows the Generator Owners the flexibility to account for variable changes (e.g., environmental conditions) in the reported MW value and select a setting that best suits their specific operating history or expectation.

The remaining issues represent comments from individual commenters. On comment questioned the inclusion of generator step-up (GSU) transformers and unit auxiliary transformers (UAT). The drafting team included these facilities to be responsive to a regulatory directive in Order No. 733, Paragraph 104. One commenter requested the drafting team make an assessment between the standards; however, the team contends that the Guidelines and Technical Basis provides sufficient figures and discussion for an entity to distinguish when each standard is applicable. Another comment recommended creating separate tables which the drafting team did not endorse.

Other single comments included, one commenter suggesting the detailed criteria in the standard are unnecessary with respect to the provisions provided in the Paragraph 81 (FERC Order Accepting with Conditions the Electric Reliability Organization's Petition Requesting Approval of New Enforcement Mechanisms and Requiring Compliance Filing, March 15, 2012). The drafting team disagreed noting that Paragraph 81 ("P81") is focused on administrative requirements that provide little, if any, benefit or protection to the reliable operation of the BES. The drafting team contended that the detailed criteria found in the standard are necessary to meet the reliability objectives. In contrast, one commenter believed the standard provided too little detail.

Organization	Yes or No	Question 2 Comment
SERC RRO	No	The Table 1 settings force generators to operate up to 200% load continuously with no possibility to trip, thereby removing the effectiveness of the protection function altogether. ANSI C50.13 (and IEEE Std c50.13-2005 - Revision of ANSI C50.13-1989) defines the generator overload design criteria used by many generator manufacturers. It specifies an overload capability at 208% armature current of 10 seconds. This ANSI standard provides an inverse time characteristic to which most synchronous generators are built. It is unacceptable for the tables of PRC-025 to require sustained operation at the load levels specified. There should be a time frame defined in PRC-025 after which the generator owner is allowed to trip their equipment. Requiring the generator to operate at the specified overload conditions indefinitely will damage the generator. Protection of the generator should be the top concern of the protection device settings. Constraining generators to values specified in the draft standard compromise protection. Protection System settings have been proven through experience to provide a level of protection to their equipment. If all generators are forced to relax their current protection settings to the values specified, then it is much more likely that generators will be damaged and out of commission for an extended period of time. Consideration should be given to the impact of having multiple generators unavailable to the reliability of the system. Overload and fault damage to a generator is not always visibly apparent and often requires visual inspection or testing. This inspection can take days to accomplish. Transmission line loading practices do not apply to generating plant equipment. Generator Owners must be allowed to protect their

Organization	Yes or No	Question 2 Comment
		equipment from overloads. PRC-025, as currently drafted, will degrade BES reliability rather than enhance it. The draft standard setting specifications of Table 1 conflict with IEEE C37.102 Guide to Generator Protection. This guide (1995 revision) recomments setting the generator overcurrent relaying (51) so that it operates at 115% of rated current and trips in 7 seconds at 226% of full-load current.
Response: The drafting team thanks you for your comment. The draft standard is intended to prevent fault protective relays from tripping generators unnecessarily for loading conditions within the generator capability. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006. Change made.		
Ameren	No	(1) Attachment 1 is much improved, however we request that R1 clearly state that the GO can use any one of the options, and that the GO is not required to use any of these relay types (protective functions), such as the language in PRC-023 R1. **Response:** The drafting team has modified Attachment 1 to address your concern. Change made. (2) System-connected auxiliary transformers are load serving and do not belong in a Generator Loadability standard. Please refer to the recently approved BES Definition which shows they are clearly outside the BES definition criteria. Early drafts of PRC-005-2 also attempted to include them, but they are correctly excluded in industry and NERC BOT approved version recently filed with FERC. **Response:** The drafting team has included in the Applicability, Facilities sections 3.2.2 and 3.2.3 to be responsive to a regulatory directive in Order No. 733, Paragraph 104. Inclusion of these two Facilities establishes requirements for load-responsive protective relays on generator step-up (GSU) transformers and on unit auxiliary transformers (UAT) that supply

Organization	Yes or No	Question 2 Comment
		station service power to support the on-line operation of generating plants. These transformers are variably referred to as station power, unit auxiliary, or station service transformer(s) used to provide overall auxiliary power to the generator station when the generator is running. The drafting team also notes that NERC Reliability Standards may be applicable to non-BES Facilities as necessary to assure reliability of the bulk power system. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Manitoba Hydro	No	(1) Attachment 1, footnote 3: This footnote contains extraneous statements that do not impose obligations, and therefore should be removed. The phrase "on-load tap changers are rarely used" is a statement of fact and therefore unnecessary. The statement should be revised to simply say "If on-load tap changers are used, the calculations shall reflect ...". Otherwise, the wording may create the impression that use of on-load tap changers is restricted by the standard. Similarly, the last sentence of the footnote uses the word "may" rather than "shall". If the statement is not a requirement, it should be removed. If it is mandatory, the word "may" should be replaced with "shall". **Response:** The drafting team agrees and has made the suggested changes to the standard. Change made. (2) In attachment 1 in the column entitled "Relay Type", the term "Transmission system" is used several times and its meaning is unclear. It is not clear how this term differs from "Transmission" as defined in the NERC Glossary. If "transmission system" is retained in the attachment, the word "transmission" should not be capitalized, as "Transmission" and "transmission system" are two distinct terms. **Response:** The term "Transmission system" was selected by the drafting

Organization	Yes or No	Question 2 Comment
		team to specifically reference only Transmission facilities. If "Transmission" were lowercase, then there would be confusion as to the general use of the word. If "system" were capitalized, it would then include distribution facilities which is not the intent of the drafting team. By using "Transmission system," the standard is clear that the relays applied in the particular application are looking into the Transmission system and not the generator. No change made. (3) For option 3 in Table 1, the statement "(51V-C) - voltage controlled (Enabled to operate as a function of voltage)" is confusing. It should read something like "(51V-C) - voltage controlled (Operates with undervoltage supervision)". **Response:** The drafting team contends that the current description used "(Enabled to operate as a function of voltage)" for 51V-C is an adequately clear representation of this type relay. No change made. (4) The statement in "Bus voltage" does not make sense. It contradicts the voltage setting criteria (75%) on the right side of the table. **Response:** The drafting team is unclear on the specific contradiction. The Bus Voltage for Option 3, as well as Option 6, requires the Generator Owner to calculate the voltage to the generator side of the Generator Step-Up (GSU) transformer for the purposes of establishing the voltage seen by the generator. The setting in the Pickup Setting Criteria column is the setting threshold to which the relay must adhere, less than 75% of the calculated voltage in this case, to meet the requirement for a 51 V-C relay applied on the Generator Owner's facilities. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Pepco Holdings Inc	No	1) In order to properly calculate the appropriate relay pick-up setting it is important to know where the CTs and VT's supplying the relay are

Organization	Yes or No	Question 2 Comment
		located. Options 1 through 12 (excluding 11b) "imply" that the CT's and VT's are located on the generator bus (i.e. the low voltage side of the GSU transformer) since the Bus Voltage criteria requires determining the generator bus voltage, which in turn is used to calculate the relay pick-up quantities. Options 11b, and 14 through 19 "imply" that the CT's and VT's are located on the high voltage side of the GSU transformer since the transmission line voltage is used in the determination of the relay pick-up quantities. Since the CT and VT location is such an important consideration in correctly calculating the appropriate relay pick-up values, the location must be specifically identified in Table 1. This could be done either via appropriate use of footnotes, a separate column in Table 1, or appending the location to the information contained in the column labeled Relay Type. For example, Option 14 could be re-labeled "Phase distance relay (21) - direction toward the Transmission system with CT's and VT's supplying the relay located on the high side of the GSU transformer." Confusion as to where the relay CT's and VT's are located is evidenced by some of the errors made in the Example Calculations provided in the Guidelines and Technical Basis document. See comments on the Example Calculations in our response to Question 3. **Response:** The drafting team has included figures in the Guidelines and Technical Basis document for clarity. Change made. 2) If the use of blinders, or load encroachment elements, are permitted to achieve compliance with the setting criteria listed in Table 1, as was discussed in the recent NERC Webinar on PRC-025-1, then specific criteria on the application of these load encroachment devices must be included in the standard. The Guidelines and Technical basis states that "it is important to consider the potential implications of revising the shape of

Organization	Yes or No	Question 2 Comment
		the relay characteristic to obtain a longer relay reach, as this practice may restrict the capability of the generating unit..." The document goes on to refer the reader to Appendix E of the Power Plant and Transmission system Protection Coordination technical reference document for further reference. However, the standard itself is silent on whether these devices are permitted, and if so, what criteria is appropriate. If the SDT has concluded that the use of load encroachment devices are not permitted to satisfy Table 1 criteria, than the standard should so state. If, on the other hand, these devices are permitted, then the standard should state: "If blinders, or other load encroachment elements are employed to extend the relay reach while satisfying the loading criteria identified in Table 1 then a requirement must be included in the standard to ensure "the relay operating characteristic also be checked to ensure it will not operate when the generator is supplying power (as measured at the generator terminals) within its published capability curve." This is extremely important since in the latest draft of PRC-019 their SDT specifically eliminated coordination of the phase distance relay with the generator reactive capability curve, implying that it would be covered in the PRC-025 loadability standard. If load encroachment is not employed, a mho characteristic set in accordance with Table 1 criteria will automatically satisfy the steady state capability curve criteria. However if load encroachment is employed an extended reach along the +X axis could cause the relay to restrict generator capability. As such, this loadability criteria needs to be addressed in this standard. **Response:** The drafting team notes that whether or not load encroachment or blinders are effective requires a case by case analysis. Clarifying changes have been made to the Guidelines and Technical Basis

Organization	Yes or No	Question 2 Comment
		document. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Dominion Resources Services, Inc.	No	Table 1. Relay Loadability Evaluation Criteria, 1a, (1): "Real Power output - 100% of the MW capability reported to the Planning Coordinator or Transmission Planner,: This should be generator nameplate rating. The MW capability reported can change. **Response:** The drafting team considered this same concern in past meetings and concluded that the Mega-Watt (MW) value reported to the Planning Coordinator or Transmission Planner was the most practical approach for a basis in determining the required setting(s). The Generator Owner has flexibility in using a more restrictive setting, which would be the case of using the generator name plate. In option 1, for example, the requirement is to use 100% of the reported MW and 150% of the nameplate MW to arrive at the Mvar component of the complex power. The impedance element must be set less than the calculated impedance derived from 115% of the complex power, which is using criteria (1) and (2). The standard allows the Generator Owners the flexibility to account for variable changes in the reported MW value and select a setting that best suits their specific operating history or expectation. Using the reported MW value accounts for environmental conditions that impact the operation of generation units and those units which operate at a level lower than their nameplate rating. This more closely achieves a loadability setting corresponding with the expected performance of the generator during field-forcing. No change made. Table 1. Relay Loadability Evaluation Criteria, 14a or 14b: What is the definition of "Generator interconnection Facilities"? **Response:** The drafting team has included additional explanation in the

Organization	Yes or No	Question 2 Comment
		Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Essential Power, LLC	No	An allowance should be made in PRC-025 for unusual operating conditions, provided that the TO and TOP are notified of such circumstances. Generators that have compromised cooling (e.g. temporarily limited to below-rated hydrogen pressure) will experience a commensurate reduction in the field forcing that can be accommodated, for example, and units with a thermal stability issue can be knocked-offline by vibration and potentially damaged if massively above-rated reactive power flow is attempted. **Response:** The drafting team notes that the Mvar performance specified within the criteria does not represent an intentional operating point but is instead a natural behavior of the generator and its excitation system to abnormal system conditions. The level of field forcing that will occur during abnormal system conditions is not affected by compromised equipment. The Mvar capability is a function of the field forcing capability of the exciter/field during a system disturbance. The drafting team does not believe that entities will change settings when the unit is de-rated. No change made. Regarding in particular voltage-restrained overcurrent relays, this type of device is notorious for not having a predictable operation time under fault conditions. If they did mis-operate in the August 2003 blackout they should be changed-out rather than requiring that the settings be set as high as specified in the draft standard. **Response:** The drafting team agrees, in general, that voltage-restrained

Organization	Yes or No	Question 2 Comment
		devices are not recommended and, where used, that these devices should be replaced. However, as the drafting team is unable to require that such relays be replaced, applicable criteria are provided. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Cogentrix Energy Power Management, LLC	No	An allowance should be made in PRC-025 for unusual operating conditions, provided that the TO and TOP are notified of such circumstances. Generators that have compromised cooling (e.g. temporarily limited to below-rated hydrogen pressure) will experience a commensurate reduction in the field forcing that can be accommodated, for example, and units with a thermal stability issue can be knocked-offline by vibration and potentially damaged if massively above-rated reactive power flow is attempted. **Response:** The drafting team notes that the Mvar performance specified within the criteria does not represent an intentional operating point but is instead a natural behavior of the generator and its excitation system to abnormal system conditions. The level of field forcing that will occur during abnormal system conditions is not affected by compromised equipment. The Mvar capability is a function of the field forcing capability of the exciter/field during a system disturbance. The drafting team does not believe that entities will change settings when the unit is de-rated. No change made. Regarding in particular voltage-restrained overcurrent relays, this type of device is notorious for not having a predictable operation time under fault conditions. If they did mis-operate in the August 2003 blackout they should be changed-out rather than requiring that the settings be set as high as specified in the draft standard. **Response:** The drafting team agrees, in general, that voltage-restrained devices are not recommended and, where used, that these devices should

Organization	Yes or No	Question 2 Comment
		be replaced. However, as the drafting team is unable to require that such relays be replaced, applicable criteria are provided. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Alliant Energy	No	Attachment 1 has exemptions regarding which load responsive relays are exempt from the standard, however there is no discussion regarding any distance element that may employ load encroachment techniques to improve loadability while still trying to maximize protection. This standard appears to require the entity to pull back the reach of the distance protection regardless, which does not seem reasonable. The guideline may discuss encroachment, however it is not part of the standard, and the auditors only rely on the standard regarding what is enforceable.
Response: The standard is intentionally not prescriptive to how an entity assures that their relay settings meet the requirement of the standard. The Guidelines and Technical Basis document discusses alternatives that entities may consider. No change made.		
Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)	No	During the 2/13/13 PRC-025-1 Webinar, we understood the SDT to say that the requirement for verifying the settings of 51 relays for station auxiliary transformers only applied to those overcurrent relays applied on the high voltage side of the transformer such that operation of relay would result in a trip of the transformer. Furthermore, we understood the SDT to indicate the 51 relays applied on the source breaker(s) from the transformer secondary winding(s) to medium voltage bus(es) were not included in scope. If this is indeed the intent of the drafting team, we recommend the SDT clarify its intent by changing the field on the Table 1 entry for UAT for 51 relays to say "Phase time overcurrent relay (51) whose actuation results in

Organization	Yes or No	Question 2 Comment
		a trip of the UAT transformer".
Response: The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made.		
Southern Company Operations Compliance	No	Please modify the last sentence of the Introduction to Attachment 1 section just before the bullet listing by changing "Examples include" to "Examples of exclusions include" to emphasize that the bulleted list is a list of exclusions. **Response:** The drafting team has incorporated this suggestion for clarity of the exclusions provided by the standard. Change made. To follow the specified table separation protocol outlined, Options 4, 5, and 6 should have the light blue separator with no text. **Response:** The drafting team has incorporated this suggestion for consistency with the formatting of Table 1. Change made. The commas appearing before the word "derived" in the "pickup setting criteria" column for many of the options of Table 1 is not needed and should be removed. **Response:** The drafting team has incorporated this suggestion for consistency in Options 5, 10, 11a, and 17. Change made. The Table 1 settings force generators to operate up to 200% load continuously with no possibility to trip, thereby removing the effectiveness of the protection function altogether. ANSI C50.13 defines the generator overload design criteria used by many generator manufacturers. It specifies an overload capability at 208% armature current of 10 seconds. This ANSI standard provides an inverse time characteristic to which most synchronous generators are built. It is

Organization	Yes or No	Question 2 Comment
		unacceptable for the tables of PRC-025 to require sustained operation at the load levels specified. There should be a time frame defined in PRC-025 after which the generator owner is allowed to trip their equipment. Requiring the generator to operate at the specified overload conditions indefinitely will damage the generator. Protection of the generator should be the top concern of the protection device settings. Constraining generators to values specified in the draft standard compromise protection. Protection System settings have been proven through experience to provide a level of protection to their equipment. If all generators are forced to relax their current protection settings to the values specified, then it is much more likely that generators will be damaged and out of commission for an extended period of time. Consideration should be given to the impact of having multiple generators unavailable to the reliability of the system. Overload and fault damage to a generator is not always visibly apparent and often requires visual inspection or testing. This inspection can take days to accomplish. Transmission line loading practices do not apply to generating plant equipment. Generators must be allowed to protect their equipment from overloads. PRC-025, as currently drafted, will degrade BES reliability rather than enhance it. The draft standard setting specifications of Table 1 conflict with IEEE C37.102 Guide to Generator Protection. This guide (1995 revision) recomments setting the generator overcurrent relaying (51) so that it operates at 115% of rated current and trips in 7 seconds at 226% of full-load current. **Response:** The draft standard is intended to prevent fault protective relays from tripping generators unnecessarily for loading conditions within the generator capability. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection

Organization	Yes or No	Question 2 Comment
		designed to coordinate with the generator short time capability as described in C37.102-2006. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Kansas City Power & Light	No	Table 1 in and of itself does not provide enough detail. Table 1 is only clear after reading the examples in the "Guidelines and Technical basis" document.
Response: The drafting team thanks you for your comments; however, the comment does not suggest what would add clarity to Table 1. No change made.		
ReliabilityFirst	No	Table 1 would be clearer if a relay functional drawing(s) was inserted that indicated the location of the installation of the relays and instrument transformers indicated in Options 1 through 19. The drawing(s) would make it clearer the differences between options such as options 1a, 1b & 1c and options 7a, 7b & 7c and whether the instrument transformers are on one side or the other of a device.
Response: The drafting team has included figures in the Guidelines and Technical Basis document for clarity. Change made.		
PPL Generation, LLC on behalf of its Supply NERC Registered Entities	No	The PPL Companies do not agree that the criteria is clearly identified for setting load-responsive protective relays. The PPL Companies agree with the comments below from the North American Generators Forum standard review team: An allowance should be made in PRC-025 for unusual operating conditions, provided that the TO and TOP are notified of such circumstances. Generators that have compromised cooling (e.g. temporarily limited to below-rated hydrogen pressure) will experience a commensurate reduction in the field forcing that can be accommodated, for example, and units with a thermal stability issue can be knocked-

Organization	Yes or No	Question 2 Comment
		offline by vibration and potentially damaged if massively above-rated reactive power flow is attempted. **Response:** The drafting team notes that the Mvar performance specified within the criteria does not represent an intentional operating point but is instead a natural behavior of the generator and its excitation system to abnormal system conditions. The level of field forcing that will occur during abnormal system conditions is not affected by compromised equipment. The Mvar capability is a function of the field forcing capability of the exciter/field during a system disturbance. The drafting team does not believe that entities will change settings when the unit is de-rated. No change made. Regarding in particular voltage-restrained overcurrent relays, this type of device is known for not having a predictable operation time under fault conditions. If they did mis-operate in the August 2003 blackout they should be changed-out rather than requiring that the settings be set as high as specified in the draft standard. **Response:** The drafting team agrees, in general, that voltage-restrained devices are not recommended and, where used, that these devices should be replaced. However, as the drafting team is unable to require that such relays be replaced, applicable criteria are provided. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Entergy Services, Inc. (Transmission)	No	The SDT should provide more reference as of how MOD-025 and PRC-019 will play a role into the loadability standards especially how reactive capability verification will provide an input to the calculations on Table 1. **Response:** The drafting team notes that the cited standards reference operating capabilities and the proposed PRC-025-1 addresses short-term disturbances and provides relay setting criteria for loadability during field-

Organization	Yes or No	Question 2 Comment
		forcing. The MOD-025-2, which combined the previous MOD-024 and MOD-025, deals with steady state capability, and standard PRC-019-1 focuses on coordination between the Automatic Voltage Regulator (AVR) control and its associated protection setting. The PRC-025-1 standard ensures the field forcing capability of the machine is used to allow the machine to stay on-line for a recoverable system disturbance. The applicable load-responsive protective relays and their associated settings are based on (1) the megawatt (MW) output reported to the Planning Coordinator or Transmission Planner, which is determined by MOD-025-2 and, (2) the calculated megavolt-ampere-reactive (Mvar) based on the generator unit nameplate rating. No change made. A clear path shall be established between PRC-019, MOD-025 and PRC-025 and perhaps cross reference the Power Plant and Transmission System Protection Coordination technical document. The terms MVAR output determined by simulation should also be replaced with the new approved requirements of MOD-025. **Response:** The drafting team notes that the Mvar output determined by simulation provides the necessary result for determining the level of field-forcing anticipated by the standard and generation unit. The standard MOD-025-1 is verification of the generation unit's Mvar capability during steady-state conditions, not field-forcing. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Luminant Energy Company LLC	No	The Table does not provide any guidance for loadability relays that may be installed on generators tied to an 345/138/20kV auto-transformer. Luminant recommends adding this operating scenario to the list.
Response: The drafting team believes this is a situation where the entity should employ options which use simulation. The Guidelines and Technical Basis to provide basis information about the issues regarding multi-winding transformers. Change		

Organization	Yes or No	Question 2 Comment
made. Applications that use more complex topologies, such as generators connected to a multiple winding transformer, are not directly addressed by the criteria in the table. Entities with these topologies should set their relays in such a way that they do not operate for the conditions being addressed in this standard and should be prepared to demonstrate that their relays are set accordingly.		
Tacoma Power	No	The table is generally clear. However, there were at least three areas for improvement. For 51V - voltage-restrained relay types, the overcurrent pickup is reduced in proportion to the voltage. Should the overcurrent element pickup be evaluated relative to 115% of the calculated current, or should the reduced overcurrent pickup be evaluated relative to 115% of the calculated current? **Response:** The overcurrent element should be evaluated relative to 115% of the calculated current, as clarified in the Guidelines and Technical Basis document. In Table 1, Options 2c and 15b, Pickup Setting Criteria column, change "...115% o..." to "...115% of..." **Response:** The drafting team has corrected the typographic error in Options 2c and 15b where the letter "f" was omitted on the word "of." Change made. In Table 1, Pickup Setting Criteria column, sometimes the term 'connected' is used when describing the Reactive Power output calculation, and sometimes the term 'aggregate' is used. Is a distinction intended? If so, what is the distinction? If not, it is suggested that these terms be made consistent. **Response:** The drafting team has revised the term "connected" to "aggregate" for consistency within the standard in Options 9a, 9b, and 9c.

