

## Background:

The Phase III & IV Drafting Team thanks all commenters who submitted comments on the fourth draft of the PRC-002 and PRC-018. These standards were posted for a 30-day public comment period from April 4 through May 3, 2006. The drafting team asked stakeholders to provide feedback on the standards through a special Comment Form. There were 19 sets of comments, including comments from more than 46 different people from more than 36 companies representing all Regions and 6 of the 9 Industry Segments as shown in the table on the following pages.

Based on the comments received, the drafting team is recommending that the Standards Authorization Committee authorize moving this set of two standards forward to balloting. The drafting team made several format changes to the standards, and made the following changes to the requirements based on stakeholder comments:

### PRC-002:

- Added a phrase to the requirement for continuous recording to state that the requirement applies to devices installed after January 1, 2009.
- Modified the requirement to provide data in COMTRADE format so that the requirement now states that the data must be in a which is capable of being viewed, read and analyzed with a generic COMTRADE<sup>1</sup> analysis tool.
- Modified the data retention section to remove the requirement to retain documentation showing changes to DME data

### PRC-018:

- Modified the requirement for time synchronization to limit the requirement to the internal DME clock.

In this 'Consideration of Comments' document stakeholder comments have been organized so that it is easier to see the responses associated with each question. All comments received on the SAR can be viewed in their original format at:

[ftp://www.nerc.com/pub/sys/all\\_updl/standards/sar/Comments\\_D4\\_S1\\_PhaseIII-IV\\_03May06.pdf](ftp://www.nerc.com/pub/sys/all_updl/standards/sar/Comments_D4_S1_PhaseIII-IV_03May06.pdf)

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, Gerry Cauley at 609-452-8060 or at [gerry.cauley@nerc.net](mailto:gerry.cauley@nerc.net). In addition, there is a NERC Reliability Standards Appeals Process.<sup>2</sup>

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<sup>1</sup> IEEE C37.111-1999 IEEE Standard Common Format for Transient Data Exchange for Power Systems or its successor standard

<sup>2</sup> The appeals process is in the Reliability Standards Process Manual: <http://www.nerc.com/standards/newstandardsprocess.html>.

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

Commenter	Organization	Industry Segment								
		1	2	3	4	5	6	7	8	9
Mike McDonald	Ameren	x		x		x				
Ken Goldsmith	ALT									
Peter Burke	ATC	x								
Dave Rudolph	BEPC									
Jeffrey T. Baker	Cinergy	x		x			x			
Fred Ipock	City Utilities, Springfield, MO	x		x		x				
Edwin Thompson	ConEdison	x								
Charles W. Rogers	Consumers Energy Company			x	x					
David Powell	FirstEnergy	x								
John Odom	FRCC		x							
Linda Campbell	FRCC		x							
Kevin Luke	FPL	x								
Bob Shoneck	FPL	x								
Dick Pursley	GRE									
David Kiguel	Hydro One Network	x								
Ron Falsetti	IESO (Ontario)		x							
Kathleen Goodman	ISO-New England		x							
Jim Cyrulewski	ITC Transmission	x								
John Soehren	ITC Transmission	x								
Van Greening	ITC Transmission	x								
Dennis Florom	LES									
Donald Nelson	MA Dept of Energy and Tele.									
Tom Mielnik	MEC									
Robert Coish	MHEB	x		x		x	x			
Terry Bilke	MISO		x							
Joe Knight	MRO		x							
Michael Shiavone	National Grid	x								
Greg Campoli	New York ISO		x							
James W. Ingleson	New York ISO		x							
Alan Adamson	New York State Rel. Council		x							
Brian Hogue	NPCC		x							
Guy Zito	NPCC		x							
Alan Boesch	NPPD	x								
John Ferraro	Northeast Utilities	x								
Todd Gosnell	OPPD									
Mark Kuras	PJM		x							
Alvin Depew	Potomac Electric Power Co	x								

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

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Evan Sage	Potomac Electric Power Co	x											
Richard Kafka	Potomac Electric Power Co	x											
Robert Dempsey	Potomac Electric Power Co	x											
Neil Shockey	SCE	x											
Wayne Guttormson	SPC												
Roger Champagne	TransEnergie (Quebec)	x											
Darrick Moe	WAPA												
Jim Maenner	WPS												
Pam Oreschnick	XEL												

**Index to Questions, Comments and Responses:**

- 1. Do you agree with the drafting team’s modification that moved the ‘functional’ requirements that should be common across all regions from PRC-002 into PRC-018? ..... 5
- 2. Do you agree with the revised time synchronization requirements in PRC-018? ..... 9
- 3. Do you agree with the drafting team’s modifications to the levels of non-compliance in PRC-018? ..... 14
- 4. Please identify anything you feel needs to be modified before these standards are implemented. .... 18

1. Do you agree with the drafting team’s modification that moved the ‘functional’ requirements that should be common across all regions from PRC-002 into PRC-018?

**Summary Consideration:** Most commenters agreed that moving the functional requirements comment across all regions from PRC-002 to PRC-018 was acceptable although some commented that this wasn’t necessary.

Commenter	Yes	No	Comment
IESO (2) Ron Falsetti		✓	<p>(i) Moving the DME’s time synchronization requirements to PRC-018-1 is not necessary. In fact, this move has resulted in convoluting the latter standard – both in requirements and in measures and compliance. Synchronizing requirements are part and partial of the technical requirements that apply to the recording devices, which should remain in PRC-002-1. The SDT’s rationale that the move would ensure consistency across all regions does not appear to be well-founded. Keeping them in PRC-002-1 can also achieve this objective since NERC standards are applied industry-wide. Regional specific requirements, in this context, would be restricted to the location and other specific monitoring and recording requirements detailed in R1 to R3 of PRC-002-1.</p> <p>(ii) Moving the concerned requirement out of PRC-002-1 does not necessarily make this standard more clear cut or standalone. In fact, since the RROs are responsible for meeting the requirements stipulated in this standard, it makes more sense to also stipulate in this standard that the Regions include the specified time synchronization requirements in their regional requirements.</p>
<p><b>Response:</b> Most commenters agreed that moving the functional requirements comment across all regions from PRC-002 to PRC-018 was acceptable.</p>			
NPCC CP9, Reliability Standards Working Group K. Goodman – ISONE David Kiguel – Hydro One Peter Lebro – NGrid Bill Shemley – NYSRC M. Schiavone – Ngrid R. Champagne – TransÉnergie M. Gopinathan – NU Alden Briggs – NBSO Ron Falsetti – IESO Don Nelson – MA Dept. of Tel. and Energy		✓	NPCC Participating members believe it is inappropriate to move the DME's time synchronization requirements R1.1 to PRC-018.

