NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Meeting Notes
Project 2018-04 Modifications to PRC-024-2
Standard Drafting Team

June 18-20, 2019

WebEx | Dial-in: 415.655.0002 | Access Code: 737 552 334

Administrative

Mat Bunch reviewed the NERC Antitrust Compliance Guidelines and noted that the meeting was public. Quorum was achieved, as at least 2/3 of members of the standard drafting team (SDT) were in attendance. The SDT chair, Bryan Burch, welcomed the members, thanked them for supporting the project, and reviewed the meeting objectives.

Agenda Items

TOs that own GSUs

The SDT reviewed the applicability to include TOs in scope of PRC-024. The Mat Bunch gave an update regarding a supplemental SAR that would give the team the latitude to include TOs as well as transformer protection, if necessary. A FERC staff member expressed concerns with removing TOs – if an event occurs where a TO owns the GSU and is not subject to the standard, there is a reliability gap. The SDT reviewed the comments received and concluded that while there may be TOs that own GSUs, it is highly unlikely that the PRC-024 protection is applied. The SDT agreed that the transformer should be in scope of PRC-024.

Collector Transformer

The SDT discussed using the term collector transformer and decided based on industry comments, "Main Power Transformer (MPT)."

The SDT also reviewed whether or not to keep in scope protection applied at the "high side of the generator connected unit aux transformer installed on a BES generating resource." Given that new microprocessors connected directly to the generator bus have volts per hertz protection on a unit aux transformer, the team agreed that this protection should be in scope of PRC-024.

Instantaneous to .10 seconds

The SDT discussed t e IRPTF Guideline suggesting .10 seconds to take an adequate frequency sample. Based off the guideline, the reason the inverters tripped is that they were using a zero crossing method to calculate frequency. A team member noted that just because we would permit tripping at no instantaneous time delay, it does not mean the generating resource must trip instantaneously.

Voltage Boundary Ending at 4 Seconds

The team discussed the comments regarding the reasoning behind the Voltage Boundaries ending at 4 seconds and not "continuous" as in the Frequency Boundaries. When reviewing the history of PRC-024, it

was determined that the previous draft of this standard the voltage ride-through curves in Attachment 2 extended out for 600 seconds before returning to normal operating voltages (95% – 105% of nominal). Also, the final step in the low voltage recovery curve was at 90% of nominal after three seconds. Commenters on this revision noted that this could potentially cause conflicts with coordination of settings for relay loadability, since they need to be evaluated for stressed system conditions of voltages at 85% of nominal. In response, the drafting team has moved the final step of the low voltage recovery curve down from 90% to 85% at three seconds and has shortened the curves so that they end at four seconds in an attempt to clarify the intent of this standard to address the transient conditions without conflicting with relay loadability.

Most stakeholders agreed with the revisions to the voltage ride-through curves in Attachment 2. Several stakeholders had concerns with the low voltage ride-through criteria being lowered to 85% for the 3-4 second interval. Stakeholders pointed out that transmission systems are designed to operate between 90% to 110% and not down to 85%; as such, generators are not expected to ride through voltages as low as 85% for an extended period of time. The GVSDT agrees with these comments and has revised the voltage ride-through chart 85% voltage level to the original 90%. This is due to removing all generator loadability relays from PRC-024 allowing the relay setting criteria for loadability to be in PRC-025. The team noted that 85% point-of-interconnection voltage for relay loadability for transmission and generation relays remains in their respective standards (PRC-023 for transmission and PRC-025 for generator).

The SDT discussed various scenarios of tripping after four seconds and noted that the standard does not address what happens after the four second voltage excursion. The SDT also disused what should happen if a voltage excursion goes beyond four seconds. Some members stated that the resource would stay online for two times reactive power output. A team member suggested changing the boundary to continuous; another team member pointed out that PRC-024 is not intended to address continuous voltage and that continuous settings are outside the scope of the standard. Another team member noted that other NERC Reliability Standards address voltage excursions after four seconds (TPL & VAR-002). In regards to the reasoning behind not changing the boundaries to extend to continuous operation, the SDT believes that what happens after four seconds would be better addressed by engineers complying to with PRC-024.

Evaluating Protection Settings

The team discussed the evaluating protection settings portion of Attachment 2, specifically mentioning that GOs and TOs should take into account the voltage difference between the "point of interconnection" and the point at which the voltage protection is to be measured. If a machine is running at its maximum MVA, it is not going to respond at all in terms of conditional reaction. A FERC staff member suggested that R3 should read "within a portion of the no trip zone." This would ensure that the resource does not set its settings to trip wherever and would hopefully encourage settings to be set at equipment limitations. The SDT agreed and made the correction in the standard.

The SDT discussed a comment regarding the removal of Requirement R4. A commenter suggested removing R4 due to the fact that the intent is covered in MOD standards. When considering the removal of an entire requirement, M. Bunch suggested considering whether the team agrees with the comment and whether the requirement is necessary for reliability. Mr. McMeekin reminded the team that a group of industry experts have reviewed the standard for any necessary retirements; the team did not recommend any retirements to any portions of PRC-024 retirements. As such, R4 will be retained.