Organization	Yes or No	Question 2 Comment
		Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
NV Energy	No	To apply a voltage test to distance relays is not meaningful. A distance relay responds to apparent impedance, regardless of terminal voltage.
Response: The drafting team thanks you for your comment. The drafting team contends that since apparent impedance is a function of both voltage and current, a voltage test is necessary. Translation of an operating point from the P-Q plane to the R-X plane is a function of voltage. No change made.		
American Electric Power	No	To improve the clarity of Table 1 AEP recommends providing separate tables for each application. **Response:** The drafting team has considered several approaches to present the criteria and believes that the single table, separated in the current fashion for different applications, is the most effective approach. The application column should be revised to remove the use of dashes " - " and to instead use the words "connected to". For examples: revise "GSU - synchronous generators" to read "GSU connected to synchronous generators". **Response:** The drafting team agrees and has modified the application column accordingly. Change made. Table 1 and the Guidelines and Technical Basis document should be revised to clearly indicate which options are applicable to a Generator interconnection Facility that is connected to both synchronous and asynchronous generators. For this situation, the options currently provided for a Generator interconnection Facility that is connected to an asynchronous generator should be used in this case. **Response:** The drafting team has added a paragraph to Attachment 1 to

Organization	Yes or No	Question 2 Comment
		address this specific configuration. Change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
SC Public Service Authority	No	We agree with the SERC Protection and Control Subcommittes's comments.
Response: The drafting team thanks you for your comments; please see our responses to SERC Regional Reliability Organization's (SERC RRO).		
ACES	Yes	(1) The table is much improved and we appreciate the clear delineation to which relay and which equipment type the setting criteria apply.
Response: The drafting team thanks you for your comments and support.		
Puget Sound Energy	Yes	a. For Option 13 in Table 1., the value of 150% is higher than the NEC Maximum rating shown in the 2011 NEC, Article 450, Table 450-3(a) for "Secondary Protection, 600 Volts or Less, Circuit Brkr or Fuse Rating". The value in the table is 125%. **Response:** The draft standard only applies to Unit Auxiliary Transformers that supply power to the unit and not to low voltage transformers installed inside the plant electrical auxiliary system. No change made. b. For Option 14 in Table 1., "Generator Interconnection Facilities - synchronous generators, Phase Distance relay (21) directional twds Trans. System" - this might better be based on line limitations, not generator limitations. **Response:** The drafting team contends that the appropriate criteria to address the objectives of this standard are based on generator performance during stressed system conditions and not line limitations. No change made.

Organization	Yes or No	Question 2 Comment
Response: The drafting team thanks you for your comments, please see the above responses.		
Northeast Power Coordinating Council	Yes	Attachment 1 is a good guideline for relay setting philosophy. However, Table 1 is is too detailed and prescriptive to be in a standard. As is, the wording in Requirement 1 and Attachment 1 should be revised to allow for relay setting exceptions. The exceptions should allow for relay settings that do not exceed the safe operating range of the generator as determined by the generator manufacturer.
Response: The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made.		
Hydro-Québec Production	Yes	Comments: As per the intent of the paragraph 81, the detailed criteria should not be incorporated in the standard.
Response: The drafting team thanks you for your comments and support. Paragraph 81[2] is focused on administrative requirements that provide little, if any, benefit or protection to the reliable operation of the BES. The drafting team contends that the detailed criteria are necessary to meet the objectives of this reliability standard. No change made.		
Duke Energy	Yes	
Southwest Power Pool	Yes	
NERC Compliance	Yes	

[2] http://www.nerc.com/files/OrderConditionallyAcceptingNewEnfocementMechFiling_031512.pdf

Organization	Yes or No	Question 2 Comment
FirstEnergy Corp	Yes	
Transmission Reliability Program	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Electric Reliability Compliance	Yes	
Northeast Utilities	Yes	
Ingleside Cogeneration LP	Yes	
Wisconsin Electric Power Company	Yes	
Tacke	Yes	
Idaho Power Co.	Yes	
MID	Yes	
SRC		SRC is not providing any comment or response to this question as it applies directly to GOs.
Response: The drafting team thanks you for your consideration.		

3. Does PRC-025-1, Guidelines and Technical Basis provide a clear understanding of the various criteria, including the options (e.g., 1a, 1b, 1c, 2a, etc.) for setting load-responsive protective relays? If not, provide specific detail that would improve the Guidelines and Technical Basis.

Summary Consideration:

Approximately half of the comments supported by 92 individuals out of 129 total individuals expressed that the PRC-025-1 Guidelines and Technical Basis in varying degrees did not provide a clear understanding of the criteria for setting load-responsive protective relays. The majority of comments received resulted in a change or substantive change to the standard.

Comments resulting in a change to the standard

The majority of the comments that resulted in changes to the standard were focused in two areas, generator overload protection concerns and questions about the location of relays on the unit auxiliary transformer or UAT. Approximately eight comments supported by about 30 individuals were concerned that the standard was preventing the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. The drafting team revised Attachment 1 to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Relay location questions were presented by at least six comments supported by about 33 individuals. To address these questions, the drafting team noted that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria.

The remaining comments that resulted in a change to the standard or other documents were raised by minority interests. At least three comments supported by about 11 individuals identified varying errors in the calculations of the Guidelines and Technical Basis document. The drafting, in particular, thanks Pepco Holdings, Inc. for conducting a thorough review and commenting on the errors discovered in the Guidelines and Technical Basis document. The drafting team implemented corrections for over a dozen various mistakes and changes to equation syntax. One comment representing six individuals requested clarity in how to apply the 0.85 per unit voltage within a simulation. The drafting team added additional clarifying text in the Guidelines and Technical Basis document which will be consolidated with the standard upon approval. A comment representing at least five individuals requested figures to illustrate the location of voltage transformers (VT) and current transformers (CT) within the context of the standard. The drafting team provided a figure in the Guidelines and Technical Basis document.

One commenter questioned when should an entity stop performing iterations in the applicable equations that require the values to converge. The drafting noted that once the change between iterations is less than one percent (<1.0%), iterations may stop. Clarifying language was added to the Guidelines and Technical Basis document.

Another individual questioned how to address configurations where both synchronous and asynchronous generation is aggregated to a common bus. The drafting team considered how to address such a scenario that is not typical of the industry. To address the issue, the drafting team appended additional information in PRC-025-1 Attachment 1, Relay Settings to explain how to apply Table 1, Relay Loadability Evaluation Criteria to such a configuration.

Comments not resulting in a change or substantive change to the standard

There were three groups of comments which could be listed as majority opinions. First, approximately six comments representing 24 individuals expressed concern either that certain Facilities should be excluded from the standard or that there was insufficient data to base the loadability criteria. The drafting team noted it developed the standard in accordance with the regulatory directive concerning generator relay loadability, which is an outcome of the 2003 blackout report. Second, about five comments supported by at least 14 individuals questioned if a station service alternate source is required to comply with the standard. The drafting team contended that if using the alternate station service source an anticipated operating condition, the protective relays on the alternate source of station service would need to be compliant with the standard. Last, at least two comments supported by about 27 individuals suggested the standard refer to the "generator leads" as the "GSU (generator step-up) leads." The drafting team disagreed because "generator leads" is the more commonly referred to term to identify the lines connecting to the Transmission system.

The remaining comments are classified as minority opinions that did not result in changes to the standard. Two comments by two individuals wanted the drafting team to revise/update the will consider whether changes are necessary to the Power Plant and Transmission System Protection Coordination written by the NERC System Protection and Control Subcommittee (SPCS). The drafting team has advised the appropriate NERC staff to make a request to the NERC Planning Committee to consider the revision. In the meantime, no changes will be made to the Power Plant technical document. These comments appeared to have no more than two comments supported by an individual commenter. One commenter suggested dropping the 0.85 calculation, where applicable and only provide the 0.95 or simulation criteria. The drafting disagreed noting that the 0.95 and 0.85 options must be available to those entities that do not have access to simulate the generator unit output. Another individual was confused about the application of the 115% margin to the setting criteria. The drafting team noted that the overcurrent element should be evaluated relative to 115% of the calculated current, as clarified in the Guidelines and Technical Basis document.

Other single comment included, one commenter suggesting the detailed criteria in the standard are unnecessary with respect to the provisions provided in the Paragraph 81 (FERC Order Accepting with Conditions the Electric Reliability Organization's Petition Requesting Approval of New Enforcement Mechanisms and Requiring Compliance Filing, March 15, 2012). The drafting team

disagreed noting that Paragraph 81 ("P81") is focused on administrative requirements that provide little, if any, benefit or protection to the reliable operation of the BES. The drafting team contended that the detailed criteria found in the standard are necessary to meet the reliability objectives. In contrast, one commenter believed the standard provided too little detail. Last, one commenter raised a similar concern found in Question 2 about a "voltage measure" concerning relays. The drafting team could only note that since the apparent impedance is a function of both voltage and current, a "voltage measure" is necessary. Translation of operating point from the P-Q plane to the R-X plane is a function of voltage.

Organization	Yes or No	Question 3 Comment
SERC RRO	No	The technical basis 1) does not adequately address the protection of the generator, and **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made. 2) is narrow in scope by basing the settings criteria on one event and simulation rather than real world event data and historical performance. The number of generators that have tripped for loadability does not constitute a statistically significant value of concern based on the overall number of generators that did trip during the Aug 2003 event. (Approx 25/290 = 8.6%) **Response:** The drafting team has developed the standard in accordance with the regulatory directive concerning generator relay loadability, which is

Organization	Yes or No	Question 3 Comment
		an outcome of the 2003 blackout report. The report revealed the need to address generator relay loadability. The drafting team understands there is limited empirical data regarding generator relays tripping due to insufficient relay loadability. However, as noted in the NERC document 'Power Plant and Transmission System Coordination' – July 2010, at least 28 generators were tripped on August 14, 2003 by load-responsive phase protection; eight of those by phase distance and 20 more by 51V protection. Generators tripping by these load-responsive protective relays are significant because these protective relays are subject to operating during the phase of a disturbance during which the system may be capable of recovering, whereas other protective relays that are not responsive to load are more likely to operate after the system has become unstable or during a system collapse. It is therefore more important to focus attention on preventing operation of load-responsive protective relays from tripping generators, which may cause or contribute to an otherwise recoverable event resulting in cascading, instability, or uncontrolled system separation. The drafting team notes that the depressed voltage condition observed on August 14, 2003, with sustained transmission voltage of 0.85 per unit, represents a realistic stressed system voltage condition for an extreme, but recoverable system event. Selection of this condition in the proposed PRC-025-1 standard is based on Recommendation 8a of the NERC Actions to Prevent and Mitigate the Impacts of Future Cascading Blackouts (Approved by the Board of Trustees February 10, 2004), which formed the basis for industry-wide evaluation of transmission relays for relay loadability and NERC Reliability Standard PRC-023. Use of this system condition provides consistency between the approved transmission relay loadability standard and the draft generator relay loadability standard. No change made.
Response: The drafting team thanks you for your comment, please see the responses above.		

Organization	Yes or No	Question 3 Comment
Ameren	No	(1) Resetting generator protective relays as advocated in this proposed standard will exceed ANSI C50.13 and IEEE C37.102 which we believe is a greater threat to BES reliability than the very rare instances of generators being tripped during an extreme disturbance. The examples of pre-mature generator trips cited as basis for this proposed standard occurred during events that are well beyond design basis.
Response: The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made		
ACES	No	(1) We believe there is still some confusion that needs be removed. It is unclear to us what differentiation is intended by "calculated generator bus voltage" and "simulate generator bus voltage" in options 1b, 1c, 2b, 2c, 7b, 7c, 8b, 8c, 9b, and 9c. One would presume that the "calculated" language is intended for the calculation to be performed assuming the high sidebus voltage is 0.85 pu. **Response:** The drafting team notes that the Guidelines and Technical Basis that accompanied the draft 2 PRC-025-1 standard posting incorporated example calculations to illustrate the various options identified in Table 1. No change made. What is particularly confusing is how does one assume that the highside bus voltage is 0.85 pu on a simulation. Do we put an artificial reactor in the simulation as the high side bus to force the voltage to 0.85 pu? **Response:** The drafting notes that the Guidelines and Technical Basis which accompanied the draft 2 PRC-025-1 standard posting has a section called, "Synchronous Generator Simulation Criteria." This section discusses how a Generator Owner might model a generation unit for the purposes of those

Organization	Yes or No	Question 3 Comment
		options which allow simulation. To simulate the high-side terminal voltage of 0.85 per unit, an artificial reactor could be inserted in the simulation on the high-side bus to force the high-side voltage to 0.85 per unit. The drafting team will include a simulation example in the Guidelines and Technical Basis to demonstrate the simulation method. Change made. An application guidelines section should be developed to explain this difference and further augment the understanding and rationale of the criteria settings in Table 1. **Response:** The drafting team has added additional information about conducting a simulation including the applicable calculations. Change made.
Response: The drafting team thanks you for your comment, please see the responses above.		
Dominion Resources Services, Inc.	No	In the Guidelines and Technical Basis document under Applicability the terms transmission Facilities and generator leads are mentioned. It should be noted that some companies use different terms when referring to the leads connecting the generator Facility to the BES facility. The leads connection between the generator Facility GSU transformer and the BES Facility breakers may be referred to GSU leads and not Generator leads. Generator leads may be those located inside the generator Facility between the GSU lowside and the generator itself. Clarity should be provided with respect to this issue.
Response: The drafting team thanks you for your comment. The drafting team contends that "generator leads" is the more commonly used term for this application. No change made.		
Pepco Holdings Inc	No	All of the following comments refer to the Example Calculations included in the Guidelines and Technical Basis document. 1) A single line drawing would be helpful to illustrate where the CT's and VT's which supply the relay are located for the various examples. At the

Organization	Yes or No	Question 3 Comment
		very least, a description of where the CT's and VT's are located should appear in the blue box heading describing each example calculation. **Response:** The drafting team has included figures in the Guidelines and Technical Basis document for clarity. Change made. 2) In all the examples, P (reported) is equal to the P (rated). To avoid confusion between the two and to demonstrate when to use which value in the calculations, a different P reported should be used in the examples. **Response:** The drafting team agrees and has revised the example calculations to provide better distinction between $P_{reported}$ and the "P" which is calculated in the sample calculations. Change made. 3) There should be one corresponding example for each option, with the exception of those requiring simulations (i.e., 1c, 2c, 7c, 8c, 9c, 14b, 15b, and 16b). At present, there is no example calculation for Option 7a. **Response:** The drafting team overlooked Option 7a in the draft 2 posting of the standard and has now included it. Change made. 4) Equations 14, 16, 36 and 38 and the subsequent results in the Example Calculations are in error. They were derived from the power transfer equation. When this equation is re-arranged to solve for the angle, the arcsin function should apply to both the numerator and denominator, not just to the numerator. The correct equation should be angle = arcsin [(P x Xt)/(V1 x V2)]. Reference Equation 6 in Appendix E of the NERC SPCS Power Plant and Transmission System Protection Coordination technical reference document. **Response:** The drafting team agrees and has corrected Equations 14, 16, 36, and 38. Change made. 5) There is a syntax error in Equations 15, 17, 37, and 39 in the Example Calculations. The cosine term within the radical expression shows the angle

Organization	Yes or No	Question 3 Comment
		being squared rather than the cosine function being squared. The equation should mirror that of Equation 7 in Appendix E of the NERC SPCS Power Plant and Transmission System Protection Coordination technical reference document. **Response:** The drafting team has corrected the syntax error in equations 15, 17, 27, and 39 to show the exponent in the correction position with respect to the function and not the angle. For reference "$\cos(\Theta)^{2}$" was changed to "$\cos^{2}(\Theta)$." Change made. 6) All examples should be reviewed for simple math errors. For example Equation 21 shows that 0.3458 x 25 = 8.6462. However, 0.3458 x 25 actually equals 8.645. Although this is a small error, it is confusing for someone trying to follow along with the calculations. **Response:** The drafting team has corrected the mathematical rounding error. Change made. 7) Equations 45 and 46 are unnecessarily included in the Example Calculations for Option 3 and Option 6. Options 3 and 6 only require a voltage setting criteria and do not require a calculation of generator P and Q. **Response:** The drafting team agrees Equations 45 and 46 are unnecessary and have removed them from the Equation Calculations. Change made. 8) There is a typographical error in the line following Equation 50 in the Example Calculations. The 100 Mvar and 475.7 Mvar values should be added together not multiplied. **Response:** The drafting team agrees that Equation 50 has a typographical error and has changed the multiplication symbol to an addition symbol. Change made. 9) The Example Calculation for Options 8a, 8b, 9a, 9b, 15a, and 16a is