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

Commenter	Yes	No	Comment
Alan Adamson – NYSRC Jim Ingleson – NYISO Greg Campoli – NYISO Guy Vito – NPCC			
<b>Response:</b> Most commenters agreed that moving the functional requirements comment across all regions from PRC-002 to PRC-018 was acceptable.			
Ameren John E. Sullivan		✓	R1 belongs with the technical requirements in standard PRC-002.
<b>Response:</b> The reason for placing the requirements in PRC-018 was to ensure they would be consistent across all Regions. Most commenters agreed that moving the functional requirements comment across all regions from PRC-002 to PRC-018 was acceptable.			
Dominion Electric Transm. (1) Thomas E. Owens	✓		Since we have no clear definition of functional verses non-functional, it matters not. For example, how is sample rate (PRC-002) a functional requirement and time sync (PRC-018) not? It appears that the transmission owner will need to comply with whatever is written in both PRC-002-1 and PRC-018-1, so having transmission owner requirements in two documents is something will will have to live with.
<b>Response:</b> The reason for placing the requirements in PRC-018 was to ensure they would be consistent across all Regions.			
Manitoba Hydro (1, 3, 5, 6) Robert Coish	✓		However, does it really matter if the common requirements are in PRC-002 or in PRC-018? In either case, they will apply to all regions. For example, R2.2.2 and R3.2.2 in PRC-002 will still apply within all regions. If this is not the case, then should these requirements also be moved to PRC-018 for consistency?
<b>Response:</b> There is less room for regional variants if the requirements aren't embedded in the region's requirements.			
City Utilities of Springfield (1, 3, 5) Fred Ipock	✓		<ol style="list-style-type: none"> <li>1. However, PRC-002-1 would be clearer if the DME introduction included a background information statement: "The PRC-002-1 intent is to have each region establish 'functional disturbance monitoring requirements' and then allow facility owners to use any equipment or any combination of equipment to meet those requirements. NERC is not requiring separate devices for SOE's, DFR's, &amp; DDR's."</li> <li>2. There are no continuous recording disturbance monitors to my knowledge in SPP. I still object to the PRC-002-1 Requirement 3 DDR "continuous recording" (versus triggered event) type of disturbance monitoring, especially considering that 1 or 2mS time stamping accuracy is needed and then the continuous monitoring only records 6 records per second, i.e. records captured and stored at 10 cycle intervals. How can it be assumed that the event desired to be captured will occur at the sampled interval? I talked to one of the high end DFR equipment manufacturers (that traditionally does triggered events at high sample rates) and it appeared to me that, although the vendor may have capability to continuously record, that software changes and product development is required to accomplish the intent</li> </ol>

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

Commenter	Yes	No	Comment
			of PRC-002-1. If what is really desired by requirement 3 is an operating system performance (not disturbance) type of monitoring similar to a phasor monitoring unit (PMU), then consider deleting the DDR continuous recording requirement and creating a separate performance standard that is intended to track operational performance, not disturbance issues. If a hybrid type disturbance monitor is desired that will act to both continuously record system performance and trigger for disturbance events, the PRC requirements need clarified.
<p><b>Response:</b></p> <p>1. Reliability standards don't include background information.</p> <p>2. Continuous recording devices capture more data for events because they collect data to show system changes leading up to the event as well as system changes through a longer period of time following an event. The requirement for continuous recording was modified to indicate that this requirement will be effective for devices installed after January 1, 2009.</p>			
ITC Transmission (1) Jim Cyrulewski	✓		
Midwest Reliability Organization (2) Wayne Guttormson Jim Maenner Al Boesch – NPPD (2) Terry Bilke – MISO (2) Bob Coish – MHEB (2) Dennis Florom – LES (2) Ken Goldsmith – ALT (2) Todd Gosnell – OPPD (2) W. Guttormson – SPC (2) Tom Mielnik – MEC (2) Darrick Moe – WAPA (2) P. Oreschnick – XEL (2) Dick Pursley – GRE (2) Dave Rudolph – BEPC (2) Joe Knight – MRO (2) 27 additional MRO members not listed above.	✓		
Pepco Holdings Inc. Affiliates	✓		

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

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Committer	Yes	No	Comment
(1) Richard Kafka Karl Kinsley Alvin Depew Evan Sage Robert Dempsey			
Ameren (1, 3, 5) Mike McDonald	✓		
FirstEnergy (1) David A. Powell	✓		
Florida Power & Light (1) Charles Kevin Luke	✓		
Florida Reliability Coordinating Council (2) John Odom Linda Campbell John Shaffer – FPL (1) Kevin Luke – FPL (1) Bob Schoneck – FPL (1)	✓		
Northeast Utilities (1) John Ferraro	✓		



2. Do you agree with the revised time synchronization requirements in PRC-018?

**Summary Consideration:** Most commenters disagreed with the time synchronization requirements and several commenters indicated that the requirements would not be achievable with today's equipment. The requirement was revised and now states: Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).

Commenter	Yes	No	Comment
IESO (2) Ron Falsetti		✓	The first sentence in R1.1 is sufficient to provide the needed requirement. All DMEs must be synchronized to a universal time standard. The second sentence and its reference to "a station clock" is confusing, and the 1 millisecond is so stringent that some DMEs may not be able to meet. We suggest this sentence be removed.
<p><b>Response:</b> The requirement was revised and now states: Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).</p>			
Dominion Electric Transm. (1) Thomas E. Owens		✓	<p>Regarding R1.1, the two different requirements of 2 milliseconds of UTC and 1 millisecond time stamp for the DME response is confusing. This does not agree with background information that states 1 millisecond and 1 millisecond. Why not simply say that Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC) and the resolution of the DME shall be 1 millisecond or less. This provides an overall accuracy within 3 milliseconds for comparing data between the various DMEs. By the way, a device with a 16 samples per cycle (960 samples per second) sample rate cannot technically have a 1 millisecond resolution (16.7 milliseconds divided by 16 samples is 1.04 milliseconds resolution). The phrase at the end of the last sentence... measured with the local station's clock is confusing and should be deleted.</p> <p>Also concerning R1.1, the time stamp in our DME records is satellite synchronized but shown as local time (either EST or EDT) because our operating centers, disturbance databases and everything else uses our local time. We disagree that UTC time should be coded into the DME records. We think that should be acceptable.</p>
<p><b>Response:</b> The use of local time zone is acceptable as long as it is synchronized to UTC time and as long as the time zone used is part of the record.</p>			
Ameren (1, 3, 5) Mike McDonald  NERC System Protection and Control		✓	Section R1.1. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available at this IEEE address: <a href="http://www.pes-psrc.org/i1workgroup.html">http://www.pes-psrc.org/i1workgroup.html</a> - After arriving at that address, choose working group I11 - "Timing Considerations for Event Reconstruction."

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Commenter	Yes	No	Comment
Task Force Charles Rogers – Consumers  NPCC CP9, Reliability Standards Working Group K. Goodman – ISONE David Kiguel – Hydro One Peter Lebro – NGrid Bill Shemley – NYSRC M. Schiavone – Ngrid R. Champagne – TransÉnergie M. Gopinathan – NU Alden Briggs – NBSO Ron Falsetti – IESO Don Nelson – MA Dept. of Tel. and Energy Alan Adamson – NYSRC Jim Ingleson – NYISO Greg Campoli – NYISO Guy Vito – NPCC  Northeast Utilities (1) John Ferraro			
<p><b>Response:</b> The requirement was revised and now states:                      Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).</p>			
Pepco Holdings Inc. Affiliates (1) Richard Kafka		✓	Section R1.1. PHI supports the comments of the PC SPCTF. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available as

