

Background:

The Phase III & IV Drafting Team thanks all those who submitted comments on the third draft of PRC-002 and PRC-018. These two standards were posted for a third public comment period from December 3, 2005 through January 17, 2006. The drafting team asked stakeholders to provide feedback on the standards through a special Standard Comment Form. There were 16 sets of comments, including comments from more than 64 different people from more than 45 companies representing 4 of the 9 Industry Segments, and all NERC Regions as shown in the table on the following pages.

Based on the comments received, the drafting team is recommending that these two standards be reposted for a final set of comments to confirm that there is consensus with the changes made to the standards before recommending that the standards be posted for ballot.

In this 'Consideration of Comments' document, stakeholder comments have been organized so that it is easier to see the summary of changes being requested of each standard. All comments received on the third draft of these two Phase III & IV standards can be viewed in their original format at:

<http://www.nerc.com/~filez/standards/Phase-III-IV.html>

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. In addition, there is a NERC Reliability Standards Appeals Process.¹

¹ The appeals process is in the Reliability Standards Process Manual: <http://www.nerc.com/standards/newstandardsprocess.html>.

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Commenter	Organization	Industry Segment								
		1	2	3	4	5	6	7	8	9
Anita Lee (G3)	AESO		x							
Jeff Billinton (G4)	AESO		x							
Darrell Pace (G1)	Alabama Electric Cooperative	x								
Jay Farrington (G5)	Alabama Electric Cooperative	x								
John E. Sullivan	Ameren									
Doug Jackson (G2)	American Electric Power-West		x							
Baj Agrawarl (G4)	APS	x								
Maurice Robinson (G2)	Arkansas Electric Cooperative Co		x							
Rebecca Berdahl (G4)	BPA-BPL					x				
Chuck Matthews (G4)	BPAT	x								
Lisa Szot (G3)	CAISO		x							
Daniel Cretu (G4)	CDWR									
Fred Ipock (G2)	City Utilities Springfield		x							
Dean Sikes (G2)	Cleco Power, LLC		x							
Thomas Owens	Dominion Va Power - Elec Trans	x								
Ronnie Bailey (G5)	Dominion Virginia Power	x								
Brian Moss (G1)	Duke Power Co	x								
Barry Jackson (G5)	Duke Power Co.	x								
Victoria L Bannon (G5)	Duke Power Co.	x								
Greg Mason	Dynegy					x				
Kham Vongkhamchanh (G1)	Entergy	x								
Charlie Fink (I) (G5)	Entergy	x								
Sam Jones (G3)	ERCOT		x							
Bill Bojorquez (G6)	ERCOT									
Phil Winston (G5)	Georgia Power	x								
Steven E. Waldrep (G5)	Georgia Power	x								
Hong Ming Shuh (G5)	Georgia Transmission Corp	x								
Nathan Lovett (G5)	Georgia Transmission Corp	x								
Ron Falsetti (I)(G3)	IESO		x							
Kathleen Goodman	ISO New England		x							
Peter Brandien (G3)	ISONE		x							
Bob Roach (G2)	Kansas City Power & Light Co.		x							
John Horakh	MAAC		x							
Mike Gazda (G5)	MEAG Power	x								
Ernesto Paon (G5)	MEAG Power	x								
William Phillips (G3)	MISO		x							
Murale Gopinathan	Northeast Utilities	x								

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Julie Reichle (G4)	NWE	x																	
Michael Calimano (G3)	NYISO		x																
Shawn Jacobs (G2)	OG&E Electric Services		x																
Mike Sidiropoulos (G4)	PAC	x																	
Ben Morris (G4)	PG&E	x																	
Bruce Balmat (G3)	PJM		x																
Mark Kuras	PJM/MAAC		X																
Jim Whitaker (G4)	PSCO	x																	
Mohan Kondragunta (G4)	SCE	x																	
Bridget Coffman (G5)	SCPCA	x																	
Art Brown (G1)	SCPSA	x																	
Pat Huntley (G1)	SERC		x																
Susan Morris (G5)	SERC		x																
Don Deberry (G4)	SMUD	x																	
Clay Young (G1)	South Carolina Electric & Gas Co			x															
Marion E. Frick (G5)	South Carolina Electric and Gas	x																	
Bob Jones (G1)	Southern Company Services	x																	
John Boshears (G2)	Southwest Power Pool		x																
Charles Yeung (G3)	SPP		x																
Brian Keel (G4)	SRP	x																	
Jonathan Sykes	SRP	x																	
Travis Sykes (G1)	TVA	x																	
Russell W. Patterson (G5)	TVA	x																	
Gary Kobet (G5)	TVA	x																	
Leonard York (G4)	WAPA	x																	
Steve Rueckert (G4)	WECC		x																
Lynn Schroeder (G2)	Westar Energy		x																
Heidt Melson (G2)	Xcel Energy		x																

“G” indicates comments submitted by one of the groups listed below

“I” indicates the individual submitted a set of comments as an individual in addition to comments submitted as part of a group.

- G1 - SERC EC Planning Standards Subcommittee
- G2 - SPP System Protection & Control Working Group
- G3 - ISO/RTO Council
- G4 - WECC Reliability Subcommittee
- G5 - SERC Protection & Control Subcommittee
- G6 - NERC Standards Evaluation Subcommittee

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1. Please identify anything you believe needs to be modified before this standard is balloted: PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements (Modified Version 0)

Summary Consideration: The definition of 'Protection System' was approved with PRC-003 (Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems) and was removed from this standard. The approved definition is:

Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.

The standard was revised to clarify the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.