Organization	Yes or No	Question 3 Comment
		extremely confusing and we believe in error. Options 8a, 8b, 9a, and 9b are for applications where the CT's and VT's supplying the relay are located on the low voltage side of the GSU transformer. As such, the generator low side bus voltage must be calculated. The example provided was supposed to be for Option 8b, which should use GSU low side quantities. However the high side voltage (293.25 kV) was calculated and then used to calculate the high side primary current. This was then divided by the low side CT ratio to obtain secondary quantities to the relay. This does not make sense. This example should be re-worked for Options 8a, 8b, 9a and 9b only, and should utilize V and I quantities on the low side of the GSU transformer. Options 15a and 16a should be broken out into a separate Example Calculation. That is because they are for applications where the CT's and VT's are located on the high voltage side of the GSU transformer. This requires the calculation of V and I quantities on the high side of the transformer. **Response:** The drafting team has made clarifying changes to the above Options regarding the location of the relay. The high-side CT ratio is now applied in the Example Calculations instead of the low-side CT ratio. Change made. 10) The blue box describing the Example Calculation for Option 14a incorrectly describes Option 14a as a phase directional time overcurrent (67) element instead of a phase distance relay (21). **Response:** The drafting team agrees and has changed the description from phase directional time overcurrent (67) element to phase distance relay (21). Change made. 11) The Example Calculation for Option 14a assumes the CT's and VT's supplying the relay are located on the high voltage side of the GSU transformer. As such, the system voltage was correctly calculated as 0.85 pu (293kV) on the high side of the transformer. However, using the low side apparent power and the high side voltage in Equation 85 is incorrect. The

Organization	Yes or No	Question 3 Comment
		P+jQ complex power used in Equation 85 is the power at the terminals of the generator (i.e., the same as was used in all the previous examples when the relay was located on the low side of the GSU). The power used in Equation 85 should be the apparent power as seen on the high side of the GSU, which would be the P+jQ seen on the low side, minus the I squared Xt Mvar loss in the transformer. In addition, since the relay is located on the high side of the GSU transformer, the CT and VT ratios used in Equation 86 should be the high side instrument transformer ratios, not those on the low side. **Response:** The drafting team has re-worked Example Calculations: 8a, 8b, 9a, 9b, 15a and 16b to be only applied to 15a and 16a. The high-side CT ratio is now applied in the Example Calculations instead of the low-side CT ratio. Criteria 14a and 14b have also been revised to reflect the Mvar loss in the transformer. Change made. 12) The Example Calculation for Options 11b, 18, and 19 assumes the CT's and VT's supplying the relay are located on the high voltage side of the GSU transformer. As such, the system voltage was correctly calculated as 1.0 pu (345kV) on the high side of the transformer. However, using the low side apparent power and the high side voltage in Equation 93 is incorrect. The P+jQ complex power derived from Equations 89 and 90 is the power on the low side of the GSU transformer (i.e., the same as was used in all the previous examples when the relay was located on the low side of the GSU). The example does not indicate where the additional Mvar source is located, but presumably it is located on the low side of the GSU since it is directly added to the generator Mvar rating. The power used in Equation 93 should be the apparent power as seen on the high side of the GSU, which would be the total P+jQ seen on the low side of the GSU from Equation 92, minus the I squared Xt Mvar loss in the transformer. As was discussed in Comment 1, a single line diagram showing where the CT's and VT's are located; what the apparent power is (both on the low and high side); and where the added

Organization	Yes or No	Question 3 Comment
		Mvar source is located; would be extremely helpful in understanding the example calculation. **Response:** The drafting team has re-worked Example Calculations: 8a, 8b, 9a, 9b, 15a and 16b to be only applied to 15a and 16a. The high-side CT ratio is now applied in the Example Calculations instead of the low-side CT ratio. Criteria 14a and 14b have also been revised to reflect the Mvar loss in the transformer. Change made.
Response: Thank you for your detailed review of the calculations. The drafting team thanks you for your comments; please see the responses above.		
American Electric Power	No	Does the drafting team have plans to re-incorporate the Guidelines and Technical Basis document back into the standard itself (as it was originally), and if so, when would this occur? If not and this document is to remain separate from the standard, the drafting team needs to establish a clear, strong relationship between the standard and guideline document and one which would allow entities to cite the guideline as evidence during an audit. A single footnote is not a sufficient reference to an external guidance document, especially one as detailed as the one proposed. **Response:** The drafting team will re-append the Guidelines and Technical Basis document to the standard upon industry approval. The documents were separated for management purposes and to facilitate editing between team members. The Guidelines and Technical Basis document title has been revised to clarify the relationship. Change made. Table 1 and the Guidelines and Technical Basis document should be revised to clearly indicate which options are applicable to a Generator interconnection Facility that is connected to both synchronous and asynchronous generators. **Response:** The drafting team has added a paragraph to Attachment 1 to

Organization	Yes or No	Question 3 Comment
		address this specific configuration. Change made. It is not clear from the Unit Auxiliary Transformer section of Guidelines and Technical Basis document how this standard would apply to a transformer with high-side windings directly connected to the transmission grid whose phase time overcurrent relaying operating would remove only plant process load but loss of this load would result in a process trip and loss of the unit. (i.e. loss of the ID fan resulting in a furnace pressure trip on the unit). This scenario needs to be added to the list of examples included in the guideline, and explicitly included or excluded. **Response:** The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made. During the 2/13 webinar it was stated that start-up transformers providing power when the unit is not on-line are out of scope for PRC-025-1. When questioned as to whether PRC-025-1 would become applicable to the transformer if the failure of the normal UAT resulted in the entity utilizing the start-up transformer for running power, the SDT responded that yes, the transformer would be applicable to PRC-025-1 during the time that occurs. If UATs are to remain in scope, an exemption should be included to allow an entity to operate in an emergency configuration without being in violation of PRC-025-1. **Response:** The drafting team contends that if this is an anticipated operating condition, the protective relays on the alternate source of station service would need to be compliant with the standard. No change made. Section 3.2.3 of the standard and the Unit Auxiliary Transformer section of the Guidelines and Technical Basis should be revised to clearly exclude

Organization	Yes or No	Question 3 Comment
		transformers that feed process loads that are needed for generating unit operation but would not result in an immediate unit trip or runback. Examples include coal unloading, lime stone unloading, environmental process etc. that provide ample time for system reconfiguration or alternative feeds to be established before the generating unit operation is impacted. These would not immediately impact the output cabability of the unit to "supply overall auxiliary power necessary to keep generating unit(s) online", and should be excluded as a result. **Response:** The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made.
Response: The drafting team thanks you for your comment, please see the responses above.		
Essential Power, LLC	No	During the 2/13 webinar it was stated that start-up transformers that provide power when the unit is not on-line are out of scope for PRC-025-1. When questioned as to whether PRC-025-1 would become applicable to the transformer if the failure of the normal UAT resulted in the entity utilizing the start-up transformer for running power, the SDT responded yes, at that time the transformer would be applicable to PRC-025-1. If UATs are to remain in scope, an exemption should be included to allow an entity to operate in an emergency configuration without being in violation of PRC-025-1. **Response:** The drafting team contends that if this is an anticipated operating condition, the protective relays on the alternate source of station service would need to be compliant with the standard. No change made. It is unclear from the wording in the Guidelines and Technical Basis whether

Organization	Yes or No	Question 3 Comment
		the following is in scope: a transformer with high-side windings directly connected to the transmission grid whose phase time overcurrent relaying operates to remove only plant process load but loss of this load would result in a process trip and loss of the unit. Transformers that provide power to auxiliary loads not directly related to the generation of power should be excluded. This includes coal/lime stone unloading, chemical and water processing, some environmental processes etc. **Response:** The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made. The Guidelines and Technical Basis does not adequately address the protection of the generator, and is narrow in scope by basing the settings criteria on one event and simulation rather than real world event data and historical performance. The number of generators that have tripped for loadability does not constitute a statistically significant value of concern based on the overall number of generators that did trip during the Aug 2003 event. (Approx 25/290 = 8.6%). **Response:** The drafting team has developed the standard in accordance with the regulatory directive concerning generator relay loadability, which is an outcome of the 2003 blackout report. The report revealed the need to address generator relay loadability. The drafting team understands there is limited empirical data regarding generator relays tripping due to insufficient relay loadability. However, as

Organization	Yes or No	Question 3 Comment
		noted in the NERC document 'Power Plant and Transmission System Coordination' – July 2010, at least 28 generators were tripped on August 14, 2003 by load-responsive phase protection; eight of those by phase distance and 20 more by 51V protection. Generators tripping by these load-responsive protective relays are significant because these protective relays are subject to operating during the phase of a disturbance during which the system may be capable of recovering, whereas other protective relays that are not responsive to load are more likely to operate after the system has become unstable or during a system collapse. It is therefore more important to focus attention on preventing operation of load-responsive protective relays from tripping generators, which may cause or contribute to an otherwise recoverable event resulting in cascading, instability, or uncontrolled system separation. The drafting team notes that the depressed voltage condition observed on August 14, 2003, with sustained transmission voltage of 0.85 per unit, represents a realistic stressed system voltage condition for an extreme, but recoverable system event. Selection of this condition in the proposed PRC-025-1 standard is based on Recommendation 8a of the NERC Actions to Prevent and Mitigate the Impacts of Future Cascading Blackouts (Approved by the Board of Trustees February 10, 2004), which formed the basis for industry-wide evaluation of transmission relays for relay loadability and NERC Reliability Standard PRC-023. Use of this system condition provides consistency between the approved transmission relay loadability standard and the draft generator relay loadability standard. No change made. Part of the Rational statement for R1 is flawed - it is not currently possible to both "comply with the draft standard and achieve (an entity's) desired protection goals". **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If

Organization	Yes or No	Question 3 Comment
		legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made.
Response: The drafting team thanks you for your comment, please see the responses above.		
Cogentrix Energy Power Management, LLC	No	During the 2/13 webinar it was stated that start-up transformers that provide power when the unit is not on-line are out of scope for PRC-025-1. When questioned as to whether PRC-025-1 would become applicable to the transformer if the failure of the normal UAT resulted in the entity utilizing the start-up transformer for running power, the SDT responded yes, at that time the transformer would be applicable to PRC-025-1. If UATs are to remain in scope, an exemption should be included to allow an entity to operate in an emergency configuration without being in violation of PRC-025-1. It is unclear from the wording in the Guidelines and Technical Basis whether the following is in scope: a transformer with high-side windings directly connected to the transmission grid whose phase time overcurrent relaying operates to remove only plant process load but loss of this load would result in a process trip and loss of the unit. Transformers that provide power to auxiliary loads not directly related to the generation of power should be excluded. This includes coal/lime stone unloading, chemical and water processing, some environmental processes

Organization	Yes or No	Question 3 Comment
		etc. The Guidelines and Technical Basis does not adequately address the protection of the generator, and is narrow in scope by basing the settings criteria on one event and simulation rather than real world event data and historical performance. The number of generators that have tripped for loadability does not constitute a statistically significant value of concern based on the overall number of generators that did trip during the Aug 2003 event. (Approx 25/290 = 8.6%) ,Part of the Rational statement for R1 is flawed - it is not currently possible to both "comply with the draft standard and achieve (an entity's) desired protection goals".
Response: The drafting team thanks you for your participation; please see the response(s) for Essential power, LLC in Question #3.		
Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)	No	During the 2/13/13 PRC-025-1 Webinar, we understood the SDT to say that the requirement for verifying the settings of 51 relays for station auxiliary transformers only applied to those overcurrent relays applied on the high voltage side of the transformer such that operation of relay would result in a trip of the transformer. Furthermore, we understood the SDT to indicate the 51 relays applied on the source breaker(s) from the transformer secondary winding(s) to medium voltage bus(es) were not included in scope. If this is indeed the intent of the drafting team, we recommend the SDT clarify its intent by including a paragraph to the Option 13A/B discussion on pages 15-17 explaining that this requirement only applies to phase overcurrent 51 relays whose actuation would result in a trip of the transformer itself and not to 51 relays monitoring the low side source breaker from the transformer to low side medium voltage bus.
Response: The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent		

Organization	Yes or No	Question 3 Comment
relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made.		
Northeast Power Coordinating Council	No	In the Guidelines and Technical Basis document under Applicability the terms transmission Facilities and generator leads are mentioned. It should be noted that some companies use different terms when referring to the leads connecting the generator Facility to the BES facility. The leads connection between the generator Facility GSU transformer and the BES Facility breakers may be referred to GSU leads and not Generator leads. Generator leads may be those located inside the generator Facility between the GSU low side and the generator itself. The terminology should be clarified.
Response: The drafting team thanks you for your comment. The drafting team contends that "generator leads" is the more commonly used term for this application. No change made.		
SRC	No	NERC in its filing in response to the FERC directives in Order 733 should note to FERC that by pro-scribing a specific technical solution in its Orders, there can be significant cost and compliance repercussions and not allow the stakeholder process to develop alternative innovative solutions. For example, if there are two alternate solutions to mitigate for a reliability risk, one which would require significant capital expense for entities to comply and one which would allow entities to configure or operate their network to mitigate that same risk, the industry should be allowed to do so. **Response:** FERC has already ruled on entities' requests for clarification and rehearing on Order 733 with regard to this matter. The drafting team notes that entities may change the configuration or operation of their network to facilitate compliance but not to eliminate a compliance obligation. No change made.

Organization	Yes or No	Question 3 Comment
		We are concerned about the outcome of PRC-025 in particular in reference to this paragraph in the Guidelines and Technical Basis: For example, if the intended protection purpose is to provide backup protection for a failed Transmission breaker, it may not be possible to achieve this purpose while complying with this standard if a simple mho relay is being used. In this case, it may be necessary to replace the legacy relay with a modern advanced-technology relay that can be set using functions such as load encroachment. It may otherwise be necessary to reconsider whether this is an appropriate method of achieving protection for the failed Transmission breaker, and whether this protection can be better provided by, for example, applying a breaker failure relay with a transfer trip system. **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance resource requirements) in cases where protection system modifications are necessary to achieve the reliability objective of the draft standard. This is why the standard has provided multiple alternatives to meet the requirements. No change made.
Response: The drafting team thanks you for your comment, please see the responses above.		
ReliabilityFirst	No	ReliabilityFirst offers the following comments related to the Guidelines and Technical Basis: 1. The Guidelines and Technical Basis document seems rather complex. In particular, the calculations for options 1b and 7b show the difficulty in applying the criteria to this type of protection. The example calculations for

Organization	Yes or No	Question 3 Comment
		these options are over three pages long due to the iterative process needed to estimate the low-side voltage on the generator side of the GSU. It is not clear from the example as to the point where the estimate is good enough. The Guidelines should provide criteria such as the iterations can stop once the difference in the low-side voltage estimates are < 1%. **Response:** The drafting team agrees and has provided guidance that it is sufficient to consider the value has converged once the difference in the low-side voltage estimates are < 1% and at that point further iterations are not necessary. Change made. 2. It might be better to simply drop the more difficult application options like these and defer to the easier or simulation options such as those in 1a, 1c, 7a and 7c. **Response:** The drafting team contends that two calculations options are needed to provide those Generator Owners that do not have access to simulation with flexibility in selecting the option that achieves the loadability setting for their protection philosophies. Simulation provides a third and enhanced method available to all Generator Owners. Also, Options 1c and 7c could actually be more challenging than 1b and 7b for those who are not familiar with the transient stability program. No change made. 3. The guidelines do not make it clear when the gross or net generator output should be used for the calculations. Presumably, the gross output is only used for the generator options 1-6. **Response:** The drafting team notes that the value is inferred as the gross output for real power for all options. This has been clarified in Table 1. Change made.
Response: The drafting team thanks you for your comment, please see the responses above.		

Organization	Yes or No	Question 3 Comment
Luminant Energy Company LLC	No	The example calculations for UAT overload relays should indicate that this applies only to protective relays installed on the high side of the transformer that are connected to trip the generator lockout.
Response: The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made.		
Tacoma Power	No	The guidelines generally help. However, there were at least two areas for improvement. Referring to Equation 66 in the Guidelines and Technical Basis, two cases of 'Vgen' should be relabeled 'Vbus.' **Response:** The drafting team has corrected the two cases of V_{gen} to V_{bus} in Equation 66 that were in error. Change made. For 51V - voltage-restrained relay types, the overcurrent pickup is reduced in proportion to the voltage. Should the overcurrent element pickup be evaluated relative to 115% of the calculated current, or should the reduced overcurrent pickup be evaluated relative to 115% of the calculated current? **Response:** The overcurrent element should be evaluated relative to 115% of the calculated current, as clarified in the Guidelines and Technical Basis document. No change made.
Response: The drafting team thanks you for your comment, please see the responses above.		
PPL Generation, LLC on behalf of its Supply NERC Registered Entities	No	The PPL Companies do not agree that the Guidelines and Technical Basis provide a clear understanding of the various criteria. The PPL Companies agree with the comments below from the North American Generators Forum standard review team:

Organization	Yes or No	Question 3 Comment
		During the 2/13 webinar it was stated that start-up transformers that provide power when the unit is not on-line are out of scope for PRC-025-1. When questioned as to whether PRC-025-1 would become applicable to the transformer if the failure of the normal UAT resulted in the entity utilizing the start-up transformer for running power, the SDT responded yes, at that time the transformer would be applicable to PRC-025-1. If UATs are to remain in scope, an exemption should be included to allow an entity to operate in an emergency configuration without being in violation of PRC-025-1. It is unclear from the wording in the Guidelines and Technical Basis whether the following is in scope: a transformer with high-side windings directly connected to the transmission grid whose phase time overcurrent relaying operates to remove only plant process load but loss of this load would result in a process trip and loss of the unit. Transformers that provide power to auxiliary loads not directly related to the generation of power should be excluded. This includes coal/lime stone unloading, chemical and water processing, some environmental processes etc. The Guidelines and Technical Basis does not adequately address the protection of the generator, and is narrow in scope by basing the settings criteria on one event and simulation rather than real world event data and historical performance. The number of generators that have tripped for loadability does not constitute a statistically significant value of concern based on the overall number of generators that did trip during the Aug 2003 event. (Approx 25/290 = 8.6%), Part of the Rational statement for R1 is flawed - it is not currently possible to both "comply with the draft standard and achieve (an entity's) desired protection goals".

Organization	Yes or No	Question 3 Comment
Response: The drafting team thanks you for your participation; please see the response(s) for Essential power, LLC in Question #6.		
Southern Company Operations Compliance	No	The technical basis 1) does not adequately address the protection of the generator, and **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made. 2) is narrow in scope by basing the settings criteria on one event and simulation rather than real world event data and historical performance. The number of generators that have tripped for loadability does not constitute a statistically significant value of concern based on the overall number of generators that did trip during the Aug 2003 event. (Approx 25/290 = 8.6%) **Response:** The drafting team has developed the standard in accordance with the regulatory directive concerning generator relay loadability, which is an outcome of the 2003 blackout report. The report revealed the need to address generator relay loadability. The drafting team understands there is limited empirical data regarding generator relays tripping due to insufficient relay loadability. However, as noted in the NERC document 'Power Plant and Transmission System

Organization	Yes or No	Question 3 Comment
		Coordination' – July 2010, at least 28 generators were tripped on August 14, 2003 by load-responsive phase protection; eight of those by phase distance and 20 more by 51V protection. Generators tripping by these load-responsive protective relays are significant because these protective relays are subject to operating during the phase of a disturbance during which the system may be capable of recovering, whereas other protective relays that are not responsive to load are more likely to operate after the system has become unstable or during a system collapse. It is therefore more important to focus attention on preventing operation of load-responsive protective relays from tripping generators, which may cause or contribute to an otherwise recoverable event resulting in cascading, instability, or uncontrolled system separation. The drafting team notes that the depressed voltage condition observed on August 14, 2003, with sustained transmission voltage of 0.85 per unit, represents a realistic stressed system voltage condition for an extreme, but recoverable system event. Selection of this condition in the proposed PRC-025-1 standard is based on Recommendation 8a of the NERC Actions to Prevent and Mitigate the Impacts of Future Cascading Blackouts (Approved by the Board of Trustees February 10, 2004), which formed the basis for industry-wide evaluation of transmission relays for relay loadability and NERC Reliability Standard PRC-023. Use of this system condition provides consistency between the approved transmission relay loadability standard and the draft generator relay loadability standard. No change made.
Response: The drafting team thanks you for your comment; please see the responses above.		
SC Public Service Authority	No	We agree with the SERC Protection and Control Subcommittes's comments
Response: The drafting team thanks you for your comment; please see the response(s) for the SERC Regional Reliability Organization (SERC RRO).		