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Commenter	Yes	No	Comment
Karl Kinsley Alvin Depew Evan Sage Robert Dempsey			described in the SPCTF comments.
<b>Response:</b> This change was adopted and is reflected in the revised standard.			
Ameren John E. Sullivan		✓	It is not certain that technical requirements regarding time synchronization can be met. See comments from NERC-SPCTF committee.
<b>Response:</b> The requirement was revised and now states: Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).			
Northeast Utilities (1) John Ferraro		✓	Also, R1.1 assumes that each station with DME is equipped with a local clock. This is not true for entities using a form of network time protocol for synchronization.
<b>Response:</b> The revised standard focuses solely on the accuracy of the clock internal to the DME.			
FirstEnergy (1) David A. Powell		✓	SOE and fault recording functions should be allowed to have a time synchronized to within 5 ms. of the UTC to accommodate existing relay equipment to be used for these functions to avoid significant equipment replacements.
<b>Response:</b> A relay that has an internal clock that can't be synchronized to within 2 milliseconds or less of UTC would not meet the criteria for the DMEs installed to meet the region's requirements, but could be used for other purposes.			
Florida Power & Light (1) Charles Kevin Luke		✓	Requirement R1.1 in PRC-018-1 second sentence should be changed to "The time stamp cannot be greater than one millisecond from the time the condition is acknowledged by the input device. As noticed in NPCC SP6 the accuracy of time stamping is based on the device and its recognition of the occurrence. This factor will vary from device and application. The review of the data record would reveal this information and at that time the record could be named with this timed stamp coded in the name of the file. This requirement needs further clarification and definition.
<b>Response:</b> This requirement was revised to conform to an alternate suggestion that was submitted by the System Protection & Control Task Force. Please see the summary consideration.			
Florida Reliability Coordinating Council (2) John Odom Linda Campbell John Shaffer – FPL (1) Kevin Luke – FPL (1) Bob Schoneck – FPL (1)		✓	In the second sentence in Requirement R1.1, the word "reached" should be replaced by "is acknowledged by". The accuracy of time stamping is based on the device and its recognition of the occurrence. This factor will vary by device and application and a review of the data record will allow the record to be accurately synchronized.

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Commenter	Yes	No	Comment
<p><b>Response:</b> The requirement was revised and now states:  <a href="#">Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).</a></p>			
<p>City Utilities of Springfield (1, 3, 5) Fred Ipock</p>		✓	<p>I still do not believe that there are off the shelf products to meet the 2 mS time stamping requirement as described by PRC-002-1 &amp; PRC-018-1. Although there are GPS clocks with better than 1 mS capability, there are clock to equipment interface issues (including associated communications connection delays) and equipment time sync processing time delays that probably make the proposed time sync 2 (or 4) mS standard not technically achievable.</p> <p>NERC's draft #3 PRC-002-1 &amp; PRC-018-1 permitted 4 mS time stamping and this was reduced to 2 mS under draft 4. Under draft 3 review comments, SPP SPCWG objected to the 4 mS and requested consideration of a slightly longer time. I still object to the lower 2 mS requirement and request a slightly longer delay for total response (including processing and connection delays) of monitoring equipment. From NERC's response to SPP's draft 3 comments, SCADA systems with 1mS SOE capabilities (that actually have about 4 to 6 mS, i.e. 1/4 to 1/3 cycle, response due to interface and processing time delays) are not acceptable for meeting the SOE requirement. With two to five cycle breakers the SCADA systems with the 1 mS SOE feature should have been acceptable SOE devices in my opinion. If the RTU is time stamping to provide the 1mS SOE SCADA record, which is different than the SCADA master time stamping report, why is not SCADA (with RTU 1mS time stamping) permitted as a SOE device? I realize that at the DFR's at a local substation may need a better time stamp than the 4 to 6 mS response of SCADA RTU and/or especially the SCADA master time stamped event that may be up to a few seconds off, but the SCADA system SOE report provides an automatic summary of the events throughout the various substations in a company's network. The SCADA system (network) sequence of operations can be fairly accurately and easily reviewed by a SCADA SOE report without manually needing to combine and summarize many DFR records from several substation disturbance monitors / locations.</p>
<p><b>Response:</b> Please see the summary consideration of comments. <a href="#">SCADA that can't be synchronized to within 2 milliseconds or less of UTC would not meet the criteria for the DMEs installed to meet the region's requirements, but could be used for other purposes.</a></p>			
<p>ITC Transmission (1) Jim Cyrulewski</p>		✓	<p>Since most devices have debounce filtering that can delay the time stamp by a minimum of 4 milliseconds, a time stamp variance of 1 millisecond is not practical.</p>
<p><b>Response:</b> The requirement was revised and now states:  <a href="#">Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).</a></p>			
<p>Manitoba Hydro (1, 3, 5, 6) Robert Coish</p>	✓		<p>In R1.1 the words "or better" are redundant as that is the meaning of the word "within" earlier in the sentence. In R1.1 second sentence, "the input device" is ambiguous. It could mean (a) the most upstream device in the measuring system or it could mean (b) the DME itself. If it means (b), then to improve clarity we suggest that "the input device" be replaced with "the input to the DME". Note that despite this requirement the time stamp error to the time of the initiating event</p>

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Commenter	Yes	No	Comment
			may significantly exceed two milliseconds due to inherent delays in upstream components in existing measurement systems. We assume the intended meaning is not (a) because then the two millisecond requirement would not be achievable in many cases due to inherent delays in components upstream of the DME.
<p><b>Response:</b> The requirement was revised and now states:  <a href="#">Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC).</a></p>			
Midwest Reliability Organization (2) Wayne Guttormson Jim Maenner Al Boesch – NPPD (2) Terry Bilke – MISO (2) Bob Coish – MHEB (2) Dennis Florom – LES (2) Ken Goldsmith – ALT (2) Todd Gosnell – OPPD (2) W. Guttormson – SPC (2) Tom Mielnik – MEC (2) Darrick Moe – WAPA (2) P. Oreschnick – XEL (2) Dick Pursley – GRE (2) Dave Rudolph – BEPC (2) Joe Knight – MRO (2) 27 additional MRO members not listed above.	✓		

3. Do you agree with the drafting team’s modifications to the levels of non-compliance in PRC-018?

**Summary Consideration:** Most commenters agreed with the modifications to the levels of non-compliance.

Commenter	Yes	No	Comment
Midwest Reliability Organization (2) Wayne Guttormson Jim Maenner Al Boesch – NPPD (2) Terry Bilke – MISO (2) Bob Coish – MHEB (2) Dennis Florom – LES (2) Ken Goldsmith – ALT (2) Todd Gosnell – OPPD (2) W. Guttormson – SPC (2) Tom Mielnik – MEC (2) Darrick Moe – WAPA (2) P. Oreschnick – XEL (2) Dick Pursley – GRE (2) Dave Rudolph – BEPC (2) Joe Knight – MRO (2) 27 additional MRO members not listed above.		✓	The MRO understands the difficulty in setting Compliance Levels, however it is unclear what the percentages being used to measure compliance are based on and how they relate to reliability? For example in Level 4 why is less than 70% considered to be such a serious violation, without an explanation or rationale the listed percentages seem arbitrary. How is the Ballot Body supposed to determine if this is appropriate? The MRO recommends that the SDT revise the compliance levels based on removing the percentages and focusing on simply not meeting the requirements. Also the MRO does not see the need to have a Level 4 Non-Compliance for a standard dealing with DME performance requirements relating to an after the fact measurement. This will not have a major effect on the real-time reliability of the bulk electric system.
<p><b>Response:</b> The levels of non-compliance were set to penalize entities that weren't showing progress in meeting the requirements. The data collected from DMEs is used to analyze disturbances for 'lessons learned' which do impact reliability. If you disagree, let us know which of the requirements could be 'missed' without adversely impacting the ability to collect data needed to analyze disturbances.</p>			
IESO (2) Ron Falsetti		✓	<ol style="list-style-type: none"> <li>1. Measure M1: With R1 added (from PRC-002-1), M1 is now very convoluted. This should not be case if R1 stays in PRC-002-1 and is stipulated as “shall be included in regional requirements”.</li> <li>2. Measure M4: M4, as written, is a requirement repeating R6. It should be reworded in the context of, for example, “shall have evidence or documentation to demonstrate R6 is met”.</li> <li>3. Compliance Level 2.4.4: the sentence “Documentation of the DME maintenance and testing program, or its implementation, was not provided” needs clarification.</li> </ol>