Several commenters made suggestions about the time synchronization requirements. The drafting team moved these requirements to PRC-018 to ensure that these are consistent throughout all NERC Regions. The time synchronization requirements were further refined as follows:

- The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock.
- Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC).

Most other modifications corrected typographical errors or improved consistency.

Commenter	Comment
John Horakh - MAAC	This is a correction that should be made, not a suggested modification. In the Definitions section, the whole definition for Protection System was incorrectly deleted. Only the item Power Circuit Breakers should have been deleted, as intended.
	<p>Response: The definition of Protection System was approved with PRC-003. The definition that was approved is:</p> <p>Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.</p>
WECC Reliability Subcommittee	<p>In the list of changes to PRC-002 above, it indicate that "power circuit breakers" was removed from the definition of Protection System. However, in the redline version and the clean version, the entire definition has been deleted. What was the actual intent?</p> <p>It is also indicated that the requirement of "continuous" recording equipment was removed. A reference to "continuously" recording DDR is then added under R4.1</p>
	<p>Response: The definition of Protection System was approved with PRC-003. The definition that was approved is:</p> <p>Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.</p> <p>The changes made to the definition were to recognize that some DDRs don't provide continuous recording. The requirement that referenced 'continuous' did apply only to the subset of DDRs that provide continuous recording. Note that the drafting team modified this requirement to clarify that all DDR systems must have the capability of having data stored for at least 10 days – and modified the implementation plan to state that compliance with this requirement (in PRC-018) will not be required until 2008.</p>

Commenter	Comment
SERC EC Planning Standards Subcommittee (G1)	<p>(1). General comment for this standard and other standards. The abbreviation [e.g.] should be written as [e.g..].</p> <p>(2). To be consistent with R2.1, R3.1 needs to be revised to [Location, monitoring, and recording requirements including the following ...].</p> <p>(3). The section above indicated that the terms [power circuit breakers] were removed from the definition of [Protection System]. However, both the redlined and clean versions of this standard indicated that the entire definition has been deleted. Recommend that the definition of [Protection System] be re-inserted without the reference to [power circuit breakers].</p> <p>(4). In R3.1.2 the word [phases] is misspelled.</p>
<p>Response: 1. This will be corrected as noted.</p> <p>2. Your suggestion was adopted, and the headings for the similar sections of the standard have been revised so they are consistent.</p> <p>3. The definition of Protection System was approved with PRC-003. The definition that was approved is: Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.</p> <p>4. The typographical error has been corrected.</p>	
Charlie Fink - Entergy	<p>We agree with the revision to include equipment specifications to cover existing type devices that could qualify as a DDR. However, we do not agree with excluding PMUs from this standard. We believe the majority of PMU related stakeholder comments were more concerned with having to invest in PMUs, rather than eliminating them from the standard. It seems a bit extreme to go from an equipment specification that only applies to PMU type devices, and then revise the standard to eliminate PMUs altogether. Allow the Regions and/or individual stakeholders the flexibility to decide which type of device they wish to pursue. Suggest that PMUs be put back into the document with either the previous draft document PMU requirements or the existing proposed specifications.</p>
<p>Response: The footnote in PRC-002 was modified to clarify that a PMU that can meet the DDR requirements can be considered a DDR.</p>	
Greg Mason - Dynegy	<p>To ensure clarity, the definition of Protection System should be modified to read as follows: "Protective relays and their associated(rest of current definition)"</p> <p>R5.4,R5.5 and R5.6-These items should be revised to reflect the fact that existing equipment may not be able to comply with these requirements(i.e. provide data in COMTRADE format). Suggest adding wording to exempt existing equipment from these requirements.</p>
<p>Response: The definition of Protection System was approved with PRC-003. The definition that was approved is:</p> <p style="padding-left: 40px;">Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.</p> <p>The standard is being written to ensure that when an event occurs, the event can be studied – the intent is not to qualify all existing equipment.</p> <p>The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear.</p>	
John E. Sullivan - Ameren	<p>1. Regarding Requirement R1: Existing requirements established by MAIN do not require sequence of event recording equipment. This could result in significant upgrade costs.</p>

Commenter	Comment
	<p>2. In Requirements R1.2.2, R2.2.3, and R3.2.2, the time synchronization should remain at one millisecond. Four millisecond synchronization (one quarter cycle) is not as useful.</p> <p>3. Regarding Requirement R2.1.3: Existing requirements established by MAIN do 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. These additional requirements could result in significant upgrade cost.</p> <p>4. Regarding Requirement R5.4 and R5.5: Many older DFRs may not support the COMTRADE format or the renaming of files. Existing requirements established by MAIN allow hard-copy and Facsimile, email, and COMTRADE submittals. While this does not appear to be a significant issue for Ameren, it may be a significant issue for other entities.</p>
	<p>1. The RRO must set the location requirements for installation of devices, but the Region doesn't have to require that any Sequence of Event Recorders be installed.</p> <p>2. Time synchronization requirements were moved from the Regional requirements to the requirements imposed on the facility owners in PRC-018. The time synchronization requirement was modified to include the following criteria:</p> <ul style="list-style-type: none"> ▪ The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. ▪ Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC). <p>3. The standard only requires quantities that can be used to 'determine' megawatts and megavars – it doesn't require the collection of megawatts and megavars. This is also true about frequency, megawatts and megavars. Further, this ability to determine polarizing currents and voltages is only required '... if used.'</p> <p>4. Correct. The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear. The intent of having a standard naming convention is to make the file contents clear to the person trying to reconstruct an event.</p>
Jonathan Sykes - SRP	<p>Some clarification and cautions should be included on the use of a protective relay as a fault recorder. The definition of DME includes a reference of protective relays used for Fault Recorders, however it would be difficult for a protective relay to meet the requirements of a Fault Recorder as described in PRC-002. The emphasis of a protective relay has always been protection and other applications such as remote communications, SCADA functions and data recording have taken a secondary roll. If a protective relay is used as a fault recorder then maintenance, redundancy, testing, outages and many other issues should be considered. Various NERC standards would now apply to the same device.</p>
	<p>Response: If a protective relay doesn't meet the requirements for a fault recorder, then it doesn't qualify as a DME. The definition of DME's allows but doesn't require that a protective relay be included as a fault recorder.</p>
Mark Kuras - PJM	<ol style="list-style-type: none"> 1. The standard implies that sequence-of-events recorders must be installed. It should be up to the region to use this type of equipment or not. 2. In R3.1.2 change ...phrases... to ...phases. 3. Remove R3.2.1 because requirements for continuous recording should be part of this standard as mentioned as a major change to this standard above. 4. In R4, please define which ...specific system Disturbance events... data needs to be retained for or remove this statement. 5. There are no implementation requirements for equipment maintenance and