Organization	Yes or No	Question 3 Comment
Wisconsin Electric Power Company	No	We propose that station auxiliary transformers (startup transformers) that are not normally used for supplying auxiliary loads should be specifically exempted from applicability to this standard. The reasoning is the same as that used to exclude relay elements that are only in-service when other Protection System components fail (see Introduction, 5th paragraph).
Response: The drafting team agrees that power transformers that are in-service when the unit is released to the dispatcher and, under normal plant operations, are capable for unit full load operation are considered. Only relays that trip the units via generator lockout action or directly trip of the generator breaker(s) are under the setting criteria. Startup/Standby transformers that are not required to keep the units running are excluded from the standard. Station service bus overcurrent relays are not subject to this standard. No change made.		
Manitoba Hydro	Yes	Based on the Technical Guidelines, it appears that the determination of whether the Generator Owner is "maintaining reliable fault protection" with the applied setting is a matter to be determined by the Generator Owner in its discretion. No objective criteria are specified for this determination. Accordingly, if the CEA will not be assessing this part of the requirement, it should be excluded from the standard. At a minimum, it should be specified that Generator Owner makes this determination. **Response:** The drafting team contends that the description of the term "while maintaining reliable fault protection" found in the Requirement R1 rationale box adequately conveys the suggested intent. No change made (2) The "Guidelines and Technical Basis" document should be included as an attachment or appendix of the standard. **Response:** The drafting team will re-append the Guidelines and Technical Basis document standard upon industry approval. The documents were separated for management purposes and to facilitate editing between team members. The Guidelines and Technical Basis document title has been revised to clarify the relationship. Change made.

Organization	Yes or No	Question 3 Comment
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Hydro-Québec Production	Yes	Comments: As per the intent of the paragraph 81, the detailed criteria should not be incorporated in the standard.
Response: The drafting team thanks you for your comments and support. Paragraph 81[3] is focused on administrative requirements that provide little, if any, benefit or protection to the reliable operation of the BES. The drafting team contends that the detailed criteria are necessary to meet the objectives of this reliability standard. No change made.		
PacifiCorp	Yes	PacifiCorp appreciates the work that went into the Guidelines and Technical Basis document, particularly with respect to the example calculations provided for each of the options referenced in Table 1 of Attachment 1. The detailed explanation of each option for a given load-responsive protective relay added a level of depth and clarity that was missing from the previous draft.
Response: The drafting team thanks you for your comment and support.		
Idaho Power Co.	Yes	The document is very helpful.
Response: The drafting team thanks you for your comment and support.		
Entergy Services, Inc. (Transmission)	Yes	The Guideline and Technical basis provides a lot of information but the fundamental issue about the clarity of the standards is the ability of merge the PRC-025 criteria with the Power Plant and Transmission System Protection Coordination technical reference document. The standard fails to combine those two document(s) into a single clear guideline.
Response: The drafting team believes the standard provides sufficient detail to be clear from an independent reading. The		

[3] http://www.nerc.com/files/OrderConditionallyAcceptingNewEnfocementMechFiling_031512.pdf

Organization	Yes or No	Question 3 Comment
drafting team will re-append the Guidelines and Technical Basis document standard upon industry approval. The documents were separated for management purposes and to facilitate editing between team members. Other documents referenced are intended to provide the reader with additional background and basis for the required settings anticipated by the draft standard. The NERC System Protection and Control Subcommittee (SPCS) will consider whether changes are necessary to the Power Plant and Transmission System Protection Coordination. No change made.		
NV Energy	Yes	Yes, except for the voltage measure for distance relays.
Response: The drafting team thanks you for your comment. The drafting team infers that this comment is related to your comment in response to Question 2. If so, the drafting team contends that since apparent impedance is a function of both voltage and current, a voltage measure is necessary. Translation of operating point from the P-Q plane to the R-X plane is a function of voltage. No change made.		
Duke Energy	Yes	
Southwest Power Pool	Yes	
NERC Compliance	Yes	
Transmission Reliability Program	Yes	
Electric Reliability Compliance	Yes	
Northeast Utilities	Yes	
Ingleside Cogeneration LP	Yes	
Kansas City Power & Light	Yes	
MID	Yes	

4. The drafting team considered industry feedback and provided a listing of "general considerations" that affect the period which industry should need to become compliant. Do you agree with the proposed Implementation Plan of: a. 48-months to apply load-responsive protective relay settings, where relay replacement is not required, and b. 72-months to apply load-responsive protective relay settings, where relay replacement is required? If not, provide an alternative implementation plan with specific rationale for such an alternative period.

Summary Consideration:

More than half of the comments supported by 81 individuals out of 131 total individuals expressed dissatisfaction with the proposed implementation period of 48-months to apply load-responsive protective relay settings, where relay replacement is not required, and 72-months to apply load-responsive protective relay settings, where relay replacement is required. Of those 15 non-affirmative positions, none of the commenters provided compelling reasons to increase the implementation period. The drafting team provided the basis for its determination; however, no commenters challenged the criteria on which the implementation period is found. The implementation plan provided with the standard is reasonable considering the factors listed in the plan.

Comments resulting in a change to the standard

Only one comment supported by 19 individuals represented the majority opinion in requesting that the standard be made clear that it only applies to load-responsive protective relays that are already present and enabled. The drafting team made provided additional clarification in the PRC-025-1, Attachment 1: Relay Settings to address this concern. The Attachment states: This standard does not require the Generator Owner to use any of the protective functions listed in Table 1.

Comments not resulting in a change to the standard

At least nine comments supported by 52 individuals which represent the majority of opinions did not agree with the proposed implementation period. The drafting team based the period to become compliant using the General Considerations listed in the Implementation Plan. The plan calls for 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relays must be completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive and the basis for the period has given due weight to the factors that influence the entity's ability to schedule outages and perform other activities.

The remaining comments represent single issues supported by six or fewer individuals and are considered minority opinion. One commenter disagreed with the approach of requiring an entity to replace all electromechanical relays that cannot meet the setting criteria and allow the entity flexibility to evaluate other settings. The drafting team disagrees because the implementation period allows sufficient time for an entity to make the necessary replacements. Another entity suggested allowing the Planning Coordinator or Region Reliability Organization to determine when settings need to be applied. The drafting disagreed with this approach noting that setting criteria must be applied consistently across the continent. One individual requested an exception like one provided in the PRC-024-1 standard. The drafting team disagreed because this exception is based on equipment potentially being damaged and the proposed PRC-025-1 standard criteria achieve its loadability goal in conditions that are not damaging to the generator.

Another commenter suggested the standard wait based on cost data from the piloted Cost Effective Analysis Process (CEAP) which was posted contemporaneously with the standard. The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance resource requirements) associated with achieving reliability objectives for facilities, resources and activities subject to the proposed PRC-025-1 standard; however, the standard is addressing regulatory directives and an identified reliability need. One commenter suggested an approach using a gradated percent complete implementation. The drafting considered this approach and concluded, based on the General Considerations found in the Implementation Plan, that a two-phased approach was best. Last, one commenter suggested the implementation period was too long. The drafting team disagreed based on the factors it considered in developing the Implementation Plan.

Organization	Yes or No	Question 4 Comment
SERC RRO	No	Regarding General Consideration #2, many units have a brief “mini-outage” every year but the interval between planned (longer) outages of sufficient duration to replace relays, apply settings, and test them can be as large as five years. We therefore suggest that the replacement-needed interval be extended to 84 months.
Response: The drafting team thanks you for your comment and notes that the Implementation Plan allows 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relays must be		

Organization	Yes or No	Question 4 Comment
completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive. No change made.		
ACES	No	(1) We disagree with the approach of requiring a registered entity to replace all electromechanical relays that cannot meet the settings of PRC-025-1 in order to comply with this standard. The standard should provide enough flexibility that registered entities reevaluate their settings to ensure that generators will not trip offline prematurely, but registered entity should make that determination. **Response:** The drafting team contends that while the implementation plan provides additional time if the Generator Owner determines that relay replacement is necessary, the standard does not require replacement and leaves responsibility for such decisions to the Generator Owner. No change made. (2) We disagree with the approach of requiring all relays to meet the setting criteria and believe there are other alternatives that for the draft standard. One approach could be for the GO to receive written confirmation or approval from the PC that the relay settings are satisfactory, with existing equipment. This would be similar to the role of the PC in PRC-023, where the PC must determine which low side terminals are subject to the standard. **Response:** The drafting team contends that there needs to be consistent criteria for determining that the relay settings are satisfactory, which have been established within the standard. No change made. Further, in PRC-024 allows for equipment limits without requiring replacing equipment for voltage excursions. We recommend the drafting team explore other alternatives that would meet the reliability objective without requiring replacement of equipment that cannot meet the criteria of PRC-025-1,. **Response:** The drafting team notes that the exceptions provided in PRC-024 address equipment limitations that, if violated, would result in damage to the

Organization	Yes or No	Question 4 Comment
		generating unit. In contrast, the performance specified within the PRC-025 criteria represents a natural behavior of the generator and its excitation system to abnormal system conditions. In this case, the generator is operating within its capability and is not at risk for damage. In both standards, a relay limitation is not an acceptable basis for an exception. No change made. (3) Another approach could be to require the Regional Entity to make an assessment of the settings on a case-by-case approach, and require certain settings are maintained for the particular region and entity. Not all entities, especially smaller entities, would have as big of an impact on the reliability of the BES and should not be required to replace relays when the impact is minimal. The regions, PC, or even the RC should be able to determine which generators are vital to reliability and could then make an assessment of those relay settings. **Response:** The drafting team contends that there needs to be consistent criteria for determining that the relay settings are satisfactory, which have been established within the standard. The drafting team has set the Applicability based on the BES definition to include all generators necessary for reliable operation of the interconnected system. Entities that do not feel that their generators are vital to reliability may use the exception process in the NERC Rules of Procedure to request an exclusion from the BES definition. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Dominion Resources Services, Inc.	No	Dominion suggest the following changes to the implementation plan: Each Generator Owner that owns load-responsive protective relays applicable to this standard shall be 100% compliant for the following: For each load-responsive protective relay, where determined by the Generator Owner that replacement is not necessary, 60 months beyond the

Organization	Yes or No	Question 4 Comment
		effective date of this standard. For each load-responsive protective relay, where determined by the Generator Owner that replacement is necessary, 84 months beyond the effective date of this standard."
Response: The drafting team contends that an implementation longer than 48 months for evaluation of setting changes and 72 months for replacement or removal of any load-responsive protective relay would be excessive. No change made.		
Ingleside Cogeneration LP	No	ICLP does not believe that sufficient justification for a capital expense has been provided. We understand the direction that FERC expects the industry proceed, but there is no data showing the extent of replacement costs - nor of the expected benefit. That is the intended purpose of the Cost Effective Analysis Procedure (CEAP), which has just been initiated. A reasonable implementation plan that involves relay replacement can begin only after a cost justification can be derived from the CEAP data. A premature assumption that one exists takes scarce dollars away from other initiatives which may return a far greater benefit.
Response: The drafting team thanks you for your comment and contends that the purpose of the CEAP is to establish guidelines for the solicitation of input and high level data from the industry, as part of and during the standards development process, to identify more cost effective ways to achieve the same or better reliability outcomes at equal or lower costs. The CEAP is intended to allow the industry the opportunity during the drafting process to identify alternative requirements or methods for meeting a standard's reliability objective that may be (i) less costly or (ii) equally or more effective, or (iii) more efficient. The CEAP, conducted in parallel with the drafting process, should not significantly delay the development of the standard and will add supporting information and background for the NERC stakeholders, the NERC Board of Trustees, and Federal, Provincial and State Regulatory Agencies to be utilized for decision-making.For this project, CEAP initiated a "pilot" project to collect data for the purposes of evaluation. The proposed PRC-025-1 standard is addressing a regulatory directive to set load-responsive protective relays at a level to prevent unnecessary tripping of generators during a system disturbance for conditions that do not pose a risk of damage. **Response:** The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance		

Organization	Yes or No	Question 4 Comment
resource requirements) associated with achieving reliability objectives for facilities, resources and activities subject to the proposed PRC-025-1 standard. No change made.		
Essential Power, LLC	No	Many units have a brief "mini-outage" every year but the interval between planned outages of sufficient duration to replace relays, apply settings and test them can be as large as five years. We therefore ask that the replacement-needed interval be extended to 84 months.
Response: The drafting team thanks you for your comment and notes that the Implementation Plan allows 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relays must be completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive. No change made.		
Cogentrix Energy Power Management, LLC	No	Many units have a brief "mini-outage" every year but the interval between planned outages of sufficient duration to replace relays, apply settings and test them can be as large as five years. We therefore ask that the replacement-needed interval be extended to 84 months.
Response: The drafting team thanks you for your comment and notes that the Implementation Plan allows 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relays must be completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive. No change made.		

Organization	Yes or No	Question 4 Comment
Southern Company Operations Compliance	No	Regarding General Consideration #2, many units have a brief "mini-outage" every year but the interval between planned (longer) outages of sufficient duration to replace relays, apply settings, and test them can be as large as five years. We therefore suggest that the replacement-needed interval be extended to 84 months.
Response: The drafting team thanks you for your comment and notes that the Implementation Plan allows 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relay must be completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive. No change made.		
Northeast Power Coordinating Council	No	Suggested changes to the Implementation Plan: Each Generator Owner that owns load-responsive protective relays applicable to this standard shall be 100% compliant for the following: For each load-responsive protective relay, where determined by the Generator Owner that replacement is not necessary, 60 months beyond the effective date of this standard. For each load-responsive protective relay, where determined by the Generator Owner that replacement is necessary, 84 months beyond the effective date of this standard.
Response: The drafting team contends that an implementation longer than 48 months for evaluation of setting changes and 72 months for replacement or removal of any load-responsive protective relay would be excessive. No change made.		
American Electric Power	No	The implementation plan proposed by the drafting team will still require the majority of the research, calculations and implementation to be completed within 48 months. We do not believe this is sufficient time for entities with a

Organization	Yes or No	Question 4 Comment
		large generating fleet. As an alternative, AEP suggests a phased implementation plan that requires entities to show that a minimum percentage of their applicable relays are compliant within a specified time frame. For example: Entities shall demonstrate that 30% of their applicable load-responsive protective relays are fully compliant with R1 within 48 months of the effective date of this standard. Entities shall demonstrate that 60% of their applicable load-responsive protective relays are fully compliant with R1 within 60 months of the effective date of this standard. Entities shall demonstrate that 100% of their applicable load-responsive protective relays are fully compliant with R1 within 72 months of the effective date of this standard.
Response: The drafting team thanks you for your comment and agrees in concept with the suggested approach and previously considered such an approach; however, the drafting team considered several key factors in how a Generator Owner would approach becoming compliant with the standard. These factors are found in the Implementation Plan, General Considerations. No change made.		
Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)	No	The NSRF would suggest additional clarification that indicates the standard applies only when an entity has such relays present and enabled. That the standard does not require that entities install additional relaying or enable further relay functionality. In PRC-024 there is a foot note explaining this.
Response: The drafting team has included additional explanation to Attachment 1 to address this concern. Refer to the summary of changes to the standard at the beginning of this document. Change made.		
PPL Generation, LLC on behalf of its Supply NERC Registered	No	The PPL Companies believe that the Implementation Plan does not address necessary scenarios. The PPL Companies agree with the comments below

Organization	Yes or No	Question 4 Comment
Entities		from the North American Generators Forum standard review team: Many units have a brief "mini-outage" every year but the interval between planned outages of sufficient duration to replace relays, apply settings and test them can be as large as five years. We therefore ask that the replacement-needed interval be extended to 84 months.
Response: The drafting team thanks you for your comment and notes that the Implementation Plan allows 72 months to become fully compliant with the standard and encompasses the five year (60-month) span suggested for a few units that may go five years between significant planned outages. The proposed phased implementation approach establishes that setting calculations be completed and required settings be applied to existing protective relays in 48 months; unless, equipment replacement or removal is necessary, then such replacement or removal of any load-responsive protective relays must be completed within 72 months (6 years). The drafting team contends that an implementation longer than 72 months would be excessive. No change made.		
NV Energy	No	The time periods seem too long. Most standards have a lengthy proposed effective dates (sometimes as long as two years). For a relay replacement, the effective application time frame could well be seven years. Even for a relay replacement the normal budgeting/design/installation/unit outage cycle is substantially less than seven years. For the locations where just a relay setting change is necessary, six years is too long.
Response: The drafting team thanks you for your comment. The drafting team considered several key factors in how a Generator Owner would approach becoming compliant with the standard. These factors are found in the Implementation Plan, General Considerations. No change made.		
SC Public Service Authority	No	We agree with the SERC Protection and Control Subcommittes's comments.
Response: The drafting team thanks you for your participation; please see the response(s) for the SERC Regional Reliability Organization (SERC RRO).		
NERC Compliance	No	We would ask that you consider 72 months to apply load-responsive

Organization	Yes or No	Question 4 Comment
		protective relay settings where relay replacement is not required. This change would allow adequate time to perform the required review and implementation, taking into account the shortage of relay engineers in the utility industry.
Response: The drafting team thanks you for your comment. The drafting team considered several key factors in how a Generator Owner would approach becoming compliant with the standard. These factors are found in the Implementation Plan, General Considerations. No change made.		
Northeast Utilities	No	
Ameren	Yes	(1) For load-responsive protective relays that become applicable to this standard, we request the 48 and 72 month implementation should be allowed based on the same distinction regarding relay replacement.
Response: The drafting team thanks you for your comment and support. The drafting team has modified the implementation plan in accordance with your comment. Change made.		
FirstEnergy Corp	Yes	FE feels that the time parameters of 48 and 72 months are acceptable.
Response: The drafting team thanks you for your comment and support.		
Manitoba Hydro	Yes	No comment.
Pepco Holdings Inc	Yes	
Duke Energy	Yes	
Luminant Energy Company LLC	Yes	
Southwest Power Pool	Yes	

Organization	Yes or No	Question 4 Comment
Transmission Reliability Program	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Electric Reliability Compliance	Yes	
Puget Sound Energy	Yes	
Hydro-Québec Production	Yes	
Entergy Services, Inc. (Transmission)	Yes	
Lakeland Electric	Yes	
Tacke	Yes	
Idaho Power Co.	Yes	
Kansas City Power & Light	Yes	
Tacoma Power	Yes	
MID	Yes	
SRC		SRC is not providing any comment or response to this question.
Response: The drafting team thanks you for your consideration.		

5. Do you agree that the provided Violation Risk Factor and Violation Severity Level Justifications are in accordance with FERC and NERC guidelines for constructing VRFs and VSLs? If not, provide specific rationale why the VRF or VSL does not meet the guidelines.

Summary Consideration:

More than half of the comments supported by 49 individuals out of 92 total individuals expressed satisfaction with the proposed Violation Risk Factor (VRF) and Violation Severity Level (VSL) Justifications.

Comments resulting in a change to the standard

The drafting team did not make any changes to the VRFs or VSLs based on comments or any other factors.

Comments not resulting in a change to the standard

Approximately eight comments supported by at least 27 individuals, representing the majority opinion, were primarily concerned with the VRF of High. The drafting team noted that the Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF and has been replaced by the new PRC-023-3, Requirements R7 and R8.

At least two comments supported by 11 individuals questioned whether or not the VRF assignment was consistent with the NERC Definition and/or FERC Guideline #4. The drafting team contended that a VRF of High is consistent with both. A requirement in the planning time frame with a VRF of High must meet the following characteristics: "a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition." There is no stipulation that a second Reliability Standard Requirement must be violated in the determination of any VRF as one comment suggested.

Furthermore, the definition does not address "normal operation" for the planning time frame, only emergency, abnormal, or restorative conditions that included circumstances around the August 14, 2003 blackout, which were exacerbated by the loss of generation. The premature or unnecessary tripping of generators resulting in the removal of dynamic Reactive Power exacerbates the severity of the voltage disturbance and, as a result, changes the character of the system disturbance. In addition, the loss of Real Power could initiate or exacerbate a frequency disturbance. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either

"applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many "Options" available depending on the type of load-responsive protective relay applied on the Generator Owner's facilities. Please refer to the VRF/VSL Justifications posted on the Project 2010-13.2 project page for further information.