Quebec Variance
The team discussed the Quebec Variance. To address some commenters' concerns, a requirement was added to the Variance for the Transmission Planner: Each Transmission Planner shall, at least one each calendar year, notify the generating resources that protect the integrity of the Transmission System equipment.

The SDT discussed the RMS and crest-to-crest part of the standard. To address comments, the team reviewed the suggestion to use "positive sequence values" instead of the RMS values. The team also discussed using "voltage use fundamental per unit RMS values."

The SDT reviewed all comments received and made changes based on industry feedback.

Attendance June 18, 2019:

Role	Name	Entity	Present?
Chair	S. Bryan Burch	Southern Company	Y
Vice Chair	Jeff Billo	ERCOT	Y
Members	Louis Fonte	California ISO	Y
	Noel Aubut	Hydro-Quebec	Y
	Amir Mohammednur	Southern California Edison	Y
	Peter Wybierala	NextEra Energy	Y
	Tracy MacNicoll	Utility Services, Inc.	Y
	Rajat Majumder	Siemens Gamesa	Y
	Yishan Zhao	Duke Energy	Y
	Mark Kuras	PJM	Y
	Gary Custer	SMA-America	
	John Anderson	Xcel Energy	Y
PMOS Liaison	Linda Lynch	Florida Power & Light	Y
NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y
	Marisa Hecht, Counsel	North American Electric Reliability Corp	
	Ryan Mauldin, Compliance	North American Electric Reliability Corp	

June 19, 2019

Role	Name	Entity	Present?	Should GSUs and MPTs be in scope?
Chair	S. Bryan Burch	Southern Company	Y	
Vice Chair	Jeff Billo	ERCOT	Y	
Members	Louis Fonte	California ISO	Y	
	Noel Aubut	Hydro-Quebec	Y	
	Amir Mohammednur	Southern California Edison	Y	
	Peter Wybierala	NextEra Energy	Y	
	Tracy MacNicoll	Utility Services, Inc.	Y	
	Rajat Majumder	Siemens Gamesa	Y	
	Yishan Zhao	Duke Energy	Y	
	Mark Kuras	PJM	Y	
	Gary Custer	SMA-America	Y	
	John Anderson	Xcel Energy	Y	
PMOS Liaison	Linda Lynch	Florida Power & Light	Y	
NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y	
	Marisa Hecht, Counsel	North American Electric Reliability Corp		
	Ryan Mauldin, Compliance	North American Electric Reliability Corp		

June 20, 2019

Role	Name	Entity	Present?	
Chair	S. Bryan Burch	Southern Company	Y	
Vice Chair	Jeff Billo	ERCOT		
Members	Louis Fonte	California ISO	Y	
	Noel Aubut	Hydro-Quebec	Y	
	Amir Mohammednur	Southern California Edison	Y	
	Peter Wybierala	NextEra Energy	Y	
	Tracy MacNicoll	Utility Services, Inc.	Y	
	Rajat Majumder	Siemens Gamesa	Y	
	Yishan Zhao	Duke Energy		
	Mark Kuras	PJM	Y	
	Gary Custer	SMA-America	Y	
	John Anderson	Xcel Energy	Y	
PMOS Liaison	Linda Lynch	Florida Power & Light	Y	
NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y	
	Marisa Hecht, Counsel	North American Electric Reliability Corp	Y	
	Ryan Mauldin, Compliance	North American Electric Reliability Corp	Y	

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	Tracy MacNicoll	Utility Services, Inc.	Y	
	Rajat Majumder	Siemens Gamesa	Y	
	Yishan Zhao	Duke Energy		
	Mark Kuras	PJM	Y	
	Gary Custer	SMA-America	Y	
	John Anderson	Xcel Energy	Y	
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NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y	
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	Ryan Mauldin, Compliance	North American Electric Reliability Corp	Y	
	Al,			

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	Yishan Zhao	Duke Energy		
	Mark Kuras	PJM	Y	
	Gary Custer	SMA-America	Y	
	John Anderson	Xcel Energy	Y	
PMOS Liaison	Linda Lynch	Florida Power & Light	Y	
NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y	
	Marisa Hecht, Counsel	North American Electric Reliability Corp	Y	
	Ryan Mauldin, Compliance	North American Electric Reliability Corp	Y	
	Al,			

June 14, 2019

Role	Name	Entity	Present?	
Chair	S. Bryan Burch	Southern Company	Y	
Vice Chair	Jeff Billo	ERCOT		
Members	Louis Fonte	California ISO		
	Noel Aubut	Hydro-Quebec		
	Amir Mohammednur	Southern California Edison	Y	
	Peter Wybierala	NextEra Energy	Y	
	Tracy MacNicoll	Utility Services, Inc.	Y	
	Rajat Majumder	Siemens Gamesa	Y	
	Yishan Zhao	Duke Energy		
	Mark Kuras	PJM	Y	
	Gary Custer	SMA-America	Y	
	John Anderson	Xcel Energy	Y	
PMOS Liaison	Linda Lynch	Florida Power & Light	Y	
NERC Staff	Mat Bunch, Standards Developer	North American Electric Reliability Corp	Y	
	Marisa Hecht, Counsel	North American Electric Reliability Corp	Y	
	Ryan Mauldin, Compliance	North American Electric Reliability Corp	Y	
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