Commenter	Comment
	testing.
<p>Response:</p> <ol style="list-style-type: none"> 1. R1 was modified to clarify that the intent is not to require the installation of SERs 2. The typographical error has been corrected. 3. The drafting team believes that the standard needs to state that DDRs installed to meet the RRO's requirements must meet a minimum set of criteria, including the ability for continuous recording. 4. These events are those that are identified by the Region, as specified in R4.1. 5. PRC-018 Requirement 5 requires entities to have a maintenance and testing program. 	
Ron Falsetti - IESO	<ol style="list-style-type: none"> 1. 3.2.2: For consistency the IESO suggests the same wording as in R 1.2.2 and R 2.2.3 be used, i.e. "...synchronized to within four milliseconds of Coordinated Universal Time." 2. R3.2.3: We suggest the term "collect" be used in place of the first "sample". 3. R4.2 and R5: The acronym DME needs to be defined upfront, say, in Section A, Item 3 Purpose.
<p>Response:</p> <ol style="list-style-type: none"> 1. The time synchronization requirements were consolidated and moved to PRC-018. 2. The word, 'sample' was removed. 3. The drafting team added the acronym to the definition as you suggested. 	
ISO/RTO Council Kathleen Goodman – ISO-NE	<ol style="list-style-type: none"> 1. The standard implies that sequence-of-events recorders must be installed. It should be up to the region whether to use this type of equipment or not. 2. In R3.1.2 change ...phrases... to ...phases. 3. Remove R3.2.1 because no requirements for continuous recording should be part of this standard. As mentioned above, continuous recording would apply to devices installed 3+ years from now, not now. 4. In R4, please define which ...specific system Disturbance events... data needs to be retained for or remove this statement. 5. There are no implementation requirements for equipment maintenance and testing. 6. R3.2.2: For consistency the IRC suggests the same wording as in R 1.2.2 and R 2.2.3 be used, i.e. "...synchronized to within four milliseconds of Coordinated Universal Time." 7. R3.2.3: We suggest the term "collect" be used in place of the first "sample". 8. R4.2 and R5: The acronym DME needs to be defined upfront, say, in Section A, Item 3 Purpose.
<p>Response:</p> <ol style="list-style-type: none"> 1. R1 was modified to clarify that the intent is not to require the installation of SERs 2. The typographical error has been corrected. 3. The drafting team believes that the standard needs to state that DDRs installed to meet the RRO's requirements must meet a minimum set of criteria, including the ability for continuous recording. 4. These events are those that are identified by the Region, as specified in R4.1. 5. PRC-018 Requirement 5 requires entities to have a maintenance and testing program. 6. The time synchronization requirements were consolidated and moved to PRC-018. 7. The word, 'sample' was removed. 8. The drafting team added the acronym to the definition and the purpose as you suggested. 	
SERC Protection and Control Subcommittee (PCS)	<p>Footnote 1 referenced in R3 should be written as follows: "These requirements do not address Phasor Measurement Units (PMUs), however PMUs that meet the requirements in this Standard may qualify as DDRs."</p>

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Commenter	Comment
	Response: Your suggestion was adopted and is reflected in the revised standard.