One individual suggested using a graduated approach like the PRC-005 standard. The drafting team agreed that the VSLs for the NERC Board of Trustees approved (November 7, 2012) PRC-005-2, R3 comports to the NERC VSL Guidelines for "Parts that Contribute Equally to Performance" (or incrementally); however, "Components" as used in PRC-005-2 are individual parts that compose a Protection System. In the case of the proposed draft PRC-025-1, each load-responsive protective relay is the single component that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

Last, one individual commented that the binary VSL exaggerates the risk and severity. The drafting team understands that a requirement with a binary Violation Severity Level (VSL), which must be Severe by definition, is perceived by industry as having a greater impact to reliability (i.e., "risk"). However, the drafting team evaluates both Violation Risk Factors (VRF) and Violation Severity Levels (VSL) independently and by their respective definitions and applies each accordingly. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe.

Organization	Yes or No	Question 5 Comment
SERC RRO	No	The high VRF and severe VSL is not appropriate for a single instance of failure to comply with one component of the many requirements contained within Table 1.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-		

Organization	Yes or No	Question 5 Comment
compliance is based on “binary” (i.e., pass-fail) condition. The entity either “applied” or “did not apply” the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many “Options” available depending on the type of load-responsive protective relay applied on the Generator Owner’s facilities. Please refer to the VRF/VSL Justifications posted on the Project 2010-13.2 project page for further information. No change made.		
ACES	No	(1) We disagree with the High VRFs for Requirement R1. Contrary to the explanation provided in the VRF justification for FERC Guideline 4, violation of either of these requirements by a single generator could not be construed as directly causing or contributing to BES instability, separation or cascading within any time frame. Thus, the VRF is not consistent with NERC guideline for a High VRF and is not consistent with FERC guideline 4. For a single violation to lead to BES instability, separation or cascading would require other standards requirements to be violated. NERC VRFs must be assigned by applying the criteria to a single violation of the requirement at a time and not multiple violations. Thus, the case where multiple trips of generators occurred cannot raise this to a High VRF.
Response: The drafting team thanks you for your comment and contends that a Violation Risk Factor (VRF) of High is consistent with the NERC VRF definition and FERC Guideline #4. A requirement in the planning time frame with a VRF of High must meet the following characteristics: “a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.” There is no stipulation that a second Reliability Standard Requirement must be violated in the determination of any VRF. Furthermore, the definition does not address “normal operation” for the planning time frame, only emergency, abnormal, or restorative conditions that included circumstances around the August 14, 2003 blackout, which were exacerbated by the loss of generation. The premature or unnecessary tripping of generators resulting in the removal of dynamic Reactive Power exacerbates the severity of the voltage disturbance and, as a result, changes the character of the system disturbance. In addition, the loss of Real Power could initiate or exacerbate a frequency disturbance. No change made.		

Organization	Yes or No	Question 5 Comment
Tacoma Power	No	A graduated structure for VSL is recommended based upon the percentage of load-responsive protective relays for which the Generator Owner failed to apply settings that are in accordance with Attachment 1: Relay Settings. According to the Violation Risk Factor and Violation Severity Level Justification, FERC's VSL Guideline 2 suggests that a "binary" type requirement must have a Severe VSL. PRC-025-1 R1 is not a "binary" type requirement in the sense that failing to apply settings in accordance with Attachment 1: Relay Settings for only one load-responsive protective relay would generally not pose the same impact to the BES as would be the case if all load-responsive protective relays did not have settings applied in accordance with Attachment 1: Relay Settings. Furthermore, according to the Violation Risk Factor and Violation Severity Level Justification, FERC's VSL Guideline 4 states that VSL "assignment should be based on a single violation, not on a cumulative number of violations." It should be noted that PRC-005-2 R3 has a graduated VSL structure based upon the percentage of Protection System Components, included within a time-based maintenance program, that were not maintained in accordance with the minimum maintenance activities and maximum maintenance intervals. In what sense would PRC-025-1 R1 differ from PRC-005-2 R3?
Response: The drafting team thanks you for your comment and agrees that the Violation Severity Levels for the NERC Board of Trustees approved (November 7, 2012) PRC-005-2, R3 comports to the NERC VSL Guidelines for "Parts that Contribute Equally to Performance" (or incrementally); however, "Components" as used in PRC-005-2 are individual parts that compose a Protection System. In the case of the proposed draft PRC-025-1, each load-responsive protective relay is the single component that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition. No change made.		

Organization	Yes or No	Question 5 Comment
Arizona Public Service Company	No	A VRF of "High" is unjustified since it applies to each individual unit and a single individual unit has limited impact on the BES, particularly the small units. The VRF value of "Low" is more appropriate on each unit basis.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. No change made.		
Dominion Resources Services, Inc.	No	Page 6 of 18, Table of Compliance Elements: there should be Lower, Moderate, and High VSL's. We disagree with the "all or nothing" approach to VSL's.
Response: The drafting team thanks you for your comment and contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. The violation is measured on a per load-responsive protective relay – per day basis. No change made.		
Transmission Reliability Program	No	BPA believes that the VRF should be set to Medium because this standard addresses the setting of a relay. Because of this, BPA believes that an error in settings does not affect the BES, it is only when an event occurs that an error in settings would then have an effect and may not cause a cascade.
Response: The drafting team thanks you for your comment and contends that a Violation Risk Factor (VRF) of High is consistent with the NERC VRF definition and FERC Guideline #4. A requirement in the planning time frame with a VRF of High must meet the following characteristics: "a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition." No change made.		
Essential Power, LLC	No	Deeming any and all violations of this standard to have a high violation risk

Organization	Yes or No	Question 5 Comment
		factor and a severe violation severity level seems overly harsh, given the compliance feasibility uncertainties expressed herein.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many "Options" available depending on the type of load-responsive protective relay applied on the Generator Owner's facilities. Please refer to the VRF/VSL Justifications posted. No change made.		
Cogentrix Energy Power Management, LLC	No	Deeming any and all violations of this standard to have a high violation risk factor and a severe violation severity level seems overly harsh, given the compliance feasibility uncertainties expressed herein.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many "Options" available depending on the type of load-responsive protective relay applied on the Generator Owner's facilities. Please refer to the VRF/VSL Justifications posted. No change made.		
Exelon Corporation and its affiliates	No	Deeming any and all violations of this standard to have a high violation risk factor and a severe violation severity level seems overly harsh. Suggest that a graded approach to the Violation Severity Level based on % of non-compliance

Organization	Yes or No	Question 5 Comment
		be used.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many "Options" available depending on the type of load-responsive protective relay applied on the Generator Owner's facilities. Please refer to the VRF/VSL Justifications posted. No change made.		
Ameren	No	The binary approach used exaggerates both the risk and its severity.
Response: The drafting team thanks you for your comment and understands that a requirement with a binary Violation Severity Level (VSL), which must be Severe by definition, is perceived by industry as having a greater impact to reliability. However, the drafting team evaluates both Violation Risk Factors (VRF) and Violation Severity Levels (VSL) independently and by their respective definitions and applies each accordingly. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. No change made.		
PPL Generation, LLC on behalf of its Supply NERC Registered Entities	No	The PPL Companies agree with the comments below from the North American Generators Forum standard review team: Deeming any and all violations of this standard to have a high violation risk factor and a severe violation severity level seems overly harsh, given the compliance feasibility uncertainties expressed herein.
Response: The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of		

Organization	Yes or No	Question 5 Comment
PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a “High” VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on “binary” (i.e., pass-fail) condition. The entity either “applied” or “did not apply” the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many “Options” available depending on the type of load-responsive protective relay applied on the Generator Owner’s facilities. Please refer to the VRF/VSL Justifications posted. No change made.		
SC Public Service Authority	No	We agree with the SERC Protection and Control Subcommittes’s comments.
Response: The drafting team thanks you for your participation; please see the response(s) for the SERC Regional Reliability Organization (SERC RRO).		
Wisconsin Electric Power Company	No	We do not agree that all violations of the requirements necessarily constitute a HIGH VRF or a SEVERE VSL. We believe there needs to be flexibility for cases where the actual risk to the BES may warrant a lower degree of sanction.
Response: The drafting team contends that this flexibility cannot be written into a VRF or VSL. However, the Compliance Enforcement Authority (CEA) considers facts and circumstances when determining what sanctions and/or penalties to impose. No change made.		
Electric Reliability Compliance	No	
Northeast Utilities	No	
Manitoba Hydro	Yes	(1) Why are Violation Severity Levels not defined for Lower, Moderate and High VSL for both PRC-025 and PRC-023?
Response: The drafting team thanks you for your comment and notes that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on “binary” (i.e., pass-fail) condition. The entity either “applied” or “did not apply” the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be		

Organization	Yes or No	Question 5 Comment
designated Severe by definition. Please refer to the VRF/VSL Justifications posted on the Project 2010-13.2 project page for further information. No change made.		
Pepco Holdings Inc	Yes	
Duke Energy	Yes	
SRC	Yes	
Luminant Energy Company LLC	Yes	
Southwest Power Pool	Yes	
NERC Compliance	Yes	
FirstEnergy Corp	Yes	
PacifiCorp	Yes	
Puget Sound Energy	Yes	
Entergy Services, Inc. (Transmission)	Yes	
Ingleside Cogeneration LP	Yes	
American Electric Power	Yes	
ReliabilityFirst	Yes	
Idaho Power Co.	Yes	

Organization	Yes or No	Question 5 Comment
Kansas City Power & Light	Yes	
Alliant Energy	Yes	
MID	Yes	
NV Energy	Yes	

6. Do you have any other comments? If so, please provide suggested changes and rationale.

Summary Consideration:

The general comments represent about 32 comments supported by 83 individuals. Minority opinions are not summarized due to the number.

Comments resulting in a change to the standard

Approximately three comments representing nine individuals were concerned about generator overload. The drafting team provided multiple options for setting generator and transformer load-responsive phase relays to address this concern. For example, 1c and 8c allow a simulation for excitation systems that are not capable of producing reactive power at 150% of rated MW. To prevent equipment damage from excessive time exposed to overload conditions, the drafting team has modified the standard to clarify exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection.

About three comments from individual commenters had concerns about the proposed PRC-025-1 standard Purpose statement "To set load-responsive [generator] protective relays…" that it is specific to generator protection and not the other listed Facilities. To address this concern, the drafting team removed the first occurrence of "generator" in the Purpose statement to provide a more general description of the standard's purpose.

At least three comments supported by three individuals was requested clarity about the location of the relays. The drafting team provided example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applied to relay's CTs connected to either the high-side or the low-side of the auxiliary transformer (UAT) transformer if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria.

Approximately three comments supported by three individuals were concerned about the application of C37.102. The drafting team notes that for some generators a setting of 150% to 200% of the generator MVA rating at its rated power factor is insufficient and is moving beyond the general application guidance expressed in C37.102 so that load-responsive protective relays allow generators to support the system during stressed conditions to the extent possible. The drafting team also notes that while C37.102 provides general guidance on the reach for phase fault backup protection, it also provides insight regarding situations in which voltage regulator action could cause an incorrect trip. Similar to information in the Guidelines and Technical Basis for PRC-025-1, C37.102 notes that consideration should be given to reducing the reach of the relay and/or coordinating the tripping time delay with the time delays of the protective devices in the voltage regulator. It also recommends that the setting of these relays be evaluated between

the generator protection engineers and the system protection engineers to optimize coordination while still protecting the turbine generator, and that stability studies may be needed to help determine a set point to optimize protection and coordination.

Comments not resulting in a change to the standard

Approximately four comments representing 15 individuals expressed concern that voltage-restrained devices should not recommended and, where used, that these devices should be replaced. The drafting team noted that it cannot require that such relays be replaced; therefore, the standard has to account for voltage-restrained devices and provide criteria applicable them.

Two comments supported by 26 individuals did not agree with the VSLs. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe.

One comment supported by 25 individuals believed that the standard should base the calculation on the nameplate rather than the reported values. The drafting team considered this same concern in past meetings and concluded that the Mega-Watt (MW) value reported to the Planning Coordinator or Transmission Planner was the most practical approach for a basis in determining the required setting(s). The Generator Owner has flexibility in using a more restrictive setting, which would be the case of using the generator name plate. In option 1, for example, the requirement is to use 100% of the reported MW and 150% of the nameplate MW to arrive at the Mvar component of the complex power. The impedance element must be set less than the calculated impedance derived from 115% of the complex power, which is using criteria (1) and (2). The standard allows the Generator Owners the flexibility to account for variable changes in the reported MW value and select a setting that best suits their specific operating history or expectation.

Approximately three comments supported by nine individuals believed there is an expectation that the generator unit is to achieve the output which the settings are based. The drafting team noted that the standard does not require that the generator achieve the Mvar capability during conditions anticipated by the standard, but instead that the load-responsive protective relays accommodate whatever field forcing may occur during disturbances. Actual observed generator performance during disturbances, as well as numerous simulations using actual generator data, have shown that many generators may approach this value of field forcing.

The drafting team understands that not all generators will be able to achieve this performance and has offered the opportunity to perform simulations with specified criteria to determine the expected performance of a specific generator and application so that the load-responsive protective relays may be set in a manner more precisely representative of that generator's performance. Therefore, an additional exception process is not warranted.

About four comments from four individuals disagreed with the Facilities defined in the Applicability of the proposed PRC-025-1. The drafting team responded that it is addressing the regulatory directives for generator step-up (GSU) transformers and unit auxiliary transformers (UAT).
Approximately three comments from three individuals were concerned that the standard is based on IEEE C37.91. The drafting team noted that the criterion for the generator step-up (GSU) transformer relaying is not based on IEEE C37.91, which observes that overcurrent relays "provide little or no thermal protection to the transformer due to the need to allow for short-time overloads." The criterion is consistent with the criterion for the generator relays themselves in that the protective relays must be immune to tripping for short-time overloads such as the field-forcing conditions of the generator that are being addressed within the standard. The criterion established for auxiliary transformer relaying is intended to restrain their performance for short-time overloads due to the elevated currents that would be experienced with the depressed source bus voltage in the presence of predominantly constant kVA (motor) loads. The drafting team notes that the standard provides exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection.

Organization	Yes or No	Question 6 Comment
Essential Power, LLC	Yes	1. We had thought in commenting on earlier drafts of PRC-025 that the toleration of extremely high current mandated by this standard would apply only for typical field-forcing periods, i.e. the few seconds it takes for the excitation limiter to respond. The present version of PRC-025 states in the 4th bull-dot of the introduction to Att. 1 however that protection systems must allow units to run for 15 minutes at the current levels stipulated in Table 1, which (as shown in the Guidelines and technical Basis document for this standard) can be on the order of 200% of rated current for generators and GSUs. This is far in excess of the thermal capability of such equipment. A cylindrical-rotor synchronous generator built to the present edition of ANSI C50.13 can withstand an armature current of 226% for 10 sec (208% in earlier editions), and 116% for 120 sec. The situation is similar for GSUs. ETAP studies of selected GSUs show that 200% current might be tolerated in many cases for a few minutes, but not a quarter hour. There should be a time frame defined in PRC-025 after which the generator owner is allowed to trip their equipment. Requiring the generator to operate at the specified

Organization	Yes or No	Question 6 Comment
		overload conditions indefinitely will damage the generator. The draft standard setting specifications of Table 1 conflict with IEEE C37.102 Guide to Generator Protection. This guide (1995 revision) recomments setting the generator overcurrent relaying (51) so that it operates at 115% of rated current and trips in 7 seconds at 226% of full-load current. **Response:** The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short-time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made. The fundamental issue appears to be that the Application Guidelines are patterned on transmission line-loading practices, but GSUs and (especially) auxiliary transformers are not used and short-term-overloaded like transmission transformers, so requiring a minimum allowable trip pickup threshold based on IEEE C37.91 alone is not appropriate. Entities should be allowed to protect their equipment from overload, rather than being forced to allow a specific amount of overload. The result is that, despite the statement in R1 that protection must be maintained, prohibiting the use of multiple definite-time or continuous inverse-time load-responsive relays for any time period less than 15 minutes can degrade the quality of existing protection while doing nothing to improve ride-through for actual field-forcing periods. There are many cases in which overload pickups set at approximately 115% to 130% of the rated current saved units with a low-level fault or exciter malfunction that caused an extended, moderate overload. Such protection would no longer be allowed, and we are skeptical of vague assurances to the effect that somehow something just as good can (and must) be developed. We believe in summary that PRC-025 as presently written would degrade rather than enhance BES

Organization	Yes or No	Question 6 Comment
		reliability, experience has revealed that the pickup settings of generator protection systems can be set much lower than the values specified in Table 1 and not result in undesirable nuisance tripping. and 15 minutes is vastly inappropriate as a one-size-fits-all field-forcing interval. **Response:** The criterion for the GSU relaying is not based on IEEE C37.91, which observes that overcurrent relays "provide little or no thermal protection to the transformer due to the need to allow for short-time overloads." The criterion is consistent with the criterion for the generator relays themselves in that the protective relays must be immune to tripping for short-time overloads such as the field-forcing conditions of the generator that are being addressed within the standard. The criterion established for auxiliary transformer relaying is intended to restrain their performance for short-time overloads due to the elevated currents that would be experienced with the depressed source bus voltage in the presence of predominantly constant kVA (motor) loads. The drafting team notes that the standard provides exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. No change made. 2. The portions of PRC-025 dealing with auxiliary transformers should be expunged in their entirety; since, aside from the considerations stated above (which apply for aux transformers as well), there is no reliability benefit to be gained. The standard cites generation unit trip records during blackouts as constituting its reason for existence; but, in response to a question posed in the webinar of Dec. 13, 2012, it was stated that there are no examples of plants being taken offline in such events by tripping of load-responsive aux transformer relays. If there's no "bang" to be had then there's no justification for the "bucks" that GOs are being asked to spend. This issue of there being no record of aux transformer loadability relay trips contributing to blackouts was raised again

Organization	Yes or No	Question 6 Comment
		in the 2/13/2013 webinar, and there was no direct answer given. It appears that this equipment is being included in PRC-025 simply because the SDT was directed to do so. This does not constitute a valid justification; and, in accordance with the cost effectiveness discussions in the 2/13/2013 webinar, any requirements that lack justification should be removed. **Response:** The drafting team has included in the Applicability, Facilities sections 3.2.2 and 3.2.3 to be responsive to a regulatory directive in Order No. 733, Paragraph 104. Inclusion of these two Facilities establishes requirements for load-responsive protective relays on generator step-up (GSU) transformers and on unit auxiliary transformers (UAT) that supply station service power to support the on-line operation of generating plants. No change made. The Facilities sections 3.2.2 and 3.2.3 seem to be out of scope given the purpose statement "generator protective relays." **Response:** The drafting team has modified the purpose as follows to address your comment. Refer to the summary of changes to the standard at the beginning of this document or to the revised purpose statement in draft 3 of the standard. Change made. We believe that Facilities section 3.2.3 does not belong in this standard as the equipment itemized does not relate directly to the generator loadability. Addressing generating plant station service transformers does not have to translate into creating a standard requirement for that equipment. An investigation and evaluation of the protection system for unit auxiliary transformers should be considered by the standard drafting team and deemed to be not related to generator loadability Providing a description of this dis-associated functionality fulfills the FERC order to address this subject. **Response:** The drafting team has included in the Applicability, Facilities sections 3.2.2 and 3.2.3 to be responsive to a regulatory directive in Order No. 733, Paragraph 104. Providing a description of this "dis-associated