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Commenter	Yes	No	Comment
			Suggest to reword it to read something similar to 2.2.5, for example: "Documentation of the DME maintenance and testing program was not provided"
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. Most commenters seemed to understand what was expected with M1.</li> <li>2. Most commenters seemed to understand what was expected with M4.</li> <li>3. The suggested modification would eliminate the compliance component for the implementation of the program.</li> </ol>			
Northeast Utilities (1) John Ferraro		✓	The structure of the Levels of Non-Compliance is troublesome. Assume that an entity has met all the requirements imposed by the RRO with the exception of having missed a certain trigger setting called for by the RRO per PRC-002-1, R2.2.3. It's likely that the entity has made the same mistake at all of the designated DME locations. Even though the entity has complied with all other requirements, it has been 100% non-compliant with all of the requirements in R2. This non-compliance structure would cause the entity to be Level 4 non-compliant for a relatively minor oversight. This would be true for any minor oversight that was common to an entity's DME installations.
<p><b>Response:</b> The result of installing devices that don't meet the requirements would be that data would not be available when needed – so the levels of non-compliance seem appropriate. If you disagree, let us know which of the requirements could be 'missed' without adversely impacting the ability to collect data needed to analyze disturbances.</p>			
Dominion Electric Transm. (1) Thomas E. Owens		✓	In PRC-018-1 regarding Section D Compliance item 1.3, we do not understand what we are being asked to retain. What does it mean to ... retain any changes to the data on DMS installations and any Disturbance data ... for three years? Owners can keep an up-to-date list of our equipment and keep data we supplied to the region, but keeping a history trail on equipment seems unnecessary. Regions should be the responsible entity for keeping that information.  In PRC-018-1 regarding Section D Compliance item 2.4.3, we feel that a level 4 non-compliance for R1 is too strict when one DME is not time synched. We suggest different levels of non-compliance based on percentages like those stated for R2 and R4 (see items 2.4.1 and 2.4.2).
<p><b>Response:</b> This is the data from Requirements 3 and 4. Note that the requirement to keep changes to data for R3 has been removed from the revised data retention requirements. The result of installing devices that don't meet the requirements would be that data would not be available when needed – so the levels of non-compliance seem appropriate.</p>			
Ameren (1, 3, 5) Mike McDonald	✓	✓	In MAIN there was no requirement for SOE - each microprocessor based relay provided such data but unless RTUs are modernized and communications added (both at very high cost) I don't see how this can be done in the time allocated - especially DFR installations that typically cost \$200-250,000 each to get installed with many systems

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Commenter	Yes	No	Comment
			outages to wire in.
<p><b>Response:</b> The determination of where DMEs need to be located is left up to the Region. If MAIN doesn't require sequence of event recorders, then you would not need to install them.</p>			
<p>City Utilities of Springfield (1, 3, 5) Fred Ipock</p>	<p>✓</p>	<p>✓</p>	<ol style="list-style-type: none"> <li>1. For proposed effective dates under PRC-018-1 A.5 Requirements 1 &amp; 2, (considering there are no continuous recording disturbance monitors within SPP, the budget process and potentially costly capital improvements, the study process, the design and equipment procurement process, and the system operating constraints for outages,) the 50%, 75%, &amp; 100% compliant times should be lengthened/adjusted to 3, 4, &amp; 5 years or more instead of 2, 3, &amp; 4 years. If the "continuous recording" is removed from the requirement, then the proposal as stated is acceptable. SPP has been installing DDR's based upon event triggering.</li> <li>2. Do not agree with the 2mS time sync requirement because of communications interface and equipment processing delays. Request consideration to changing/lengthening the 2 mS time sync or clarifying time sync application so compliance is more easily accomplished. For the minimum DME sampling rate of 16 samples per cycle, it appears to me with internal processing within the DME device there will likely be more than 2 mS resolution?</li> <li>3. Agree, per PRC-018-1 R5, that DME data recorded should be archived for three years. Do not agree with PRC-018-1 Compliance D.1.3 that "any changes to the DME installation" be retained for three years. A scope increase from the (DME data storage) requirement appears to have been inserted into the compliance section. If the DME (substation / power plant) installation (as built) drawings are modified and are no longer applicable at a site, then there should not be a requirement to store for three years old obsolete drawings that were associated with older designs. Obsolete drawings, if improperly accessed and used, may cause safety or operational problems when working at the site. Compliance section 1.3 should only refer to DME event record storage.</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. The determination of what types of DMEs need to be located is left up to the Region. If SPP wants to allow dynamic disturbance recorders that do not include continuous recording, then SPP would need a Regional Difference to this standard. Note that the requirement was modified to clarify that this requirement for continuous recording is only applied to devices installed after Jan 1 2009</li> <li>2. Note that the drafting team did change this requirement so that the 2 ms time synch only applies between the GPS time synch and the internal DME clocks.</li> </ol>			



Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018

Commenter	Yes	No	Comment
3. The drafting team eliminated the requirement to retain the data for changes to DME installation in support of your suggestion.			
Ameren John E. Sullivan	✓		As long as technical requirements specified in the standards can be met by equipment manufacturers.
<b>Response: Agreed.</b>			
FirstEnergy (1) David A. Powell	✓		
Florida Power & Light (1) Charles Kevin Luke	✓		
Manitoba Hydro (1, 3, 5, 6) Robert Coish	✓		
Pepco Holdings Inc. Affiliates (1) Richard Kafka Karl Kinsley Alvin Depew Evan Sage Robert Dempsey	✓		
Florida Reliability Coordinating Council (2) John Odom Linda Campbell John Shaffer – FPL (1) Kevin Luke – FPL (1) Bob Schoneck – FPL (1)	✓		
ITC Transmission (1) Jim Cyrulewski	✓		