<p>Thomas Owens - Dominion</p>	<ol style="list-style-type: none"> 1. Regarding R1, Dominion-Electric Transmission suggests 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. . . Sequence of Events Recording (SER) equipment: Also modify the definition accordingly. 2. Regarding R2, Dominion-Electric Transmission suggest the abbreviation of DFR be approved for use to refer to fault recording equipment. Since the requirements in PRC-002 are specifying a Comtrade 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. . . Digital Fault Recording Equipment (DFR) equipment: Also modify the definition accordingly. 3. Regarding R3.1.2, the word phrases should be changed to phases. 4. Regarding R5.1, it should be stated that the Regions should specify the types of events to be captured by each type DME. The type of events to be captured by DDRs should be stated separately from other DME. This must include what special triggers are required on the recorder to save the RMS data. Since this may affect the recorder design and software, it also should be mentioned under the section on installation requirements. This is required because many DDRs will be of a vintage that do not have continuous recording. 5. Regarding R3.2.1, it states - for installations effective three years after BOT adoption, capability for continuous recording. The meaning of the word effective is unclear. Does it mean installed, in service or something else? Add or modify verbage to indicate - DDRs installed 3 years after BOT.. for example. 6. Regarding R1.2.2, R2.2.3 and R3.2.2, it states - The recorded time may be expressed as local time, as long as the local time zone used is clearly stated. Does the statement of local time zone need to be in the recorded data, part of the file name, displayed when viewing the comtrade record or on a cover memo? The answer may affect recorder software, analysis software and firmware. Add verbage to clarify how local time zone should be stated. 7. Regarding Paragraph R3.2.3, the reasons for specifying a minimum 1600 samples per second are unclear; this number is not evenly divisible by 60 (Hz). We are not sure why the minimum data sampling rate of 1600 samples per channel per second is specified. Did this number from from the IDWG proposal? Why specify such a high sample rate and only save 6 records per second? Is this to try and capture some harmonic content in the RMS calculation? Is the intent to save an average of the RMS data over several cycles of time or is the intent to just simply save 1 RMS sample every 10th cycle and ignore the 9 cycles that follow? It may be better to save more samples as opposed to saving averages. The minimum sample rate should be changed to something lower such as 960 (16 samples/cycle) which would match the minimum sample rate specified for a DFR. This number is evenly divisible by 60, has computational advantages because it has several integer factors and would include the effects of up to the 8th harmonic. 8. Regarding R4.2, it is assumed that the captured DME data referred to here is the archived data stored by the Regional Reliability Organization. The question is does it refer to the facility owner's stored data or to both? Add verbage to clarify to whom this requirement applies. 9. Regarding Paragraph R5.4, Availability of recorded Disturbance data in COMTRADE format, 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,
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	<p>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. There is no provision in COMTRADE for storing RMS values, phase angles, or real and imaginary components of a signal. 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. Paragraph R3.2.3 of PRC-002-1 states that DDRs - shall record the RMS value of electrical quantities... 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. Some other file format should be used as a standard; a format suitable for importing into a database would be more practical.</p> <p>10. Regarding Paragraph R5.5, some 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 pending. Many vendors will have to make software enhancements to comply. The compliance footnote #2 should be changed to allow a period of time after the standard is approved, possibly one year later, for facility owners to become compliant with the COMNAMES naming convention.</p> <p>Regarding Paragraph R5.5, it is assumed this only relates to data files that are forwarded by the facility owner to the Regions and not necessarily for files stored on the actual recorders. Add verbage to clarify.</p>
<p>Response:</p>	<ol style="list-style-type: none"> 1. Your suggestion was adopted and is reflected in the revised standard. 2. If magnetic recorders, or any other piece of equipment, in locations specified by the Region and identified as needing a DME, but does not meet the requirements of this standard, the equipment will need to be replaced in accordance with the implementation plan. 3. The typographical error has been corrected. 4. The standard requires the Regions to establish "criteria for events" for DMEs of which DDRs are a part. Due to the various conditions that exist on the system, regional input is necessary to capture the variety of conditions and the type of recording and triggering that can appropriately capture the needed information. 5. The requirement has been reflected in a modified proposed effective date for this requirement. 6. The statement of local time can be simply provided in any form specified by the Region. 7. Your suggested change has been made. 8. The associated standard PRC-018 is being revised to state that the data is to be archived by the facility owner. 9. There are no inherent limitations in the COMTRADE format that prevent its use for exchange of some of the data as you mentioned; however, to provide a complete picture of an event, it may be necessary to supplement the COMTRADE data with some data in another format. The data can be recorded in any format that is reasonable but it must be available and converted to the COMTRADE for exchange. The standard has been revised to indicate "provision for" this format. This will allow the Region to specify the appropriate format depending on type of event and recorder. 10. The intent of the standard is to provide a common basis for naming files for exchange. Recorders do not have to follow this convention but the files retrived from the recorders can be subsequently renamed for exchange.
<p>Southwest Power Pool (SPP) System</p>	<p>See attachments: Word documents - - Phase III & IV Std Comments Parts 1 & 2 (Draft 3 PRC-002-1 & PRC-018-1) SPP Response to NERC.doc</p>

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Protection & Control Working Group (SPCWG)	
Response: Your attachment was appended to this document. See responses to the attachments that are at the end of this document.	
NERC Standards Evaluation Subcommittee	The SES offers no revisions to the proposed standard.

2. Please identify anything you believe needs to be modified before this standard is balloted: PRC-018-1 – Disturbance Monitoring Equipment Installation and Data Reporting

Summary Consideration: Most commenters agreed with PRC-018 as proposed. The functional requirements that had been identified in PRC-002 that should be applied to all DMEs were moved from PRC-002 to PRC-018. This modification will ensure that the DMEs installed in all Regions meet a minimum set of criteria. The requirements that were moved address time synchronization and the ability to retrieve disturbance data.

The levels of non-compliance were modified to more specifically address R2, R4 and R5.

Most other changes were made to improve consistency in format.