Organization	Yes or No	Question 6 Comment
		functionality" would not address FERC's concern and would not be responsive to the directive. Inclusion of these two Facilities establishes requirements for load-responsive protective relays on generator step-up (GSU) transformers and on unit auxiliary transformers (UAT) that supply station service power to support the on-line operation of generating plants. No change made. Further, there is confusion over which station service transformers are included in the scope. In footnote 1, is the concern immediate or eventual trips of the generator with the loss of a station service transformer? Are station service bus overcurrent relays subject to minimum setting criteria specified in Table 1? **Response:** The power transformers that are in-service when the unit is released to the dispatcher and, under normal plant operations, are capable for unit full load operation are considered. Only relays that trip the units via generator lockout action or directly trip the generator breaker(s) are under the setting criteria. Startup/Standby transformers that are not required to keep the units running are excluded from the standard. Station service bus overcurrent relays are not subject to this standard. The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. In addition, corresponding changes have been made to the Guidelines and Technical Basis document. Change made. 3. Equipment limitations may exist that have not been considered thus far in drafting PRC-025. Not all units include high initial response AVRs, and PRC-025 states in fact that only 20% of units examined were able to generate MVARS at the 150% of rated MW level mandated in the draft standard. A GSU sized to cover a generator with lesser field-forcing capability would be

Organization	Yes or No	Question 6 Comment
		suitably specified for the application, but left exposed to damage by the PRC-025 settings criteria. Older transformers, designed to standards different from those in force today (and having incurred some degradation of condition), may incur mechanical damage upon being subjected to excessive current. This can take the form of buckling of inner windings, stretching of outer windings, spiraling of end turns in helical windings, collapse of yoke insulation, press rings, press plates and core clamps, conductor tilting, conductor axial bending between spacers, and dielectric failures. PRC-025 should accordingly be revised to grandfather existing major equipment, similar to the approach used in PRC-024. Relaying changes may be necessary in some cases, but scaling-back the criteria in table 1 of the standard to respect the limitations of existing equipment should be permitted. **Response**: The drafting team notes that the standard provides multiple options for setting transformer load-responsive phase relays to address this concern. For example, 8c allows a simulation for excitation systems that are not capable of producing reactive power at 150% of rated MW. No change made. 4. The applicability of PRC-025 should exclude small gensets that are NERC-registered solely due to being black start-capable, the tripping of which would not meaningfully affect the ability of the system to ride through Disturbances. It would be best to allow such units to maintain their present loadability relay settings, if they are consistent with a reasonable coordination study, rather than mandate upgrades that augment the degree to which NERC requirements have already eliminated any economic rationale for having black-start facilities. The inclusion of generating units and generating plants identified as Blackstart Resources in the Transmission Operator's system restoration plan is unnecessary and inappropriate. These units typically are the smaller units in a

Organization	Yes or No	Question 6 Comment
		generating fleet and, alone, would not impact the ability to ride through the type of system excursion that is the concern of this standard. Further, allowing protection system settings that are more conservative than these proposed in this standard will better protect these resources that are essential to recovering from a system blackout. **Response:** The drafting team believes that during Blackstart conditions the generator may experience extreme voltage and loading swings; therefore, Blackstart units are included and apply to the standard. If such generators are excluded from the applicability of the standard, they may not perform as expected to facilitate system restoration. Also, the drafting team notes that the standard only applies to those Blackstart resources identified in the Transmission Operator's system restoration plan (i.e., SRP) if identified as being BES. No change made.
Response: The drafting team thanks you for your comments, please see the above responses.		
Cogentrix Energy Power Management, LLC	Yes	1. We had thought in commenting on earlier drafts of PRC-025 that the toleration of extremely high current mandated by this standard would apply only for typical field-forcing periods, i.e. the few seconds it takes for the excitation limiter to respond. The present version of PRC-025 states in the 4th bull-dot of the introduction to Att. 1 however that protection systems must allow units to run for 15 minutes at the current levels stipulated in Table 1, which (as shown in the Guidelines and technical Basis document for this standard) can be on the order of 200% of rated current for generators and GSUs. This is far in excess of the thermal capability of such equipment. A cylindrical-rotor synchronous generator built to the present edition of ANSI C50.13 can withstand an armature current of 226% for 10 sec (208% in earlier editions), and 116% for 120 sec. The situation is similar for GSUs. ETAP studies of selected GSUs show that 200% current might be tolerated in many cases for a few minutes, but not a quarter hour. There should be a time

Organization	Yes or No	Question 6 Comment
		frame defined in PRC-025 after which the generator owner is allowed to trip their equipment. Requiring the generator to operate at the specified overload conditions indefinitely will damage the generator. The draft standard setting specifications of Table 1 conflict with IEEE C37.102 Guide to Generator Protection. This guide (1995 revision) recomments setting the generator overcurrent relaying (51) so that it operates at 115% of rated current and trips in 7 seconds at 226% of full-load current. The fundamental issue appears to be that the Application Guidelines are patterned on transmission line-loading practices, but GSUs and (especially) auxiliary transformers are not used and short-term-overloaded like transmission transformers, so requiring a minimum allowable trip pickup threshold based on IEEE C37.91 alone is not appropriate. Entities should be allowed to protect their equipment from overload, rather than being forced to allow a specific amount of overload. The result is that, despite the statement in R1 that protection must be maintained, prohibiting the use of multiple definite-time or continuous inverse-time load-responsive relays for any time period less than 15 minutes can degrade the quality of existing protection while doing nothing to improve ride-through for actual field-forcing periods. There are many cases in which overload pickups set at approximately 115% to 130% of the rated current saved units with a low-level fault or exciter malfunction that caused an extended, moderate overload. Such protection would no longer be allowed, and we are skeptical of vague assurances to the effect that somehow something just as good can (and must) be developed. We believe in summary that PRC-025 as presently written would degrade rather than enhance BES reliability, experience has revealed that the pickup settings of generator protection systems can be set much lower than the values specified in Table 1 and not result in undesirable nuisance tripping. and 15 minutes is vastly inappropriate as a one-size-fits-all field-forcing interval.

Organization	Yes or No	Question 6 Comment
		2. The portions of PRC-025 dealing with auxiliary transformers should be expunged in their entirety; since, aside from the considerations stated above (which apply for aux transformers as well), there is no reliability benefit to be gained. The standard cites generation unit trip records during blackouts as constituting its reason for existence; but, in response to a question posed in the webinar of Dec. 13, 2012, it was stated that there are no examples of plants being taken offline in such events by tripping of load-responsive aux transformer relays. If there's no "bang" to be had then there's no justification for the "bucks" that GOs are being asked to spend. This issue of there being no record of aux transformer loadability relay trips contributing to blackouts was raised again in the 2/13/2013 webinar, and there was no direct answer given. It appears that this equipment is being included in PRC-025 simply because the SDT was directed to do so. This does not constitute a valid justification; and, in accordance with the cost effectiveness discussions in the 2/13/2013 webinar, any requirements that lack justification should be removed. The Facilities sections 3.2.2 and 3.2.3 seem to be out of scope given the purpose statement "generator protective relays." We believe that Facilities section 3.2.3 does not belong in this standard as the equipment itemized does not relate directly to the generator loadability. Addressing generating plant station service transformers does not have to translate into creating a standard requirement for that equipment. An investigation and evaluation of the protection system for unit auxiliary transformers should be considered by the standard drafting team and deemed to be not related to generator loadability Providing a description of this dis-associated functionality fulfills the FERC order to address this subject. Further, there is confusion over which station service transformers are included in the scope. In footnote 1, is the concern immediate or eventual trips of the generator with the loss of a station service transformer? Are station service bus overcurrent relays subject to minimum setting criteria specified in Table 1? 3. Equipment limitations may exist that have not been considered thus far in

Organization	Yes or No	Question 6 Comment
		drafting PRC-025. Not all units include high initial response AVRs, and PRC-025 states in fact that only 20% of units examined were able to generate MVARS at the 150% of rated MW level mandated in the draft standard. A GSU sized to cover a generator with lesser field-forcing capability would be suitably specified for the application, but left exposed to damage by the PRC-025 settings criteria. Older transformers, designed to standards different from those in force today (and having incurred some degradation of condition), may incur mechanical damage upon being subjected to excessive current. This can take the form of buckling of inner windings, stretching of outer windings, spiraling of end turns in helical windings, collapse of yoke insulation, press rings, press plates and core clamps, conductor tilting, conductor axial bending between spacers, and dielectric failures. PRC-025 should accordingly be revised to grandfather existing major equipment, similar to the approach used in PRC-024. Relaying changes may be necessary in some cases, but scaling-back the criteria in table 1 of the standard to respect the limitations of existing equipment should be permitted. 4. The applicability of PRC-025 should exclude small gensets that are NERC-registered solely due to being black start-capable, the tripping of which would not meaningfully affect the ability of the system to ride through Disturbances. It would be best to allow such units to maintain their present loadability relay settings, if they are consistent with a reasonable coordination study, rather than mandate upgrades that augment the degree to which NERC requirements have already eliminated any economic rationale for having black-start facilities. The inclusion of generating units and generating plants identified as Blackstart Resources in the Transmission Operator's system restoration plan is unnecessary and inappropriate. These units typically are the smaller units in a generating fleet and, alone, would not impact the ability to ride through the type of system excursion that is the concern of this standard. Further, allowing protection system settings that are more conservative than these proposed in this standard will better protect these

Organization	Yes or No	Question 6 Comment
		resources that are essential to recovering from a system blackout.
Response: The drafting team thanks you for your participation; please see the response(s) for Essential power, LLC in Question #6.		
Kansas City Power & Light	Yes	Generators and Generator step up transformers are critical elements of the BES and have very long lead times for replacement or major repair. However, the Transmission Relay load ability standard has less stringent load ability requirements than the Generator load ability standard. Transmission lines are allowed to trip at 150% of four hour rating or 115% of 15 minute rating. This standard requires generators to stay on line up to 180% of their rating for distance element settings and requires GSU's to stay on line up to 200% of their rating for phase over current elements. The relay setting limits in this standard are not based on protection of the generator or GSU and risk damaging this equipment under extreme operating conditions. The suggestion is to reduce the load ability requirements for generators and GSU's to coordinate better with the Transmission Relay Load ability standard.
Response: The drafting team notes that PRC-025-1 addresses generator relay loadability concerns that are fundamentally different than transmission relay loadability. The criterion in PRC-025-1 prevents tripping from generator load-responsive protective relays for short-time overloads during the field-forcing conditions of the generator, for which the equipment was designed. The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. To prevent equipment damage from excessive time exposed to overload conditions, the drafting team has modified the standard to clarify exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. Change made.		
SERC RRO	Yes	The purpose statement should be modified from "prevent unnecessary tripping" to "minimize unnecessary tripping" of generators.

Organization	Yes or No	Question 6 Comment
		Response: The drafting team contends that the goal of the draft PRC-025-1 reliability in general is to prevent, not minimize tripping of generators during a system disturbance for conditions that do not pose a risk of damaging the generator. No change made. Part of the Rational statement for R1 is flawed - it is not currently possible to both comply with the PRC-025 draft standard and achieve desired protection goals. Generation systems that were not designed to provide 150% field forcing capabilities may contain other equipment (GSU's, for example) that may incur overload damage if subjected to periods of generator over-loads at the power flow magnitudes specified in Table 1. **Response:** The drafting team notes that the standard provides multiple options for setting generator and transformer load-responsive phase relays to address this concern. For example, 1c and 8c allow a simulation for excitation systems that are not capable of producing reactive power at 150% of rated MW. To prevent equipment damage from excessive time exposed to overload conditions, the drafting team has modified the standard to clarify exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. Change made. Abnormal operating conditions (reduced generator or GSU cooling ability, generator vibration problems at high VAR production levels, etc.) must be considered in the standard development to allow for exceptions to Table 1 for equipment protection. **Response:** The drafting team notes that the standard does not require that the generator achieve the Mvar capability during conditions anticipated by the standard, but instead that the load-responsive protective relays accommodate whatever field forcing may occur during disturbances. Actual observed generator performance during disturbances, as well as numerous simulations using actual generator data, has shown that many generators may

Organization	Yes or No	Question 6 Comment
		approach this value of field forcing. The drafting team understands that not all generators will be able to achieve this performance and has offered the opportunity to perform simulations with specified criteria to determine the expected performance of a specific generator and application so that the load-responsive protective relays may be set in a manner more precisely representative of that generator's performance. Therefore, an additional exception process is not warranted. No change made. It is acknowledged that voltage restrained overcurrent relays are known for not having predictable operating times during fault conditions. If the voltage restrained overcurrent relay mis-operations were a significant contributor to the Aug 2003 blackout , then the standard should address voltage restrained relay types rather than specifying such high (liberal) allowable thresholds for pickup of all types of generator load responsive protective relays. **Response:** The drafting team agrees, in general, that voltage-restrained devices are not recommended, and where used, that these devices should be replaced. However, as the drafting team is unable to require that such relays be replaced, applicable criteria are provided. The threshold criteria in PRC-025-1 are necessary to prevent tripping from generator load-responsive protective relays for short-time overloads during the field-forcing conditions of the generator, for which the equipment was designed. No change made. In the Guidelines and Technical Basis document under Applicability the terms transmission Facilities and generator leads are mentioned. It should be noted that some companies use different terms when referring to the leads connecting the generator Facility to the BES facility. The leads connection between the generator Facility GSU transformer and the BES Facility breakers may be referred to GSU leads and not Generator leads. Generator leads may be those located inside the generator Facility between the GSU lowside and the generator itself.

Organization	Yes or No	Question 6 Comment
		Response: The drafting team thanks you for your comment. The drafting team contends that "generator leads" is the more commonly used term for this application. No change made. The comments expressed herein (Qiestions 1-6) represent a consensus of the views of the above-named members of the SERC EC Protection and Control Subcommittee only and should not be construed as the position of SERC Reliability Corporation, its board, or its officers.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Manitoba Hydro	Yes	The meaning of a reliability standard should be clear from a reading of the standard alone, rather than being dependent on external documents. **Response:** The drafting team believes the standard provides sufficient detail to be clear from an independent reading. Note that the Guidelines and Technical Basis document, which is currently its own document, was separated from the standard to facilitate team development and for document manageability. Other documents referenced are intended to provide the reader with additional background and basis for the required settings anticipated by the draft standard. No change made. It is not clear from a simple reading of the standard that what appears to be a single requirement is actually three sequential requirements. Based on a review of the Implementation Plan and RSAW, R1 requires the Generator Owner to: (i) Assess its load-responsive protective relays to determine if application of the settings prescribed in Attachment 1 maintain reliable fault protection; (ii) after the assessment is completed, either replace those load-responsive relays that will not maintain reliable fault protection with the prescribed settings or change the Generator Owner's protection philosophy;

Organization	Yes or No	Question 6 Comment
		(iii) after all necessary replacements or protection philosophy changes have been made, the prescribed settings in Attachment 1 shall be applied. Requirement 1 should be redrafted as three separate requirements in order to clarify its meaning and to avoid inconsistencies with supporting documents such as the RSAW. At present, the RSAW refers to relay replacement, while the standard does not. **Response:** The drafting team worked extensively to create a standard with the fewest number of requirements subject to compliance and that would achieve the necessary benefit for reliability. The drafting team observes that elements of your proposal appear to prescribe a "how" and not a "what," which is beyond the scope of the standard. No change made. (2) Based on the drafting team's response to Manitoba Hydro's comment regarding the vagueness of the phrase "while maintaining reliable fault protection" and the Technical Guidelines, it appears that NERC intends for this element of the requirement to be determined by the Generator in its sole discretion, rather than being subject to audit. Therefore, the standard should be clarified by adding the phrase "as determined by the Generator Owner, in its sole discretion" after the phrase "while maintaining reliable fault protection". **Response:** The drafting team contends that the description of the term "while maintaining reliable fault protection" found in the Requirement R1 rationale box adequately conveys the suggested intent. No change made. (3) For the 51 relays on the step-up transformers (Option 10): Following this setting criteria could mean that the pickup setting could be 175% of nameplate rating of the transformers. Should there be any concern with the transformer overload and mechanical damage as a result? Also, the 175% setting is not consistent with the 150% number in the Transmission Relay Loadability standard. **Response:** The drafting team notes that setting criteria and option numbers

Organization	Yes or No	Question 6 Comment
		have changed for some options in the revised draft. Regardless, mechanical damage is a result of much higher current levels than those being addressed within this standard. The drafting team also notes that the standard provides exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. Finally, the setting criteria in PRC-025-1 and PRC-023-3 are intentionally different. PRC-025-1 addresses generator relay loadability concerns that are fundamentally different than transmission relay loadability. The criterion in PRC-025-1 prevents tripping from generator load-responsive protective relays for short-time overloads during the field-forcing conditions of the generator, for which the equipment was designed. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Ameren	Yes	(1) The MW capability reported to the PC or TP changes by a minute amount from time to time. As written this could trigger a significant amount of documentation. Please include a tolerance of 2% increase from the originally documented value before triggering such a review. **Response:** The drafting team contends that if an entity is concerned about minor changes in the reported capability, the entity can reflect these minor changes as an increased margin in their relay setting. No change made. (2) Is a declaration or just documentation required if an owner uses none of these 'Relay types' for these 'Applications' on a particular generating unit? **Response:** The drafting team notes that the standard is applicable to a Generator Owner only when the owner applies load-responsive protective relays. When a particular Generator Owner does not apply load-responsive protective relays pursuant to PRC-025-1, providing a declaration or documentation as evidence of compliance is a concern that should be

Organization	Yes or No	Question 6 Comment
		addressed by the Generator Owner's management. No change made. (3) In addition to our comments, we also agree with the SERC Protection & Control Subcommittee (PCS) comments and include them by reference. **Response:** Please see the responses for SERC RRO in Question 6.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
ACES	Yes	(1) We would like to see a more straight-forward approach to this standard. The requirement and the table should allow for setting capabilities of existing equipment and not require registered entities to replace relays in order to comply. **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance resource requirements) in cases where protection system modifications are necessary to achieve the reliability objective of the draft standard. This is why the standard has provided multiple alternatives to meet the requirements. No change made. Also we have concerns that the bright line is not clear enough and compliance with loadability should be separated by standards. Finally, we would like to see a compare/contrast assessment of PRC-023-3 and PRC-025-1 to better understand the separation of responsibilities. This assessment could be in the technical or application guidelines. **Response:** The drafting team agrees, in general, that voltage-restrained devices are not recommended, and where used, that these devices should be replaced. However, as the drafting team is unable to require that such relays

Organization	Yes or No	Question 6 Comment
		be replaced, applicable criteria are provided. The threshold criteria in PRC-025-1 are necessary to prevent tripping from generator load-responsive protective relays for short-time overloads during the field-forcing conditions of the generator, for which the equipment was designed. No change made. (2) This standard exceeds NERC's jurisdictional bounds as the FERC-approved Electric Reliability Organization (ERO). According to the Energy Policy Act of 2005, a reliability standard includes requirements for the operation of existing bulk-power system facilities, and the design of planned additions or modifications to such facilities to the extent necessary to provide for reliable operation of the bulk-power system, but a reliability standard does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity. Further, the Act "does not authorize the ERO or the Commission to order the construction of additional generation or transmission capacity or to set and enforce compliance with standards for adequacy or safety of electric facilities or services."This standard is proposing new construction of Protection System relaying schemes that could be interpreted as enlarging the facility, where electro-mechanical relays may exist. This replacement of equipment goes beyond the intent of the EPA 2005. **Response:** The drafting team notes that in Subtitle A, Reliability Standards, Section 215 (i)(2), Electric Reliability of the Energy Policy Act of 2005[4] states: "This section does not authorize the ERO or the Commission to order the construction of additional generation or transmission capacity or to set and enforce compliance with standards for adequacy or safety of electric facilities or services." This clause pertains to the construction of additional generation or transmission capacity and not the modification, replacement, or installation of a relay that may be necessary to meet the reliability goal of a

[4] Energy Policy Act of 2005, http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf

Organization	Yes or No	Question 6 Comment
		standard. FERC Order No. 762,[5] Paragraph 328 states: "The proposed Reliability Standard does not necessarily have to reflect the optimal method, or "best practice," for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently." No change made. (3) There is already tremendous pressure to retire units based on environmental and other regulations. Given that many older units already experience significant cost pressures any increase in their operating costs could have the unintended consequence of force retiring plants which will sdegrade reliability particularly in areas with marginally adequate levels of planning reserve. These older plants are most likely to have electro-mechanical relays that may have to be replaced to meet the settings criteria in the standard and the cost of replacing the relays could exceed the benefits of staying in service. Having fewer plants online would have an adverse impact on reliability. If a relay is functioning properly, but it is not capable of meeting compliance with PRC-025-1, the introduction of the standard itself becomes a threat to reliability. We suggest rethinking the replacement of equipment and propose to have exceptions for equipment that cannot meet the requirements for new technology. **Response:** The proposed PRC-025-1 standard is addressing a regulatory directive to set load-responsive protective relays at a level to prevent unnecessary tripping of generators during a system disturbance for conditions that do not pose a risk of damage. The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance resource requirements) associated

[5] Federal Energy Regulatory Commission, Order No. 672, Docket No. RM05-30-000, February 3, 2006, http://www.ferc.gov/whats-new/comm-meet/020206/E-1.pdf

Organization	Yes or No	Question 6 Comment
		with achieving reliability objectives for facilities, resources and activities subject to the proposed PRC-025-1 standard. This is why the standard has provided multiple alternatives to meet the requirements. No change made. (4) This standard is unduly discriminatory to smaller utilities that do not have unlimited resources to replace fully-functioning equipment that cannot meet the requirements of the proposed standard. This standard assumes that all registered entities have a budget of an IOU, and budgets to replace equipment within three years after implementation is enough time. As stated above, compliance with this standard may have unintended consequences of units being retired, which could have adverse impacts on reliability. **Response:** The drafting team notes FERC Order No. 762,[6] Paragraph 329 and 330 state: "329. The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice — the so-called "lowest common denominator" — if such practice does not adequately protect Bulk-Power System reliability. Although FERC will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability. 330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a "lowest common denominator" Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it. No change made.