4. Please identify anything you feel needs to be modified before these standards are implemented.

Commenter	Comment
<p>Midwest Reliability Organization (2) Wayne Guttormson Jim Maenner Al Boesch – NPPD (2) Terry Bilke – MISO (2) Bob Coish – MHEB (2) Dennis Florom – LES (2) Ken Goldsmith – ALT (2) Todd Gosnell – OPPD (2) W. Guttormson – SPC (2) Tom Mielnik – MEC (2) Darrick Moe – WAPA (2) P. Oreschnick – XEL (2) Dick Pursley – GRE (2) Dave Rudolph – BEPC (2) Joe Knight – MRO (2) 27 additional MRO members not listed above.</p>	<ol style="list-style-type: none"> <li>1. The MRO recommends that the proposed effective date for PRC-002 be extended from nine months to at least a year after BOT adoption. The regions already have a lot of work to accomplish. This is not the only standard out there for implementation. As well, there has to be better coordination between standards regarding implementation timelines and impacts on region and entity workloads.</li> <li>2. For the PRC-002 DME Definition, the MRO suggests removal of the references to specific devices, such as protective relays and phasor measurement units to keep it in line with focusing on the function of the device. Otherwise you may wish to list generator AVR's and power system stabilizers as examples of devices that can also provide disturbance monitoring capabilities.</li> <li>3. The MRO suggests that the SDT consider some sort of grandfathering for existing DME's that do not meet these new performance requirements. Replacing the installed base of existing DME's represents a significant outlay of resources, and could delay the installation of other needed DME's.</li> <li>4. For PRC-002 R4.5 the MRO recommends deletion of this requirement. The MRO questions the wisdom of placing any unapproved standard, IEEE or otherwise, as a requirement even with the explanatory note given. How is the Ballot Body supposed to approve an open-ended commitment to any standard not defined when financial penalties may be associated with not meeting it? Either it is a requirement now or it is not.</li> <li>5. For PRC-002 R3.2.2 the MRO suggests that the SDT use consistent units for sampling rates in the standard, for example 960 samples per second listed in R3.2.2 is equivalent to the 16 samples per cycle listed in R2.2.2.</li> <li>6. For PRC-018 R1.2 the MRO suggests that the SDT clarify the intent further. Is it the intent of the requirement that even if disturbance data is retrieved the data on the DME can not be erased until after 10 days, or can the data be erased as long as any retrieved data is saved for 10 days? The MRO suggests the following language, "Recorded data from each Disturbance shall be capable of retrieval from the DME for 10 days. As well, is 10 days an appropriate measure for retrievability of data when it also depends on how much storage capacity the DME has and the number of events it is exposed to.</li> <li>7. For PRC-018 R6 the MRO recommends that the SDT extend the proposed effective date for already installed DME from six months to a year. Many entities will require a longer transition period to develop such a program if they do not have one already. As well, the MRO recommends that the SDT refer to</li> </ol>

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

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Commenter	Comment
	<p>the SAC a request to consolidate all maintenance and testing requirements regarding DME's, and protective relays into one standard.</p> <p>8. For the PRC-018 Measures the MRO recommends that the SDT specifically list the Requirements that are associated with each Measure for clarity. Each Requirement is supposed to have an associated Measure.</p>
<p><b>Response:</b></p> <p>1. PRC-002 is an existing approved Version 0 standard with a few requirements added. Regions should be able to modify their existing requirements within the proposed nine months.</p> <p>2. The devices listed were provided to give examples, and weren't intended to be all-exhaustive.</p> <p>3. Improving the ability to collect data on events and improving models were both recommendations following the blackout. If entities were grandfathered, then there would be no incentive to make the improvements already identified as needed to support reliable operations.</p> <p>4. The IEEE standard is written but hasn't been balloted. By including the language in this standard, it keeps this standard up to date. By including this in the standard, it informs entities that they need to be prepared to comply with this requirement.</p> <p>5. The sampling rates provided were specific to the types of recording devices being described, and are the most commonly used references to the sampling rates.</p> <p>6. If you retrieve the data, you don't have to keep the data on the device for 10 days. The intent was to retain recorded data for 10 days – this would allow a Region to request data for an event up to 10 days following that event. The 10 days was selected to give the Region sufficient time to determine whether to analyze an event.</p> <p>7. Entities should already have a maintenance and testing program in place – documenting this program should be achievable within 6 months. If you want to consolidate all maintenance and testing requirements into a single standard, you can submit a SAR with a description of the standards you feel should be consolidated.</p> <p>8. Your suggestion was adopted and references to each requirement are attached to each measure.</p>	

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

Commenter	Comment
<p>IESO (2) Ron Falsetti</p>	<ol style="list-style-type: none"> <li>1. PRC-002 and PRC-018 should be restructured to meet their respective purposes, i.e. that PRC-002 is intended to stipulate the requirements to ensure that Regional Reliability Organizations establish technical, data and location requirements for installation of Disturbance Monitoring Equipment (DME), whereas PRC-018 is intended to stipulate the requirements for ensuring that DMEs are installed and that disturbance data is reported in accordance with regional requirements to facilitate analyses of events; for example R1.1 of PRC-018 is better suited in PRC-002</li> <li>2. R1, R2 and R3 of PRC-002 as written could result in the RRO stipulating the locations for installing DMEs. Responsible entities within the region may have their own specific needs to install DMEs at other locations. Moreover, preferred locations to install DMEs to meet regional needs would normally be coordinated with the responsible entities. We suggest the leading sentences of R1, R2 and R3 be reworded to include only the monitoring and recording requirements, and add a sentence at the end of each of these three requirements to require that the RRO shall coordinate with responsible entities within the region to identify the location for SMD installation.</li> <li>3. For each of R1, R2 and R3 in PRC-002, there needs to be a requirement on the minimum availability of the DMEs. One of the findings of the 2003 blackout investigation was that some DMEs were found not operational. We believe this is an important requirement to ensure that installed DMEs are operational when called upon (i.e. when unavailability is otherwise not detected during routine maintenance and testing.)</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. Most commenters agreed with the division of requirements between PRC-002 and PRC-018.</li> <li>2. This is what was intended. Entities within a region may install additional DMEs in additional locations if they so desired.</li> <li>3. The maintenance and testing program that is now required, should minimize this problem.</li> </ol>	
<p>NPCC CP9, Reliability Standards Working Group K. Goodman – ISONE David Kiguel – Hydro One Peter Lebro – NGrid Bill Shemley – NYSRC M. Schiavone – Ngrid R. Champagne – TransÉnergie M. Gopinathan – NU Alden Briggs – NBSO Ron Falsetti – IESO</p>	<ol style="list-style-type: none"> <li>1. Measure M4: M4, as written, is a requirement repeating R6. It should be reworded in the context of, for example, “shall have evidence or documentation to demonstrate R6 is met”.</li> <li>2. Compliance Level 2.4.4: the sentence “Documentation of the DME maintenance and testing program, or its implementation, was not provided” needs clarification. Suggest to reword it to read something similar to 2.2.5, for example: “Documentation of the DME maintenance and testing program was not provided, or no evidence that the testing program did occur within the identified intervals”.</li> <li>3. R1, R2 and R3 of PRC-002 as written could result in the RRO stipulating the locations for installing DMEs. Responsible entities within the region may have their own specific needs to install DMEs at other locations. Moreover, preferred locations to install DMEs to meet regional needs would normally be coordinated with the responsible entities. We suggest the leading sentences of R1, R2 and R3 be reworded to include only the monitoring and recording requirements, and add a sentence at the end of</li> </ol>

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

Commenter	Comment
<p>Don Nelson – MA Dept. of Tel. and Energy                      Alan Adamson – NYSRC                      Jim Ingleson – NYISO                      Greg Campoli – NYISO                      Guy Vito – NPCC</p>	<p>each of these three requirements to require that the RRO shall coordinate with responsible entities within the region to identify the location for SMD installation.</p> <p>4. For each of R1, R2 and R3 in PRC-002, there needs to be a requirement on the minimum availability of the DMEs. One of the findings of the 2003 blackout investigation was that some DMEs were found not operational. We believe this is an important requirement to ensure that installed DMEs are operational when called upon (i.e. when unavailability is otherwise not detected during routine maintenance and testing.)</p> <p>5. In PRC-018-1, fifth dash under Proposed Effective Date: NPCC participating members suggest revising the sentence “100% compliant 6 months after installation for DMEs installed to meet Regional Reliability Organization requirements per Reliability Standard PRC-002 Requirements 1, 2 and 3. This needs clarification.</p> <p>6. There are some legacy DME which fail to meet the standards to some degree. We believe the 4 year replacement time is too short in cases of a small degree of deficiency. We suggest that the four year time frame apply to locations which are not covered by DME or covered with DME which is entirely inadequate. We suggest an 8 year time frame for cases where the DME is deficient in only one or two of the requirements defined in either PRC-002 or PRC-008.</p>
<p><b>Response:</b></p> <p>1. M4 points to the details of the maintenance and testing program which are included in R6.</p> <p>2. This suggestion was adopted and is reflected in the revised standard.</p> <p>3. The intent of these standards is to have the Region identify where the devices are needed and then to have entities install them. This should result in sufficient DMEs installed on the bulk electric system to ensure that any disturbance can be analyzed.</p> <p>4. The maintenance and testing program which is in these standards should force entities to ensure that the equipment is operational.</p> <p>5. The intent of the qualifying language in the ‘Proposed Effective Date’ section is to clarify that entities have longer to comply with the data reporting and retention requirements and the maintenance and testing program for any devices newly installed to meet the region’s requirements.</p> <p>6. The intent of the standard is not to require that all DMEs be upgraded. Many DMEs are installed for local use and won’t fall under these standards. Only the DMEs that are installed to meet the region’s requirements need to meet these requirements. The specifications included in these standards are designed to ensure that disturbances on the bulk electric system can be analyzed. It is difficult to defend extending the deadline for another four years.</p>	