John Horakh - MAAC	This is a clarification, not a suggested modification. In the Redline version of PRC-018-1, definitions from PRC-002-1 are provided for reference only in a yellow box, but they are the unmodified definitions. In the Clean version of this standard, these referenced definitions are not included. If the former (inclusion) was desired, the definitions should be modified as in PRC-002-1. If the later (non-inclusion) was desired, there is no correction needed.
Response: The definitions will be removed from PRC-018 – they correct versions will be in both the clean and red line versions of PRC-002.	
SERC EC Planning Standards Subcommittee (G1)	(1). General comment for this standard and other standards. Need consistent format for referencing requirements. For example, [Requirement 1] vs. [R1] vs. [Requirement R1]. (2). Delete the term [power circuit breakers] from the reference to the definition of [Protection System] in the yellow box on page 2.
Response: The format for referencing requirements within a standard is as follows: <ul style="list-style-type: none"> • The first time the requirement is referenced, the phrase, 'Requirement 1' is used. • Each successive time the same requirement is referenced, 'R1' is used. This is the format established by the Director of Standards. The definitions will be removed from PRC-018 – they correct versions will be in both the clean and red line versions of PRC-002.	
Greg Mason - Dynegy	1.Section D2-The calculation of the percent numbers in this section needs to be clarified. Are the referenced %'s calculated for each entity responsible for installation of DME's and providing Recorded Disturbance data?
Response: The levels of non-compliance are always assigned to an individual entity. Your interpretation is correct – but note that there is phased-in compliance.	
Mark Kuras – PJM ISO/RTO Council Kathleen Goodman – ISO-NE	R2/M2, R4/M4 and R5/M5 are not addressed in the levels of non-compliance.
Response: The standard was modified to add levels of non-compliance to address these requirements and measures.	
Southwest Power Pool (SPP) System Protection & Control Working Group (SPCWG)	See attachments: Word documents - - Phase III & IV Std Comments Parts 1 & 2 (Draft 3 PRC-002-1 & PRC-018-1) SPP Response to NERC.doc

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Response: See comments attached to the subject documents.	
NERC Standards Evaluation Subcommittee	The SES offers no revisions to the proposed standard.

3. Do you agree with the proposed implementation plan for PRC-002 and PRC-018? If no, please identify specifically what you feel needs to be modified.

Summary Consideration:

Most commenters indicated support for the proposed implementation plan. The language used to identify the proposed implementation dates was changed from fixed dates (such as January 1, 2007) to a number of months beyond the date the standard is approved by the Board of Trustees (such as 14 months beyond BOT adoption).

Commenter	Yes	No	Comment
Greg Mason - Dynegy		x	1.The dates need to be set relative to when the RRO procedures are approved and issued(i.e. as written the standard assumes 1/1/07 but it may be later than that). 2.The timetable for R1 compliance needs to only be 100% by 4/1/11 for Generation Owners...installation of DME's at Generators will require coordination with plant outages and many plants are on a 3 year outage schedule.
Response: The 'proposed effective dates' for installation of DMEs have been changed so they link to the date regional requirements are issued per PRC-002. PRC-018 has phased effective dates over a four year period beyond the effective dates for PRC-002.			
Southwest Power Pool (SPP) System Protection & Control Working Group (SPCWG)		x	See attachments: Word documents - - Phase III & IV Std Comments Parts 1 & 2 (Draft 3 PRC-002-1 & PRC-018-1) SPP Response to NERC.doc
Response: Please see the response to the comments on the attached document.			
WECC Reliability Subcommittee	x		Effective dates should be tied to approval date rather than hard dates. This is a general comment that should be applied to all standards in the event that development and approval is delayed.
Response: Agreed. The 'proposed effective dates' for installation of DMEs have been changed so they link to the date regional requirements are issued per PRC-002.			
John Horakh - MAAC	x		
SERC EC Planning Standards Subcommittee (G1)	x		
Charlie Fink - Entergy	x		
Mark Kuras - PJM	x		
Ron Falsetti - IESO	x		
Murale Gopinathan – Northeast Utilities	x		
NERC Standards Evaluation Subcommittee	x		
ISO/RTO Council	x		
Thomas Owens - Dominion	x		

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Commenter	Yes	No	Comment
SERC Protection and Control Subcommittee (PCS)	x		
Kathleen Goodman – ISO-NE	x		

Attachments from SPP System Protection & Control Working Group

Date: December 10, 2005

Revised: January 11, 2006

To: sarcomm@nerc.com - - Mark Ladrow

From: Southwest Power Pool System Protection & Control Working Group (SPP SPCWG)

Subject: Phase III & IV Standards Comments:
SPP SPCWG Review Comments (Part 1)
NERC Standards Draft 3 PRC-002-1 & PRC-018-1 (DME's)

The Southwest Power Pool (SPP) System Protection & Control Working Group (SPCWG) has participated in emails and telephone / conference calls to review the NERC draft #3 PRC-002-1 & PRC-018-1 standards, which relate to disturbance monitoring equipment (DME). The proposed new NERC standards were derived from old Planning Criteria. However, the proposed new NERC DME standards have incorporated several additional requirements and more specifics to the older Planning Standards requirements. These changes seemingly result in more restrictive performance mandates that the transmission and generation owners must abide by. The SPP SPCWG is concerned with these revised NERC standards and requests modifications be made to PRC-002-1 & PRC-018-1 that will facilitate compliance.

To support the SPP SPCWG request to have NERC again consider modifications to the draft #3 PRC-002-1 & PRC-018-1, this submittal contains SPCWG email (background) discussions, additional review comments, and an attempt at completing the NERC comment form for draft #3 PRC-002-1 & PRC-018-1.

I. For background information, the following are email excerpts and discussion review comments from various SPCWG members {These SPP review comments will, per footnote, be Word document/file known as Phase III & IV Standard Comments Part 1 (Draft 3 PRC-002-1 & PRC-018-1) SPP Response to NERC.doc}:

1. Comments related to PRC-002-1 & PRC-018-1: I have more questions than answers. I would ask who has Dynamic Disturbance Recorders? How many? Where they are located? Why were they installed, rather than a DFR? When were they installed? I may be wrong, but I am thinking this may be old technology and no one is installing these as a matter of course. Who manufactures them? I have not had manufacturer's representatives come by and try to sell me one. What does one cost? As far as writing up a criteria for the installation of these in the SPP, I would keep it very generic, such as, those lines/locations which have been identified in studies (stability - ???) as prone to power flow swings and/or oscillations or those lines/locations determined by SPP studies requiring out-of-step tripping/protection. What have other RTOs written as far as criteria related to Dynamic Disturbance Recorders and as far as where they are required to be installed, rather than a DFR? Why re-invent the wheel when some other RTO may have already done all of the dirty work.