[6] Federal Energy Regulatory Commission, Order No. 672, Docket No. RM05-30-000, February 3, 2006, http://www.ferc.gov/whats-new/comm-meet/020206/E-1.pdf

Organization	Yes or No	Question 6 Comment
		(5) The introduction section on page 7 uses "relay element." Because element is a NERC defined term, we suggest avoiding its use here as it is inconsistent with the meaning. We suggest using "component" instead of "element." **Response:** The drafting team agrees that is important to be consistent with terms, especially NERC defined glossary terms; however, the drafting team contends that the use of "relay element," in this case, has sufficient clarity over the defined term "Element," which is capitalized to denote to the reader it is a defined NERC term. No change made. (6) Thank you for the opportunity to comment.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Wisconsin Electric Power Company	Yes	1. The 2nd paragraph in Attachment 1 Introduction should be revised for clarity. We suggest: "Criteria for synchronous generator relay setting values are derived from the unit's maximum gross Real Power capability in megawatts (MW), as reported to the Planning Coordinator or Transmission Planner. The unit's Reactive Power capability in megavoltampere-reactive (Mvar) is determined by calculating the MW value based on the unit's nameplate megavoltampere (MVA) rating at rated power factor..." **Response:** The drafting team contends that your revisions do not add any additional clarity to the current wording. No change made. 2. We are concerned that the protection of transformers from damage due to through-faults will be sacrificed by the setting constraints in this standard. The requirements and examples should be revised to assure that transformer protection will be able to be applied which meets the criteria in the IEEE C37.91 through-fault protection curves. **Response:** The drafting team contends that the setting criteria do not

Organization	Yes or No	Question 6 Comment
		preclude adequate protection against damage due to through-faults. Mechanical damage is a result of much higher current levels than those being addressed within this standard. No change made. The drafting team also notes that the standard provides exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. No change made. 3. A similar concern may apply to generators and the need to set protection that protects the generator from conditions which may exceed the stator winding short-time thermal requirements given in IEEE C50.13 Section 4.2.1. **Response:** The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short-time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
NV Energy	Yes	1. What difference does the type of generator make to the relay settings, especially for transformer over-current protection? The supporting materials do not have a technical justification for treating synchronous and asynchronous generators differently. We do not see any rationale for any difference in settings. **Response:** The drafting team contends that the rationale for the differences is contained within the Guidelines and Technical Basis document. Please refer to the sections titled “Asynchronous Generator Performance” and “Synchronous Generator Performance.” No change made. 2. The relay Pickup Setting Criteria should be simpler: based upon a percentage of the unit MVA alone. For example option #1a, Test #1 states the

Organization	Yes or No	Question 6 Comment
		relay should allow at least 115% of 100% rated MW output, then test #2 states 150% of 100% of MW output. Which one is to be used? **Response:** The drafting team notes that the two "tests" referenced by the commenter represent the real power output and the reactive power output to be used in calculating the settings. Therefore, both of these values are used. No change made. The criteria are confusing. The real goal here is to allow full machine output within the generator capability curves (meaning both real and reactive power output) to support the interconnection during a disturbance. Therefore, the settings should be based on the unit MVA capability alone. **Response:** The drafting team notes that PRC-025-1 is not for the steady state condition but for the field-forcing (short-term) condition. The drafting team believes the provided Example Calculations in the Guidelines and Technical Basis document provide sufficient detail to clarify the process for calculating the various Options. No change made. 3. What difference does the unit GSU make? The goal here is to ensure the unit stays on-line during a disturbance, while the relays continue to adequately protect the unit and GSU. The test should be unit MVA alone **Response:** The drafting team notes that the GSU is in series with the generator output and subject to the same load-responsive protective relay loadability concerns anticipated by the proposed standard. No change made. 4. All the criteria can be simplified into one: relays should allow at least 150% unit MVA. **Response:** The drafting team notes that the various types of criteria account for different behaviors during stressed system conditions exhibited by different types of generators. Establishing a single criterion would be unnecessarily restrictive for many types of generating units. No change made.

Organization	Yes or No	Question 6 Comment
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Public Service Enterprise Group	Yes	1. The draft standard does not take into consideration situations where a GO cannot meet the setting requirements of the standard due to equipment limitations (e.g. generator and transformer withstanding limitations). The standard should have some means for a GO to provide technical justification in the event they cannot meet the setting requirements without compromising the generator's protection. **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team also notes that the standard provides exclusions for dedicated generator and transformer overload protection that operates in time frames appropriate to overload protection. No change made. 2. The guideline and technical basis document describes cases during the 8/14/2003 event where generator units tripped offline when they shouldn't have. However, it makes no reference to the transmission protection schemes that should have operated prior to a generator's relays operating, thus preventing the generator from tripping offline. The document gives no justification of how having generator overload relays set in the manner described in the draft standard would prevent another 8/14/2003. There would have had to been several transmission relay misoperations before a generator relay would have the opportunity to operate and worsen a system event. **Response:** The drafting team has developed the standard in accordance with the regulatory directive concerning generator relay loadability, which is an outcome of the 2003 blackout report. The report revealed the need to address generator relay loadability. The drafting team understands there is limited empirical data regarding

Organization	Yes or No	Question 6 Comment
		generator relays tripping due to insufficient relay loadability. However, as noted in the NERC document 'Power Plant and Transmission System Coordination' – July 2010, at least 28 generators were tripped on August 14, 2003 by load-responsive phase protection; eight of those by phase distance and 20 more by 51V protection. Generators tripping by these load-responsive protective relays are significant because these protective relays are subject to operating during the phase of a disturbance during which the system may be capable of recovering, whereas other protective relays that are not responsive to load are more likely to operate after the system has become unstable or during a system collapse. It is therefore more important to focus attention on preventing operation of load-responsive protective relays from tripping generators, which may cause or contribute to an otherwise recoverable event resulting in cascading, instability, or uncontrolled system separation. The drafting team also notes that such nuisance tripping is undesirable, and has exacerbated actual serious disturbances. The standard provides that the Generator Owner may perform simulations to determine the actual generator performance during the stressed conditions anticipated by the standard which is a more precise option. The drafting team notes that since the document 'Power Plant and Transmission System Coordination' – July 2010 was published, additional study has been undertaken, involving 67 simulations of performance of actual generators for the abnormal conditions anticipated by this standard and for the actual conditions observed on August 14, 2003. These simulations have clearly revealed that generators can approach or achieve the level performance specified in the standard and thus not cause a disturbance to deepen. Simulation offers a practical alternative to real world event and historical performance data. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		

Organization	Yes or No	Question 6 Comment
Northeast Power Coordinating Council	Yes	Section 3.1.1 - Change to: "Generator Owner that applies load-responsive protective relays at the terminals of BES facilities." Section 3.2 - remove the entire section (3.2, 3.2.1, 3.2.2, 3.2.3, and 3.2.4), the revised Section 3.1.1 now will cover this section. **Response:** The drafting team contends that the Applicability as written makes a necessary distinction to include non-BES Facilities that are essential to ensuring the generator remains on line, such as unit auxiliary transformer and elements used to collect dispersed generation. No change made. R1 - remove the following words: "while maintaining reliable fault protection." - it is not possible to measure or prove this statement. **Response:** The drafting team contends that the description of the term "while maintaining reliable fault protection" found in the Requirement R1 rationale box adequately conveys the suggested intent. No change made. In Section C., the Table of Compliance Elements there should be Lower, Moderate, and High VSL's. The "all or nothing" approach does not reflect an entity's success at achieving compliance. **Response:** The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. No change made. Table 1. Relay Loadability Evaluation Criteria, 1a, (1): "Real Power output - 100% of the MW capability reported to the Planning Coordinator or Transmission Planner", this should be generator nameplate rating. The MW capability reported can change. **Response:** The drafting team considered this same concern in past meetings

Organization	Yes or No	Question 6 Comment
		and concluded that the Mega-Watt (MW) value reported to the Planning Coordinator or Transmission Planner was the most practical approach for a basis in determining the required setting(s). The Generator Owner has flexibility in using a more restrictive setting, which would be the case of using the generator name plate. In option 1, for example, the requirement is to use 100% of the reported MW and 150% of the nameplate MW to arrive at the Mvar component of the complex power. The impedance element must be set less than the calculated impedance derived from 115% of the complex power, which is using criteria (1) and (2). The standard allows the Generator Owners the flexibility to account for variable changes in the reported MW value and select a setting that best suits their specific operating history or expectation. Using the reported MW value accounts for environmental conditions that impact the operation of generation units and those units which operate at a level lower than their nameplate rating. This more closely achieves a loadability setting corresponding with the expected performance of the generator during field-forcing. No change made. Table 1. Relay Loadability Evaluation Criteria, 14a or 14b: What is the definition of “Generator interconnection Facilities”? **Response:** The drafting team has included additional explanation in the Guidelines and Technical Basis document and made several changes to both draft PRC-023-3 and PRC-025-1 to address these concerns. Refer to the summary of changes to the standard at the beginning of this document. Change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Dominion Resources Services, Inc.	Yes	Section 3.1.1 - Change to: “Generator Owner that applies load-responsive protective relays at the terminals of BES facilities.” Section 3.2 - remove the entire section (3.2, 3.2.1, 3.2.2, 3.2.3, and 3.2.4), the

Organization	Yes or No	Question 6 Comment
		revised Section 3.1.1 now will cover this section. **Response:** The drafting team contends that the Applicability as written makes a necessary distinction to include non-BES Facilities that are essential to ensuring the generator remains on line, such as unit auxiliary transformer and elements used to collect dispersed generation. No change made. R1 - remove the following words: "while maintaining reliable fault protection." - it is not possible to measure or prove this statement. **Response:** The drafting team contends that the description of the term “while maintaining reliable fault protection” found in the Requirement R1 rationale box adequately conveys the suggested intent. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
American Electric Power	Yes	As stated in our earlier comments, the scope of this draft is inconsistent with the title and purpose with respect to generator protective relays as opposed to generation relays. The phrase “generator relay” has a specific meaning to a relay engineer, and encompasses only a subset of the generation relays covered under this standard. **Response:** The drafting team notes that the purpose statement is general, and is not intended to apply exclusively to generator relays. The drafting team has modified the purpose in response to your comment. Please refer to the revised purpose statement in draft 3 of the standard. Change made. AEP disagrees with the removal of the PRC-023-2 effective date tables in their entirety because the PRC-023-2 tables include provisions allowing the TO, GO and DP 39 months following the notification by the planning coordinator of a new inclusion to the list of circuits subject to R6 to come into compliance with R1, R2, and R3. **Response:** The drafting team agrees that certain items in the PRC-023-2

Organization	Yes or No	Question 6 Comment
		standard's implementation plan should have remained. The items which remain relevant given the time frame expected for approval have been replaced in the proposed PRC-023-3 revised standard. Change made. AEP requests than a definitive time frame for evaluations of new inclusions be included in PRC-023-3. **Response:** The drafting team has developed an implementation plan for Transmission Owners in PRC-023-3 for generator interconnection facilities under 200 kV that is identical to that provided in PRC-025-1 for similar facilities. Change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Hydro-Québec Production	Yes	Comments: HQP (Generation) doesn't own the following components detailed in the proposed standard: 1) the asynchronous generator, 2) the GSU transformer, 3) The load-responsive protective relay (21); 4) the phase time overcurrent relay - Voltage control (51C). HQP recommends moving all of these components to the Transmission Relay Loadability standard PRC-023-3.
Response: The drafting team thanks you for your comment. Generator Owner has been retained in the Applicability of PRC-023-3 to address configurations where the Generator Owner owns load-responsive protective relays on the terminals of network transmission lines. Specific requirements in PRC-025-1 have been duplicated as Requirements R7 and R8 in PRC-023-3 to address configurations were the TO and DP they own protective relays on dedicated generator interconnection Facilities and/or GSU. Change made.		
Tacke	Yes	In section 3.2 "Facilities". I think it is critical that the following phrase be added at the end of the first paragraph: "..., and any generator, regardless of size or connected voltage, that has been shown to be material to the reliability of the BES". The "bright line" of 100 kV and 20 MVA is fine in general, but when it is known that a generator connected at less than 100 kV is material to the

Organization	Yes or No	Question 6 Comment
		reliability of the BES, it should be included as an applicable facility for this standard. Please remember that WECC requires dynamic model verification for all units 20 MVA or larger connected at voltages 60 kV and above. This is because WECC members have learned over the years to recognize the significant role that smaller size generators play in system response and stability. Also, past WECC studies of major outages have shown that generators connected at less than 100 kV, have played a major role in the impact of outages. In fact, the most accurate duplication of the 1996 outage and more recent outages that the WECC MVWG has simulated, have shown that the accuracy of the simulated results of actual system outages is highly affected by the accuracy of the modeled system below 100 kV.
Response: The drafting team's intent of the Applicability is to remain consistent with the definition of the Bulk Electric System (BES) for the general application of the standard. The current approved BES definition exception process provides for inclusion of lower voltage level Facilities and smaller generators that are determined to be critical to the reliability of the BES. No change made.		
Luminant Energy Company LLC	Yes	Luminant recommends that language be added to the Table (Relay Loadability Evaluation Criteria - Options 13a and b) explaining that only relays that act to trip the generator directly or via lockout or auxiliary tripping relay are included.
Response: The drafting team notes that for some generators a setting of 150% to 200% of the generator MVA rating at its rated power factor is insufficient and is moving beyond the general application guidance expressed in C37.102 so that load-responsive protective relays allow generators to support the system during stressed conditions to the extent possible. The drafting team also notes that while C37.102 provides general guidance on the reach for phase fault backup protection, it also provides insight regarding situations in which voltage regulator action could cause an incorrect trip. Similar to information in the Guidelines and Technical Basis for PRC-025-1, C37.102 notes that consideration should be given to reducing the reach of the relay and/or coordinating the tripping time delay with the time delays of the protective devices in the voltage regulator. It		

Organization	Yes or No	Question 6 Comment
also recommends that the setting of these relays be evaluated between the generator protection engineers and the system protection engineers to optimize coordination while still protecting the turbine generator, and that stability studies may be needed to help determine a set point to optimize protection and coordination. Change made.		
MID	Yes	MID is generally in agreement with the proposed standard requirements. However MID disagrees with applicability to only BES connected geneators. In section 3.2 "Facilities", MID proposes the following phrase be added at the end of the first paragraph: "..., and any generator, regardless of size or connected voltage, that has been shown to be material to the reliability of the BES". The “bright line” of 100 kV and 20 MVA is fine in general, but when it is known that a generator connected at less than 100 kV is material to the reliability of the nearby BES, it should be included as an applicable facility for this standard. WECC requires dynamic model verification for all units 20 MVA or larger connected at voltages 60 kV and above. This is because WECC members have learned over the years to recognize the significant role that smaller size generators play in system response and stability.
Response: The drafting team’s intent of the Applicability is to remain consistent with the definition of the Bulk Electric System (BES) for the general application of the standard. The current approved BES definition exception process provides for inclusion of lower voltage level Facilities and smaller generators that are determined to be critical to the reliability of the BES. No change made.		
ReliabilityFirst	Yes	More clarity is needed to identify the differences between the different protection applications for GSUs, Generator interconnection Facilities and generators. Some of the options appear to be almost identical and could possibly be combined in the table as they are in the calculations within the Guidelines and Technical Basis document.
Response: The drafting team thanks you for your comment; however, the comment has not provided sufficient detail as to the confusion and the specific references. The drafting team notes the table is divided for each discrete application in order to		

Organization	Yes or No	Question 6 Comment
make it clearer to users. No change made.		
WPS	Yes	Placing a blanket restriction on generator phase-responsive protective element settings could reduce protection in certain situations. Rather, this decision should be left to the Professional Protection Engineers who consider technical resources, such as the IEEE Guide for AC Generator Protection, and individual unit characteristics when applying protection element settings. **Response:** The drafting team notes that for some generators a setting of 150% to 200% of the generator MVA rating at its rated power factor is insufficient and is moving beyond the general application guidance expressed in C37.102 so that load-responsive protective relays allow generators to support the system during stressed conditions to the extent possible. The drafting team also notes that while C37.102 provides general guidance on the reach for phase fault backup protection, it also provides insight regarding situations in which voltage regulator action could cause an incorrect trip. Similar to information in the Guidelines and Technical Basis for PRC-025-1, C37.102 notes that consideration should be given to reducing the reach of the relay and/or coordinating the tripping time delay with the time delays of the protective devices in the voltage regulator. It also recommends that the setting of these relays be evaluated between the generator protection engineers and the system protection engineers to optimize coordination while still protecting the turbine generator, and that stability studies may be needed to help determine a set point to optimize protection and coordination. The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide

Organization	Yes or No	Question 6 Comment
		exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made. The guideline & technical basis document states "...it is suggested that the responsible entity consider both the requirement within this standard and its desired protection goals, and perform modifications to its protective relays or protection philosophies as necessary to achieve both." The document continues on further stating "...it may be necessary to replace the legacy relay with a modern advanced-technology relay...". These comments are of concern since several BES generator protection schemes consist of legacy protective relays which may require a wholesale change out to comply with this reliability standard. **Response:** The drafting team understands there is a cost impact (e.g., implementation, maintenance, and ongoing compliance resource requirements) associated with achieving reliability objectives for facilities, resources and activities subject to the proposed PRC-025-1 standard. This is why the standard has provided multiple alternatives to meet the requirements. No change made. This standard speaks specifically to asynchronous phase-responsive protective elements. These protective elements are usually associated with wind turbines which could pose protection issues. The standard drafting team should consider revising the applicability criteria to clearly state that PRC-025 is not meant to apply to individual wind turbines but to aggregated generation greater than 75MVA connected at a common point at 100kV or above. **Response:** The drafting team thanks you for your comments. The drafting team did not intend to apply PRC-025-1 to individual wind turbines or solar units themselves and intended it to apply to the aggregated generation instead. The Applicability has been modified to reflect this intent based on

Organization	Yes or No	Question 6 Comment
		other comments. Change made. Clarification should be added to the standard indicating that PRC-025 only applies to those relays that are present and enabled and does not require entities to add additional protective relays. **Response:** The drafting team has modified Attachment 1 to address your concern.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Alliant Energy	Yes	The bright line is extremely dull and blurry when it comes to auxiliary transformers. Each standard appears to treat auxiliary transformers different and confuses the user regarding auxiliary transformers. The standard is not clear if the terminals referred to in 3.1.1 are only the high voltage side or farther down into the auxiliary system such as the low voltage terminals plus low side breaker and bus, etc. Please clarify the stopping point for this standard. **Response:** The power transformers that are in-service when the unit is released to the dispatcher and, under normal plant operations, are capable for unit full load operation are considered. Only relays, regardless of location, that trip the units via generator lockout action or directly trip of the generator breaker(s) are under the setting criteria. Startup/Standby transformers that are not required to keep the units running are excluded from the standard. Station service bus overcurrent relays are not subject to this standard. The drafting team notes that the example calculations for the unit auxiliary transformer (UAT) phase overcurrent relay applies to relay's CTs connected to either the high-side or the low-side of the unit auxiliary transformer (UAT) if the relay trips the generator directly or via generator lockout. Additional language was added to 13a and 13b to clarify the relay loadability criteria. Change made.