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

<p>Ameren John E. Sullivan</p>	<p>PRC-002-1:</p> <ol style="list-style-type: none"> <li>1. R1: Previously, MAIN requirements did not require sequence of event recording. Significant upgrade costs may be incurred if this requirement is imposed.</li> <li>2. R2.1.3: Previously, MAIN requirements did not require the ability to determine Polarizing currents and voltages (R2.1.3.3), frequency (R2.1.3.4), and Megawatts and Megavars (R2.1.3.5) from DFR data. This could result in significant upgrade cost.</li> <li>3. R3.1.1: The list of considerations is of no practical use from the perspective of being measurable or enforceable.</li> <li>4. R4.4 and R5: Many older DFRs may not support the COMTRADE format or renaming of files. MAIN requirements allow hardcopy, facsimile, email, and COMTRADE submittals.</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. The determination of where DMEs need to be located is left up to the Region. If MAIN doesn't require sequence of event recorders, then you would not need to install them.</li> <li>2. Most commenters supported this requirement so it was not changed. Note that it is up to MAIN to determine whether to require the installation of fault recorders and if they are required, then to identify where they must be located. The intent is not to require all existing equipment to be upgraded – the intent is for the region to identify what equipment needs to be installed where, and then if the devices are not already installed in those locations, to give entities several years to acquire and install those devices where needed. As envisioned, many entities will have DMEs installed for their own purposes beyond the DMEs that must be installed to meet the region's requirements.</li> <li>3. The list provides Regions with factors that must be considered to provide a degree of uniformity when determining where DMEs should be located.</li> <li>4. The standard was modified to state that the data must be provided in a format which is capable of being viewed, read and analyzed with a generic COMTRADE analysis tool.</li> </ol>	
<p>Dominion Electric Transm. (1) Thomas E. Owens</p>	<p>Comments for PRC-002-1</p> <ol style="list-style-type: none"> <li>1. The definition of Fault Recorder ends with ... This may include protective relays. We suggest this last sentence be removed and Protective Relays included in the footnote at bottom of page with PMUs. Protective relays can also be used as an SER device and in the future may even function as a DDR.</li> <li>2. Regarding R1, we suggest the abbreviation of SER be approved for use to refer to sequence of event recording equipment. As such modify the wording to say - The Regional Reliability Organization shall establish. . . for Sequence of Events Recording (SER) equipment. Also modify the definition accordingly. This would be similar to the acronym DDR, which is used in the definition of a Dynamic Disturbance Recorder.</li> <li>3. Regarding R2, we suggest the abbreviation of DFR be approved for use to refer to fault recording equipment. Since the requirements in PRC-002 are specifying a digital file format and magnetic tape recorders cannot meet this requirement, the only type fault recorders that could then exist will be digital fault recorders (DFRs). As such modify the wording to say - The Regional Reliability Organization shall establish. . . for Digital Fault Recording Equipment (DFR) equipment. Also modify the definition accordingly.</li> <li>4. Regarding R2.2.2 and R3.2.2, be consistent when specifying sampling rate. R2.2.2 says 16 samples per cycle</li> </ol>

	<p>and R3.2.2 says 960 samples per second. These are the same sample rate. Change one to agree with the other, possibly using 960 samples per second.</p> <ol style="list-style-type: none"><li>5. Regarding R3.2.1, capability for continuous recording could mean that the device can record continuously but this feature may be turned off. Continuous recording should be considered optional or at the discretion of the regions. Triggered DDR devices should be acceptable as DDRs. If a triggered DDR can capture the desired events, the need for continuous recording should be waived. As such triggering requirements and recording duration requirements should be added.</li><li>6. Regarding Paragraph R4.4, reporting data in a COMTRADE format is fine for DFRs (maybe even SERs) but not for DDRs. It should also be noted that this paragraph should apply only to reporting requirements, not data storage requirements. As such, conversion of vendor proprietary file formats to COMTRADE is only required when reporting or sharing data.</li><li>7. DDRs typically store RMS values, frequency and phase angles. Also in R3.2.2 a DDR is required to record RMS values. There is no provision in COMTRADE for storing RMS values, phase angles, or real and imaginary components of a signal. Since recorded RMS values do not reflect waveform data (without additional information) this type of recording falls outside the COMTRADE standard. Further, programs designed to read COMTRADE files would not properly interpret the files from DDRs. The industry (IEEE) should develop some other file format to be used as a DDR standard file format. Until this happens some other format besides COMTRADE should be allowed for DDR data, possibly a format suitable for importing into a database. <p>The COMTRADE format is structured for instantaneously sampled data; that is, a number (usually large) of digitally-sampled analog data points, which may be greater or less than zero (described in Section 3.3, C37.111 IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems (1999). Each file line containing digitized analog data includes one field for the number of digital counts that reflects the instantaneous magnitude of the signal. Several lines are needed to reconstruct a waveform. COMTRADE is structured to store transient data; there is no provision in the Standard to indicate that the data in a COMTRADE file is any other type. Section 1.1 of IEEE C37.111 states that the COMTRADE standard - defines a format for files containing transient waveform and event data.</p></li><li>8. Regarding Paragraph R4.5, many recorders do not presently name files in accordance with the C37.232 IEEE Recommended Practice for Naming Time Sequence Data Files. Approval of this standard is still pending. Many vendors will have to make software or hardware enhancements to comply. Unless vendors conform to this standard, each file would have to be renamed. The compliance footnote #2 should be changed to allow a period of time after the standard is approved, possibly two to four years, for facility owners to become compliant with the COMNAMES naming convention. Again it should only apply to reporting and sharing data, not for data storage.</li></ol> <p>Comments for PRC-018-1</p> <ol style="list-style-type: none"><li>9. Regarding R1.2, data recorded by some existing DMEs and some newer ones have limited memory and cannot be configured to ... be retrievable for 10 days. The settings in the DMEs typically have a maximum number of records as the limit not the number of days of data. The transmission owner needs flexibility on this requirement because in many cases the data is retrieved from the DME within several days of the event and whether the DME retains 3 days or 10 days of data is irrelevant. This may require hardware and software changes by the DME vendors and</li></ol>
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	possibly unnecessary DME replacements by transmission owners to comply.
<p><b>Response:</b></p>	<ol style="list-style-type: none"> <li>1. The drafting team added a footnote in support of your suggestion, to the heading for DMEs: Phasor Measurement Units and any other equipment that meets the functional requirements of DMEs may qualify as DMEs.</li> <li>2. The term, 'sequence of event recorders' is not used in the standard. The standard does include a single use of the phrase, 'sequence of event.' An acronym can only be used in situations where the phrase is used multiple times in a standard.</li> <li>3. As written, R2 allows any device that meets the criteria to be acceptable, and this isn't limited to digital fault recorders.</li> <li>4. The sampling rates provided were specific to the types of recording devices being described, and are the most commonly used references to the sampling rates.</li> <li>5. Triggered DDR devices don't necessarily collect as much information as desired to analyze an event – for common, short-term events, they may collect enough data – but for longer events, the data that leads up to the event isn't recorded and they may stop recording before the end of the event.</li> <li>6. R4.4, as written, is related to reported data and not data storage.</li> <li>7. The requirement was modified so that it now requires Disturbance data be provided in a format which is capable of being viewed, read and analyzed with a generic COMTRADE analysis tool.</li> <li>8. There will be a gap in time while waiting for the IEEE Standard to become effective. As envisioned, the responsible entity retrieves data and if needed, names and converts the data before submitting the data to the RRO.</li> <li>9. If the device can't store 10 days worth of data, then the data would need to be retrieved and stored elsewhere. The intent was to retain recorded data for 10 days – this would allow a Region to request data for an event up to 10 days following that event. The 10 days was selected to give the Region sufficient time to determine whether to analyze an event.</li> </ol>
<p>Ameren (1, 3, 5) Mike McDonald</p>	<ol style="list-style-type: none"> <li>1. Section R3.1.3.1 summarizes 3 vslues without specification of what these are - for instalnce Voltage (all three phase-to-neutral voltages or just one? This was much more elaborate in R2.2.3. These shold be comperably specoified.</li> <li>2. Compliance of the RRO is appropriate - it needs to get completed. However, compliance in terms of equipment upgrades and new installations of DMEs needs to be based on criticality of the upgrade as well as the overall cost to the owner. Since each RRO has it's own members as participants in the drafting of it's own requirements, you can easily defeat the overall purpose of these 'standards' as knowing tha tthere is a huge cost to many of there issues, the local RROs will simply make their requirements so soft that little actuallly will need to be done - as they can't afford it without outside funding. NERC should provide an oversite of the selection of location of DMEs where it applies to the transportation of power to insure that events can be analyzed. Making 'requirements' of selecting locations based on 'voltage sensitive areas' is not, as I understand it, part of NERCs charge.</li> <li>3. All of section R.3 is so broad that iss neither of practical use, measurable or enforceable.</li> <li>4. It appears to me that you have completely left out monitoring the communicaitons paths of the relayign that</li> </ol>