[Response: This appears to be an email submitted for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018.](#)

2. A. Comments on PRC-002-1 & PRC-018-1: Currently the Southwest Power Pool (SPP) requires Disturbance Monitoring Equipment (DME) based on the necessity to determine system performance and the causes of system disturbances within the region. As defined in the SPP criteria 7.1, DME may include Sequence of Event Recording (SOE), Fault Recording Equipment (DFR), and Dynamic Disturbance Recording Equipment (DDR).

Response: This appears to be an email submitted for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018.

B. The proposed wording of PRC-002-1 alludes to requiring SOE and DDR regardless of a region's necessity for such equipment. It is the SPP's concern that the detailed requirements in PRC-002-1 could ultimately require members to install expensive equipment that may not be needed in the region to sufficiently determine system performance and the causes of system disturbances within the region. For example, in R1.2 it is proposing to require SOE to be synchronized to four milliseconds. While this may be appropriate for very select locations, it may not be practical at large quantities of substations. Other examples are in R3.1 and R3.2 discussing proposed DDR requirements. The configuration of the SPP system has led to very little, if any, experience with DDR's having a resolution of 1600 samples per second that continuously store at 6 records per second. It is felt that DDR's should be required only if system studies identify locations that are likely to cause system stability issues.

Response: R1.1.1 indicates that each Region will identify criteria for the installation of equipment. There is no intention to require installation of equipment where it is not needed. Each Region needs to establish criteria that is relevant to that region. The blackout investigation was hampered by the fact that existing disturbance monitoring equipment wasn't time synchronized in a manner that allowed investigators to easily reconstruct the sequence of events related to the blackout. One of the Planning Committee's task forces made specific recommendations for improvements to PRC-002 and PRC-018 to improve the ability to investigate system events.

C. Another area of concern (of the proposed standard requirements) is R5.5, which is proposing to require data files to be named in conformance with IEEE C37.232. Unless vendors conform to this standard, each file would need to be renamed. SPP feels that given a system disturbance, that data can be adequately identified without such file naming.

Response: The intent of the standard is to provide a common basis for naming files for exchange. Recorders do not have to follow this convention but the files retrieved from the recorders can be subsequently renamed for exchange.

3. Attached is our first review of the SPP Criteria 7.1 compared to the proposed NERC PRC-002-1 and PRC-018-1. We have included DDR into the SPP criteria and expanded the "disturbance" definition to match that of NERC. We deleted the requirement to record waveforms. Waveform recording is not mentioned in PRC-002 or PRC-018 and should not be required. Also, the SPP criteria tried to lump all DME into similar requirements. This does not work well for SER. Therefore; we attempted to separate certain SER requirements from the DFR and DDR requirements.

Response: This appears to be an email submitted for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018. Note that whatever 'attachment' is referenced in this comment, there was no attachment provided with these comments.

4. A. It appears the SPP region may be immediately out of compliance, if the draft #3 PRC-002-1 & PRC-018-1 are adopted, as presently proposed. The SPP region believed from the old NERC Planning Standards that any combination of several different classes of equipment might be utilized as disturbance monitoring equipment (DME) devices. Under the old DME requirements, the region was not required to have individual boxes and reporting for each SOE, DFR, and DDR device. The standards, as drafted, appear to mandate that the region must report on and have differing single device DME equipment to provide SOE's, DFR's, & DDR's. SPP's existing criteria, that specifies at very specific locations, one box, high end DFR/DDR equipment with channel capacity to monitor several lines at a substation, will not meet the new dynamic disturbance recorder (DDR) requirement proposed. Existing SPP DME equipment should be grandfathered, as acceptable DDR devices. Since existing SPP region DME's usually [a] have "triggered" event capture devices instead of a device with "continuous" capturing of data,

[b] have data sampling at least 64 samples per cycle instead of 26-2/3 samples per cycle (1600 samples per second), [c] have Comtrade data format for newer disturbance monitoring equipment (DME), but not for older DMEs, [d] have oscillograph displays for current and voltage waveforms including status sequence for various inputs, [e] have time stamping but possibly not have the 1 millisecond time stamping resolutions proposed, it should not be reasonable to exclude these historical high end DFR's as DDR devices.

Response: The intent of the standard was not to install specific types of equipment but rather provide for specific functional capability, regardless of the type of equipment. The standard has been revised to indicate functional requirements.

The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear. The intent of having a standard naming convention is to make the file contents clear to the person trying to reconstruct an event.

B. SCADA systems with SOE synchronized to 5 milliseconds should be acceptable.

Response: The standard sets the functional requirement that the time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. SCADA was not originally designed to meet the purpose of this standard. It was designed sometime ago for other purposes and monitoring of far more equipment.

It is noted that the PRC-002-1 R1.1.2 references “protection system” devices to be monitored by SOE equipment. Since the protection system by definition does not include breakers, does this mean that breakers may be excluded from SOE reports? Protection engineers often utilize the breaker operating sequences to determine whether or not correct protection occurred for events on the power system. Breaker SOE information should be a part of the information from sequence of event records.

Response: The standard does not specify the pieces of equipment to be monitored and leaves that to the Region.