Organization	Yes or No	Question 6 Comment
		############################## Requiring the calculations of PRC-025 using the gross MW numbers submitted from MOD-024 might create a lot of unnecessary re-work if MOD-024 submittals are regularly updated with minor MW changes. This will drastically increase costs of compliance and the entities risk of non-compliance with very little reliability benefit. We would like to see an option that would be based upon the nameplate MW or some other static number even if it means the entity has to use a higher margin in their calculation. Tweaking a generator setting every year is not desirable and will open more risk for the BES in the end. **Response:** The drafting team contends that if an entity is concerned about minor changes in the reported capability, the entity can reflect these minor changes as an increased margin in their relay setting. No change made. ############################## We are concerned that the proposed calculations for the distance relays will adversely affect reliability of the BES by requiring GO entities to pull back their distance reaches too far and conflict with itself since R1 language also requires the utility to maintain reliable fault protection. Because of the combination of MW, MVAR ratings specified, 115% margin, reduced voltage and approximate 56 degrees power factor angle used in PRC-025-1, the user realizes over a 30% reduction in equivalent reach for a distance relay when compared to other equivalent standards listed below: 1. PRC-023-2 options which uses: 150% facility rating @ 0.85 pu voltage and a power factor angle of 30 degrees. 2. IEEE C37.102-2006, “Guide for AC Generator Protection”, Section 4.6.1.1: “Generally, a distance relay setting of 150% to 200% of the generator MVA rating at its rated power factor has been shown to provide good coordination for stable swings, system faults involving in-feed, and normal loading

Organization	Yes or No	Question 6 Comment
		conditions." Therefore, it appears that the GO must maintain higher equivalent loadability on a generator than a TO relative to a transmission line. This may work when a generator is connected to multiple lines but doesn't make sense for radial connections or if you become radial due to maintenance or line outages. Many of our generator relays will require distance relay setting changes based upon this proposed standard and we will no longer be able to back up all of the lines leaving our generating stations. This will put a much higher risk and responsibility on the TO too have extremely reliable protection for the lines. We will no longer be able to trip the generator off in a backup mode if the TO does not clear the phase fault at end of line. We believe this has gone a little too far in that R1 still requires the entity to maintain reliable fault protection which the formulas are starting to tread on. With this standard, as written, remote backup protection will likely no longer be an option. **Response:** The drafting team contends that it is possible to provide phase fault backup protection while meeting the requirements of this standard. If legacy approaches do not allow the entity to meet both, other approaches may be necessary. The drafting team also notes that while C37.102 provides general guidance on the reach for phase fault backup protection, it also provides insight regarding situations in which voltage regulator action could cause an incorrect trip. Similar to information in the Guidelines and Technical Basis for PRC-025-1, C37.102 notes that consideration should be given to reducing the reach of the relay and/or coordinating the tripping time delay with the time delays of the protective devices in the voltage regulator. It also recommends that the setting of these relays be evaluated between the generator protection engineers and the system protection engineers to optimize coordination while still protecting the turbine generator, and that stability studies may be needed to help determine a set point to optimize protection and

Organization	Yes or No	Question 6 Comment
		coordination. The drafting team notes that for some generators a setting of 150% to 200% of the generator MVA rating at its rated power factor is insufficient and is moving beyond the general application guidance expressed in C37.102 in order that load-responsive protective relays allow generators to support the system during stressed conditions to the extent possible. The standard PRC-023-2 (and proposed -3) is addressing steady-state transmission relay loadability and the proposed PRC-025-1 standard is addressing loadability during dynamic loading conditions, resulting in the difference between these two standards. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Lakeland Electric	Yes	The Effective date for the standard is on the first page of the PRC-025-1 Generator Relay Loadability project document but is not included in the draft 2 of the Standard. The effective date is normally included as section 5. of the Introduction. **Response:** The drafting team agrees that section "5. Effective Date:" should be included in the standard. Currently, there is a reference in the pages preceding the standard that includes "Effective Dates." Please note that the effective date is based on regulatory approval and the Implementation Plan provides the time frames for achieving compliance. The implementation Plan is approved in conjunction with the standard. Change made. The Guidelines and Technical Basis document needs to have "PRC-025-2" included on page title as it is in the footnotes starting on page 2. PRC-025-1 is not included anywhere on page one of the document. **Response:** The drafting team will re-append the Guidelines and Technical Basis document standard upon industry approval. The documents were separated for management purposes and to facilitate editing between team

Organization	Yes or No	Question 6 Comment
		members. The Guidelines and Technical Basis document title has been revised to clarify the relationship. Change made.
Response: The drafting team thanks you for your comments and support, please see the responses above.		
Tacoma Power	Yes	The IEEE standards for transformers no longer use the terms “no-load tap changers,” “off-load tap changers” or “on-load tap changers.” The preferred terms are “deenergized tap changer” and “load tap changer” per IEEE Standard C57.12.00. The preferred term of “deenergized tap changer” emphasizes that the transformer must be deenergized, not simply unloaded before moving the tap. Attachment 1, paragraph 4 and footnote 3 should be revised to read: “Calculations using the generator step-up (GSU) transformer turns ratio shall use the actual tap that is applied (i.e., in service) for GSU transformers with deenergized tap changers (DETC). Load tap changers (LTC) are rarely used for GSU transformers; when used, the calculations shall reflect the tap that results in the lowest generator bus voltage.”
Response: The drafting team thanks you for your comment and agrees with the suggestion to use the IEEE standard C57.12.00 terms. Change made.		
Independent Electricity System Operator	Yes	The January 2012 date under the “Anticipated Date” column in the “Description of Current Draft” Section on Page 1 should read January 2013.
Response: The drafting team thanks you for your comment and support. The date has been updated. Change made.		
Midwest Reliability Organization NERC Standards Review Forum (MRO NSRF)	Yes	The NSRF believes that this is a well written, well based, and focused NERC standard. The NSRF appreciates that the standard is solidly based on existing industry understood IEEE guidelines and practices. The NSRF would suggest that the structure of having one requirement with multiple applications to relays is clear and should support the reliable operation of the BPS.

Organization	Yes or No	Question 6 Comment
Response: The drafting team thanks you for your comment and support.		
PPL Generation, LLC on behalf of its Supply NERC Registered Entities	Yes	The PPL Companies believe that the proposed changes would reduce the reliability of the BES. The PPL Companies concerns are in concert with comments below from the North American Generators Forum standard review team: 1. We had thought in commenting on earlier drafts of PRC-025 that the toleration of extremely high current mandated by this standard would apply only for typical field-forcing periods, i.e. the few seconds it takes for the excitation limiter to respond. The present version of PRC-025 states in the 4th bull-dot of the introduction to Att. 1 however that protection systems must allow units to run for 15 minutes at the current levels stipulated in Table 1, which (as shown in the Guidelines and technical Basis document for this standard) can be on the order of 200% of rated current for generators and GSUs. This is far in excess of the thermal capability of such equipment. A cylindrical-rotor synchronous generator built to the present edition of ANSI C50.13 can withstand an armature current of 226% for 10 sec (208% in earlier editions), and 116% for 120 sec. The situation is similar for GSUs. ETAP studies of selected GSUs show that 200% current might be tolerated in many cases for a few minutes, but not a quarter hour. There should be a time frame defined in PRC-025 after which the generator owner is allowed to trip their equipment. Requiring the generator to operate at the specified overload conditions indefinitely will damage the generator. The draft standard setting specifications of Table 1 conflict with IEEE C37.102 Guide to Generator Protection. This guide (1995 revision) recommends setting the generator overcurrent relaying (51) so that it operates at 115% of rated current and trips in 7 seconds at 226% of full-load current. The fundamental issue appears to be that the Application Guidelines are patterned on transmission line-loading practices, but GSUs and (especially)

Organization	Yes or No	Question 6 Comment
		auxiliary transformers are not used and short-term-overloaded like transmission transformers, so requiring a minimum allowable trip pickup threshold based on IEEE C37.91 alone is not appropriate. Entities should be allowed to protect their equipment from overload, rather than being forced to allow a specific amount of overload. The result is that, despite the statement in R1 that protection must be maintained, prohibiting the use of multiple definite-time or continuous inverse-time load-responsive relays for any time period less than 15 minutes can degrade the quality of existing protection while doing nothing to improve ride-through for actual field-forcing periods. There are many cases in which overload pickups set at approximately 115% to 130% of the rated current saved units with a low-level fault or exciter malfunction that caused an extended, moderate overload. Such protection would no longer be allowed, and we are skeptical of vague assurances to the effect that somehow something just as good can (and must) be developed. We believe in summary that PRC-025 as presently written would degrade rather than enhance BES reliability, experience has revealed that the pickup settings of generator protection systems can be set much lower than the values specified in Table 1 and not result in undesirable nuisance tripping. and 15 minutes is vastly inappropriate as a one-size-fits-all field-forcing interval. 2. The portions of PRC-025 dealing with auxiliary transformers should be deleted in their entirety; since, aside from the considerations stated above (which apply for aux transformers as well), there is no reliability benefit to be gained. The standard cites generation unit trip records during blackouts as constituting its reason for existence; but, in response to a question posed in the webinar of Dec. 13, 2012, it was stated that there are no examples of plants being taken offline in such events by tripping of load-responsive aux transformer relays. There's no justification for the cost that GOs are being asked to spend. This

Organization	Yes or No	Question 6 Comment
		issue of there being no record of aux transformer loadability relay trips contributing to blackouts was raised again in the 2/13/2013 webinar, and there was no direct answer given. It appears that this equipment is being included in PRC-025 simply because the SDT was directed to do so. This does not constitute a valid justification; and, in accordance with the cost effectiveness discussions in the 2/13/2013 webinar, any requirements that lack justification should be removed. The Facilities sections 3.2.2 and 3.2.3 seem to be out of scope given the purpose statement "generator protective relays." We believe that Facilities section 3.2.3 does not belong in this standard as the equipment itemized does not relate directly to the generator loadability. Addressing generating plant station service transformers does not have to translate into creating a standard requirement for that equipment. An investigation and evaluation of the protection system for unit auxiliary transformers should be considered by the standard drafting team and deemed to be not related to generator loadability Providing a description of this dis-associated functionality fulfills the FERC order to address this subject. Further, there is confusion over which station service transformers are included in the scope. In footnote 1, is the concern immediate or eventual trips of the generator with the loss of a station service transformer? Are station service bus overcurrent relays subject to minimum setting criteria specified in Table 1? 3. Equipment limitations may exist that have not been considered thus far in drafting PRC-025. Not all units include high initial response AVRs, and PRC-025 states in fact that only 20% of units examined were able to generate MVARS at the 150% of rated MW level mandated in the draft standard. A GSU sized to cover a generator with lesser field-forcing capability would be suitably specified for the application, but left exposed to damage by the PRC-025 settings criteria. Older transformers, designed to standards different

Organization	Yes or No	Question 6 Comment
		from those in force today (and having incurred some degradation of condition), may incur mechanical damage upon being subjected to excessive current. This can take the form of buckling of inner windings, stretching of outer windings, spiraling of end turns in helical windings, collapse of yoke insulation, press rings, press plates and core clamps, conductor tilting, conductor axial bending between spacers, and dielectric failures. PRC-025 should accordingly be revised to grandfather existing major equipment, similar to the approach used in PRC-024. Relaying changes may be necessary in some cases, but scaling-back the criteria in table 1 of the standard to respect the limitations of existing equipment should be permitted. 4. The applicability of PRC-025 should exclude small gensets that are NERC-registered solely due to being black start-capable, the tripping of which would not meaningfully affect the ability of the system to ride through Disturbances. It would be best to allow such units to maintain their present loadability relay settings, if they are consistent with a reasonable coordination study, rather than mandate upgrades that augment the degree to which NERC requirements have already eliminated any economic rationale for having black-start facilities. The inclusion of generating units and generating plants identified as Blackstart Resources in the Transmission Operator's system restoration plan is unnecessary and inappropriate. These units typically are the smaller units in a generating fleet and, alone, would not impact the ability to ride through the type of system excursion that is the concern of this standard. Further, allowing protection system settings that are more conservative than these proposed in this standard will better protect these resources that are essential to recovering from a system blackout.
Response: The drafting team thanks you for your participation. These comments are substantively the same as Essential Power, LLC.'s comments above for Question #6, items 1 through 4. Please see the response provided for Essential Power, LLC in Question 6.		

Organization	Yes or No	Question 6 Comment
Southern Company Operations Compliance	Yes	The purpose statement should be modified from "prevent unnecessary tripping" to "minimize unnecessary tripping" of generators. **Response:** The drafting team contends that the goal of the draft PRC-025-1 reliability in general is to prevent, not minimize tripping of generators during a system disturbance for conditions that do not pose a risk of damaging the generator. No change made. Part of the Rational statement for R1 is flawed - it is not currently possible to both "comply with the draft standard and achieve our desired protection goals". Generation systems that were not designed to provide 150% field forcing capabilities may contain other equipment (GSU's, for example) that may incur overload damage if subjected to periods of generator over-loads at the power flow magnitudes specified in Table 1. **Response:** The drafting team notes that the standard provides multiple options for setting generator and transformer load-responsive phase relays to address this concern. For example, 1c and 8c allow a simulation for excitation systems that are not capable of producing reactive power at 150% of rated MW. No change made. Abnormal operating conditions (reduced generator or GSU cooling ability, generator vibration problems at high VAR production levels, etc.) must be considered in the standard development to allow for exceptions to Table 1 for equipment protection. **Response:** The drafting team notes that the standard does not require that the generator achieve the Mvar capability during conditions anticipated by the standard, but instead that the load-responsive protective relays accommodate whatever field forcing may occur during disturbances. Actual observed generator performance during disturbances, as well as numerous simulations using actual generator data, has shown that many generators may approach this value of field forcing.

Organization	Yes or No	Question 6 Comment
		The drafting team understands that not all generators will be able to achieve this performance and has offered the opportunity to perform simulations with specified criteria to determine the expected performance of a specific generator and application so that the load-responsive protective relays may be set in a manner more precisely representative of that generator's performance. Therefore, an additional exception process is not warranted. No change made. The high VRF and severe VSL is not appropriate for a single instance of failure to comply with one component of the many requirements contained within Table 1. **Response:** The drafting team thanks you for your comment. The Violation Risk Factor (VRF) comports with the NERC VRF definition and is consistent with similar requirements among Reliability Standards. For example, Requirement R1, criterion 6 of PRC-023-2 – Transmission Relay Loadability addresses similar concerns regarding Transmission lines and is also a "High" VRF. The drafting team contends that the Violation Severity Level (VSL) comports with NERC VSL Guidelines. For example, non-compliance is based on "binary" (i.e., pass-fail) condition. The entity either "applied" or "did not apply" the setting(s) in accordance with Attachment 1: Relay Settings; therefore, the Violation Severity Level must be designated Severe. There is only one Requirement, R1 that is applicable. The requirement has many "Options" available depending on the type of load-responsive protective relay applied on the Generator Owner's facilities. Please refer to the VRF/VSL Justifications posted on the Project 2010-13.2 project page for further information. No change made. It is acknowledged that voltage restrained overcurrent relays are known for not having predictable operating times during fault conditions. If the voltage constrained overcurrent relay mis-operations were a significant contributor to the Aug 2003 blackout, then those types of relays should be required to be

Organization	Yes or No	Question 6 Comment
		replaced rather than specifying such high (liberal) allowable thresholds for pickup of all types of generator load responsive protective relays. **Response:** The drafting team agrees, in general, that voltage-restrained devices are not recommended, and where used, that these devices should be replaced. However, as the drafting team is unable to require that such relays be replaced, applicable criteria are provided. The threshold criteria in PRC-025-1 are necessary to prevent tripping from generator load-responsive protective relays for short-time overloads during the field-forcing conditions of the generator, for which the equipment was designed. No change made.
Response: The drafting team thanks you for your comment and support, please see the responses above.		
Entergy Services, Inc. (Transmission)	Yes	The SDT may want to consider creating a new revision of the Power Plant and Transmission System Protection Coordination, Technical Reference Document Revision 1 - July 2010 to include the principles of PRC-025 and create a single source for compliance.
Response: The drafting team thanks you for your comment and support. The drafting team believes the standard provides sufficient detail to be clear from an independent reading. Other documents referenced are intended to provide the reader with additional background and basis for the required settings anticipated by the draft standard. The NERC System Protection and Control Subcommittee (SPCS) will consider whether changes are necessary to the Power Plant and Transmission System Protection Coordination. No change made.		
Electric Reliability Compliance	Yes	The standard is attempting to define relay settings for the generator from a pure electrical perspective in optimal operating conditions without taking into account other plant situations that could be impacted in a transient system event. Plant situations may be scheduled for resolution during future outages. However, equipment age/operating condition, changes in operational parameters, and overall operating environment may suggest that lower relay settings would be best to protect the plant for the greater good of

Organization	Yes or No	Question 6 Comment
		the BES. Would the team consider parameters and/or situations wherein the suggested settings in the standard might be modified to take plant environments/situations into consideration?
Response: The drafting team thanks you for your comment and notes that if equipment in the plant is de-rated due to age or condition, this may result in changes to the capability. Changes in the generator control parameters, etc., are subsequently reported and reflected in operations. The drafting team has offered the opportunity perform simulations with specified criteria to determine the expected performance of a specific generator and application so that the load-responsive protective relays may be set in a manner more precisely representative of that generator's performance. Therefore, an additional exception process is not warranted. No change made.		
Pepco Holdings Inc	Yes	There appears to be a typo on page 2 of the Implementation Plan for the retirement of PRC-023-2. The plan for the retirement of PRC-023-2 should read "Midnight of the day immediately prior to the Effective Date of PRC-023-3 ..."
Response: The drafting team thanks you for your comment and support and agrees this is a typographical error. Change made.		
SC Public Service Authority	Yes	We agree with the SERC Protection and Control Subcommittes's comments.
Response: The drafting team thanks you for your participation; please see the response(s) for the SERC Regional Reliability Organization (SERC RRO).		
San Diego Gas & Electric		The Purpose states, Purpose: To set load-responsive generator protective relays at a level to prevent unnecessary tripping of generators during a system disturbance for conditions that do not pose a risk of damaging the generator. The phrase, "for conditions that do not pose a risk of damaging the generator", is not reflected anywhere else in the standard. There needs to be a statement either in the applicability section or requirements section that

Organization	Yes or No	Question 6 Comment
		allows a generator owner or operator to take exception to the requirement if damage to the machinery is possible. Without additional clarification, the standard does not reflect the stated Purpose.

Response: The drafting team thanks you for your comment and notes that the proposed PRC-025-1 criteria represent a natural behavior of the generator and its excitation system to abnormal system conditions. In this case, the generator is operating within its short-time capability and is not at risk of damage.

The drafting team understands that not all generators will be able to achieve this performance and has offered the option to perform simulations with specified criteria to determine the expected reactive performance of a specific generator and application so that the load-responsive protective relays may be set in a manner more precisely representative of that generator's performance. Therefore, an additional exception process is not warranted.

However, the drafting team did not intend to prevent the use of generator overload protection as defined in clause 4.1.1.2 of the C37.102-2006 IEEE Guide for AC Generator Protection. Attachment 1 has been revised to provide exclusion for generator overload protection designed to coordinate with the generator short time capability as described in C37.102-2006 so that Generator Owners may adequately protect their generators. Change made.

END OF REPORT