**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

	protects the EHV system and is critical in insuring proper clearing of transmission faults and the stability of the system.
<p><b>Response:</b></p> <p>1. Standards do not include explanatory information – just statements of required performance. The recording devices have different applications and require the collection of different types of data.</p> <p>2, 3. Most commenters have supported the requirement for the RRO to identify where DMEs need to be installed.</p> <p>4. This requirement should be addressed by the Region within PRC-002 R1.1.2 Devices to be monitored.</p>	
FirstEnergy (1) David A. Powell	<p>The footnote in the DME definition should include "PMU and any other equipment capable of meeting the DME technical and functional requirements". Some SCADA RTU and relay equipment can support the SOE function. Then the reference to protective relays could be removed from the second bullet.</p> <p>There is a typo in PRC-002-1 Section R3 (Phrases) should be Phases. PRC-018-1 Section 2.2.2 has a typo (Organization is spelled wrong).</p>
<p><b>Response:</b> The footnote was modified in support of your suggestion. These typographical errors have been corrected.</p>	
Florida Power & Light (1) Charles Kevin Luke	<p>R3.6 through R3.8 should be removed. This values constantly change and maintaining such a database is impossible to maintain accuracy during an on going bases. Therefore R3.1 through R3.5 should be maintained for compliance and R3.6 through 3.8 reported only when a Regional Reliability Organization - identified event is recorded and data is submitted.</p> <p>The Proposed Effective Dates also raise a concern that are listed in PRC-018-1. The economic impact of these imposed requirements are unknown at this time due to the pending definition of the issuance of the regional requirements. This could vary to be in the amounts of millions of dollars per year for the next four years. Would prefer to see stretched out to five or seven years.</p>
<p><b>Response:</b> The items listed in R3.6 through R3.8 should not change very often – it should be updated as the changes are made. The standard does not require that the data be contained within a single document – it just needs to exist somewhere – it could be in a group of documents. The requirements are already spread out over several years. Since the need for these improvements was highlighted in the blackout reports, it is difficult to justify spreading out the installation dates even further.</p>	
Manitoba Hydro (1, 3, 5, 6) Robert Coish	<ol style="list-style-type: none"> <li>1. R1.2 in PRC-018 needs clarification.</li> <li>2. In PRC-018 Data Retention tracking and retaining any (potentially numerous) changes to the data on DME installations for three years would be onerous and is probably not necessary as long as Distubance data submitted is properly documented and is retained for three years.</li> <li>3. In PRC-018 proposed effective dates, what criteria will be used to determine percentages of compliance?</li> </ol>

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

	<p>4. In PRC-002, 2.1.2, R7 should be R6.</p> <p>5. In PRC-018, Levels of Non-compliance 2.1.1, replace the word its with the word the.</p>
<p><b>Response:</b></p> <p>1. The intent was to retain recorded data for 10 days – this would allow a Region to request data for an event up to 10 days following that event. The 10 days was selected to give the Region sufficient time to determine whether to analyze an event.</p> <p>2. The requirement to retain data on changes to the DME installations was removed in support of your suggestion.</p> <p>3. These were intended to be % of the required installations – so that if the RRO identified 20 DME installations for one entity, 10 would have to be accomplished within the first two years after the RRO’s requirements were distributed. As envisioned, most entities would already have some devices installed that would meet the standard’s requirements – so not all installations would necessarily have to come from ‘new’ equipment.</p> <p>4. R7 was changed to R6 as noted.</p> <p>5. Your suggestion was adopted and is reflected in the revised standard.</p>	
<p>Florida Reliability Coordinating Council (2) John Odom Linda Campbell John Shaffer – FPL (1) Kevin Luke – FPL (1) Bob Schoneck – FPL (1)</p>	<p>In requirement R3.1.1 in PRC-002-1, there is a requirement for the region to develop criteria for the selecting the location for Dynamic Disturbance Recording (DDR) equipment based on a list of possible location types. This is not a requirement in R2.1.1 for fault recorders. The concern is that with the long list of possible location types, how can the region demonstrate (during compliance activities) that it considered all of these factors. Therefore, this list should be deleted and this requirement should parallel R2.1.1.</p>
<p><b>Response:</b> While difficult to measure whether an entity ‘considered’ many items, the list does provide guidance to entities on the range of items to consider when determining where to locate these devices. The list was recommended for inclusion by one of the teams that worked on the blackout investigation.</p>	
<p>Northeast Utilities (1) John Ferraro</p>	<p>1. PRC-018-1, R1.2. States that "recorded data from each Disturbance shall be retrievable for ten days." However, the DME definitions allow that relays may be used in fault recording applications. In the event of a series of lightning strikes in a fairly short period of time, it's quite possible that relay records will be overwritten before the data can be recovered. In this situation, it would not be possible to satisfy the conditions of R1.2. Even centralized data collection software applications may not be sufficient to prevent this problem, and could impose undue cyber-security costs to implement. Either an exception is needed for installations using relays with limited memory, or the definition allowing the use of relays needs to be more limiting regarding the capabilities of the relays used in such a capacity.</p> <p>2. Also, PRC-002-1, R3.2.1 calls for a requirement for continuous recording capability. This position will effectively force the upgrade or replacement of DDRs that have been performing satisfactorily on a triggered basis on behalf of those entities who had the foresight to install such devices in the first place. This seems inordinately punitive. I suggest rewording to permit the continued use of installed technology.</p>

**Response:**

1. Some entities use data concentrators to collect and compile this data from relays. The intent was to retain recorded data for 10 days – this would allow a Region to request data for an event up to 10 days following that event. The 10 days was selected to give the Region sufficient time to determine whether to analyze an event.
2. Continuous recording devices capture more data for events because they collect data to show system changes leading up to the event as well as system changes through a longer period of time following an event. The requirement for continuous recording was modified to indicate that this requirement will be effective for devices installed after January 1, 2009.