C. It is recommended that PRC-002-1 requirement R3.2.1 be dropped from the proposed standard. This requires in three years after Board of Trustees (BOT) adoption, capability for continuous recording. If continuous recording is not standard practice within the industry today, how can one assume that in three years multiple vendors will have DDR equipment proven to perform this requirement? If technology today is centered on continuous monitoring with triggered event recordings, how can a requirement be based upon emerging products? It is possible that technology will develop further and it may become reasonable to expect continuous recording. At that time the NERC reliability standard should be updated to reflect the requirement to changed technology.

Response: The changes made to the standard recognize that some DDRs don't provide continuous recording. The requirement that referenced 'continuous' did apply only to the subset of DDRs that provide continuous recording. Note that the drafting team modified this requirement to clarify that all DDR systems must have the capability of having data stored for at least 10 days – and modified the implementation plan to state that compliance with this requirement (in PRC-018) will not be required until 2008.

A similar philosophy should be taken with the naming convention. The draft IEEE naming convention still is probably a moving target as far as exactly what format the name will assume. Also, I do not believe that most manufacturers of equipment have implemented this naming convention into their products. Adding this requirement in a new standard appears to require manual processing at this time. I do not know how the industry encourages movement towards new and improved technologies, but to mandate developing/emerging technologies be implemented when there are product development cycles going on seems unfair, especially if financial penalties may be imposed for non compliance. Are there other methods that would encourage implementing emerging technologies without the fear of becoming non-compliant because products have not been fully developed and expectations are moving targets? Is it

possible that the standards might have a desired (not required) performance for good utility practices that are really emerging technologies and that, when the bugs are worked out, then the standard could become a requirement. However, it is recognized that such desires, if not a requirement, will probably not be implemented at many companies.

Response: The intent of the standard is to provide a common basis for naming files for exchange. Recorders do not have to follow this convention but the files retrieved from the recorders can be subsequently renamed for exchange.

Also a concern of the naming convention, is that companies may not desire to disclose precise location (longitude & latitude) and manufacturer information about their microprocessor protection-fault locating relays (DFR's) and/or DDR's. Since this sensitive information knowledge, if made available to the public, might enhance exposure to terrorist damage to the facility or aid in unauthorized device entry and subsequent disabling of or reprogramming of the device.

Response: Critical data can be made available subject to confidentiality agreements. The standard is not intended to force critical disclosure.

D. My company does not have any one box, substation/power plant, high end DFR event triggering, disturbance monitoring equipment (DME's), as defined by the SPP criteria. However, my company does have a SCADA system with time stamping features at all of its substations. It also has several fault locating relays on individual transmission lines, autotransformers, and buses. The newer fault locating relays with GPS time synchronizing may be wired and programmed to trigger similar to a DFR device, while the older relays are normally only fault type relays. A few of these relays do have 64 samples per cycle monitoring with triggered events and SER time stamping. Only about 6 lines out of about 50 on my company's transmission system are not covered by a fault-locating relay, on at least one end of the line. However, per SPP criteria today, these (fault locating relays and SCADA systems) are not reportable DME devices. Under the proposed NERC PRC-002-1 and PRC-018-1 draft standards these devices may become reportable. However, due to the magnitude of reporting on all microprocessor relays, it is preferred that these devices not be required to all be reported (as DFR's) under the draft NERC PRC-002-1 & PRC-018-1 standards. SPP existing criteria realized that microprocessor fault locating relays were included in the relay portion of the criteria, and that relay maintenance, testing, and tracking were covered so that separate redundant DME reporting was not necessary, if a relay provided DME functionality.

Realizing there are hundreds of fault locating relays (there were more than 10,000 terminals at 345kV when the zone 3 issue was reported upon), separate reporting of these, as DME and relay devices will significantly impact reporting and costs. NERC should permit combining of the DME reporting with the relay reporting, if the DME device is a fault-locating relay. Again it would be nice if the DFR relay report does not require the detail described in the draft standard, since knowledge made too public may result in less security, but if enough detail is not provided then how does one confirm reliability enhancement adequacy of the DFR device? SPP realized that most utility companies utilize a SCADA system with SOE capabilities, and that there is in general no routine/repeatable SCADA maintenance performed. NERC should not require periodic maintenance testing of SCADA, since it is commission tested and it is somewhat self monitoring in that SCADA either functions or it does not function. SPP in their protection equipment did not require companies to list and report on their SCADA equipment (master unit, RTU's, and software formats), unless it was considered a part of the special protection applications. Only two companies within SPP indicated they have stand alone SOE devices at a substation, and then only at a couple of locations. Some companies, in addition to the SCADA SOE capability, have programmed microprocessor relays and DFR equipment to provide SER data.

Nothing was mentioned about permitting the transmission inter-connection high-end, microprocessor revenue meters &/or power quality monitors to be classified as DFR devices. It is recommended that such meters and PQ monitors be allowed as DFR devices, if programmed and wired/set up to provide the DME information NERC desires.

Response: The standard has been revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.

E. It was recognized that that for the fault locating (DFR) functions, most companies were using digital relays capable of displaying fault data and current /voltage waveforms. The relays provided adequate information for most line operations and for many planning studies & verifications. SPP may have assumed from NERC's old Planning Standards that the high-end DFR devices were needed for the planning engineers and for verification of modeling information, especially for swing conditions or if fault locating relays malfunctioned. Thus the SPP criteria only requires high end DFR's. (see SPP Criteria 7.1) However, it now appears NERC may not require the higher sampling rates common in DFR one box disturbance monitors. Instead they seem to want continuous recording, which is not readily available in the marketplace. Some NERC clarification is needed so the regions understand how to respond and react.