Southern California Edison (1)  
Neil Shockey

1. PRC-002 R2. On the issue of electrical quantities to be measured and/or monitored, SCE is concerned with the specific use of the term “three phase to neutral voltages.” We believe that NERC’s DME applies to locations within Regional areas, where disturbances will result in a need for their people to gather event recordings from mostly high voltage (usually over 115 kV) lines. Yet, in the event inter-Utility connections are lower voltage, where they may not have phase to neutral voltages available, rather only phase-to-phase voltages are available. We are concerned that if the NERC document has compliance statements that hold Utilities to only the monitoring of phase-to-neutral voltages, will the Utilities be obligated to install new primary voltage equipment, or will they be given exceptions?
2. On the issue of Megawatts and megavars, most fault recorders do not specifically record these quantities. Most Utilities use Fault Recorders for the purposes of validating the proper operation of protective relaying systems, and the currents and voltages that are present during a fault. Thus, when defining recording channels for an FR, Watts and Vars are considered to be operating and dynamic system quantities, so they are not typically recorded in real-time, in FR’s. However, newer technology DFRs can typically use a feature known as “calculated channels,” where the Watts and/or Vars on a particular line and/or bank element can be calculated and plotted, from the recorded current and voltage data from an FR. These Watt and Var quantities are definitely something that’s very helpful in post-disturbance analysis; We are concerned that this section is showing that these quantities are to be recorded in FR’s, and that a number of Utilities’ FR systems will not be able to comply, given the age and vintage of their FR’s.
3. R3. Under the DDR’s section on Technical Requirements, there is a paragraph that addresses the sample rates of the DDR devices. We are uncertain as to why there was mention of specific sample rates here, along with the number of records per second. This is probably fine, but it seems to be somewhat inconsistent with the comparable section within the FR requirement (R2), where there is only mention of a minimum sampling rate of 16 samples per cycle.
4. R1., R2., and R3. It appears that any references to data retention considerations may have been inadvertently removed from these sections. Maybe this was intended, but in looking at the WECC’s guidelines, it appears here, so we believe that the NERC may want to use some similar language, to prompt Regions to consider data retention periods, accordingly.  
Data retention
5. The rest of PRC-002-1 has a number of changes, mostly re-defining the paragraph designations, etc. They may want to check all of the cross-references, once all the revisions have been incorporated, since it appears that some of the cross-references may not be correct, in the draft.

**Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018**

	<p>6. PRC-018 R3. The addition of the “date last tested” raises concern to SCE. Most Utilities have limited field resources, so SCE is not personally aware of too many Utilities that test their SER’s and FR’s. If this becomes a compliance issue, which it appears that it will, SCE can see some ways that people may try to satisfy this requirement (including some very large Utilities): a. date of the DME’s last recording, b. date last time the DME had major channel re-work, c. date of last configuration file changes, d. spot-verify analog and digital channels work during event analysis, or e. complete verification of all analog and digital channel operations. All of us that use the event recordings from DME’s to analyze system events realize the importance and value of regular checks, and even some limited field testing and/or channel calibration, of DME’s yet a reasonable approach should be used that is not overburdensome.</p>
<p><b>Response:</b></p> <p>1, 2. The standard requires that the devices record data “sufficient to determine” phase-to-neutral voltages – the standard doesn’t require “monitoring”.</p> <p>3. Digital fault recorders record at clock speed so it isn’t necessary to require a specific recording speed. With DDRs, the clock speed is typically higher than the recording rate, so both must be specified.</p> <p>4. These individual data retention requirements were merged and moved into PRC-018 R1.2 when the last draft of the standards was developed.</p> <p>5. All the cross references have been verified. R7 was changed to R6.</p> <p>6. The elements you’ve listed could be part of a maintenance and testing program. The Region has flexibility in identifying the criteria for equipment location including specific system voltages for which DMEs must be installed.</p>	
<p>ITC Transmission (1) Jim Cyrulewski</p>	<p>Proposed changes to PRC-002-1 and PRC-018-1 Standards PRC-002-1</p> <p>1. Page 1 Definition of Terms Used in Standard</p> <ul style="list-style-type: none"> <li>•Sequence of event recorders which record equipment chronological response to an event with a typical resolution of 1 millisecond.</li> <li>•Fault recorders, which record actual waveform data depicting the system primary voltages and currents as they exist during an event.</li> </ul> <p>2. Footnote applies to DDRs only and should read: Phasor Measurement Units that meet the functional requirements of DDRs may qualify as DMEs.</p> <p>Page 2 A. Introduction:</p> <p>3. Purpose should have added at the end “and verify system models.”</p> <p>B. Requirements:</p> <p>4. Page 4 R4.4 Provision for reporting Fault and Dynamic Disturbance data in COMTRADE.... Add a sentence at the end “Sequence data in ASCII table or CSV file.”</p>

## Consideration of Comments on the Fourth Posting of PRC-002 and PRC-018

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	<p>5. Page 5 D. Levels of Non-Compliance: End should be changed to reference R6 (there is no R7). PRC-018-1 B. Requirements</p> <p>6. Page 2 R1.1 Since most devices have debounce filtering that can delay the time stamp by a minimum of 4 milliseconds, a timestamp variance of 1 millisecond is not realistic.</p> <p>7. Page 3 R1.2 Needs to be written specifically for each type of DME. Fault data should be retrievable for a longer period (minimum 3 months) than Dynamic and Sequence data.</p> <p>8. Need more requirements under R1 to address data storage in non-volatile memory and the ability of the DME to function absent of AC power to the installation site.</p> <p>9. Page 3 R3.7 Because they are typically not monitored by DMEs, remove disconnect and alarm status.</p>
<p><b>Response:</b></p> <ol style="list-style-type: none"><li>1. The drafting team believes there is already consensus on the definitions in the standard.</li><li>2. The footnote was modified as suggested and applied more globally to DMEs.</li><li>3. The Purpose was modified as suggested and includes the phrase, 'and verify system models.'</li><li>4. The requirement was changed and now states that data must be provided in a format which is capable of being viewed, read and analyzed with a generic COMTRADE analysis tool.</li><li>5. R7 was changed to R6 as noted.</li><li>6. Agree. R1.1 was changed so that it now focuses only on the time synchronization of the internal device clock.</li><li>7. The intent was to retain recorded data for 10 days – this would allow a Region to request data for an event up to 10 days following that event. The 10 days was selected to give the Region sufficient time to determine whether to analyze an event.</li><li>8. The standard requires that the data be available – how each entity complies is up to each entity.</li><li>9. The items in R3.7 are examples and are monitored by many DMEs.</li></ol>	