Response: The standard has been revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided. The standard only specifies the minimum requirements and the Region can always state more stringent requirements.

5. In the old NERC planning criteria the sequence of events recorders (SOE's), fault recorders (DFR's), and dynamic disturbance recorders (DDR's) were thought by SPP to be grouped together as a system of disturbance monitoring equipment (DME's) that provided system-monitoring capabilities. The combined devices are connected to the power system for the purpose of monitoring performance of the system. Some devices may include fault data, disturbance data, and SOE data. The SPP took a different approach to the old planning criteria than that is apparently proposed by the new reliability standard. Individual reporting (list of equipment) on each 100kV and above monitoring device was not a SPP region requirement. SPP did not require listing of some equipment and reporting, since fault locating relays were addressed in the relay section of the criteria and SCADA systems really did not have routine maintenance activities. SPP desires that NERC does not require separate reporting for three classifications of DME equipment: SOE's, DFR's, and DDR's. Some devices may do all of these functions and thus (per the proposed DME standard) may need to be listed in three different DME reports, and other reports such as relay reports. Is there a method to permit all DME's to remain under only one reporting mechanism and also permit the reporting of various devices to be streamlined?

Response: The standard has been revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided. The standard only specifies the minimum requirements and the Region can always state more stringent requirements.

The SPP region recognized that existing older facilities would be somewhat exempt from forced equipment replacement on 100kV and above, i.e. that grandfathering of existing equipment was permissible for the most part. SPP also recognized for new transmission and generation construction projects that about every company was installing microprocessor relays with fault recording capabilities and SCADA systems with SOE capability for major events such as breaker operations or device 86 lockout conditions. The various SPP protection engineers use the relay fault data/records and SCADA data/records to analyze their transmission system operations. It was recognized that equipment sampling rates (4, 16, 64, etc., samples per cycle) and time stamping resolution [5, 4, 1, etc. millisecond, or microsecond(s) within a device and/or synchronized to a report] differed somewhat among entities. However, for routine fault analysis each SPP member felt they generally had adequate recording equipment for fault analysis on [a] new facilities being built and [b] when upgrading older electromechanical relay equipment to microprocessor relay equipment. When necessary, SPP (& other

region) engineers have exchanged event records to help each other evaluate system operations and performance during disturbances. It was recognized that different companies within SPP may have different types of “equipment, records, and reporting”, but that each company’s parties coordinated to evaluate the differences so that wide area disturbance analysis and reporting may be facilitated.

It was SPP’s interpretation of the old DME planning criteria that NERC was actually requesting that the regions respond to the “high end DFR type of equipment”, so that across the region, and region to region, that fault disturbance analysis might be improved and planning departments might have dynamic disturbance captured data to study power swings. The SPP criteria 7.1 for DME’s indicate specific requirements and locations, which were to be regionally identified. (See SPP DME Criteria 7.1 and location excerpt below.) Most SPP companies that used the DDR’s assumed them to be one box DFR equipment monitoring with event triggering type of application and DFR to be rated at least 64 samples per cycle and 30 cycles of data (some pre-fault or pre-disturbance and some post-disturbance). Some SPP members did not have any DDR equipment, as defined by SPP Criteria. The SPP region did not specifically require all fault locating relays to be tabulated. Some members within the region may have this relay fault locating information in a tabulation or represented on one line system drawing(s), whereas others may not have developed the fault locating relays as a DME database structure.

Because of the magnitude of the devices and locations, the SPP region did not require a listing of, and a maintaining of the list for, all SOE equipment and all fault-locating equipment. Only this type of equipment needed to be reported at designated locations, which per SPP Criteria 7 are significant facilities defined as: “Disturbance Monitoring Equipment will be required at all new EHV substations, operated at 345kV or higher, and all new generating stations of 400 MVA or greater placed in service after January 1, 2002. In addition, any new substation placed in service after January 1, 2002 containing six (6) or more lines operating at 100 kV and above will be required to have DME. However, when additional lines placed in service after January 1, 2002 are added to an existing substation that results in six (6) or more total lines, then DME shall be required for monitoring all elements within the substation as defined in 7.1.1. These requirements may be waived at SPP’s discretion, if DME is already located at an adjacent substation.”

[Response: This appears to be an exchange of information for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018. Previous responses address a number of comments regarding use of SCADA, variety of equipment, past practices and more stringent Regional requirements. This standard has been revised to make the functional requirements more clear.](#)

Remember that for zone 3 NERC Recommendation 8a review for 230kV and above lines, there were 10,000 plus terminals. Add to this [a] redundant fault locating relays on a terminal and [b] all the beyond zone 3 related DME equipment to track and report on, and it is apparent the significant amount of work that may become necessary annually just for reporting purposes. For NERC to dictate a database segregated by each type of DME device and of the magnitude seems unnecessary embellishment and contributes to operating cost increases.

[Response: PRC-018 merely continues the practice established by the old Planning Measurements since 2001. To perform an effective analysis, location of monitoring is important.](#)

Within SPP there are very few, if any, DDR’s that trigger to record for 1600 samples per second and at a rate of 6 records per second. To my knowledge and the remaining SPCWG knowledge, within SPP there are not any DDR devices that record continuously.

[Response: The standard has been written to provide requirements necessary for system reliability. Compliance is needed to ensure this reliability.](#)

SCADA typical time stamping resolution is about 5 milliseconds, not 4 milliseconds, although some SCADA time stamping may meet the 1-millisecond requirement. Not all SCADA alarms points are defined as SOE's. Typically SCADA SOE points are selected for breaker 52a contacts (open & close) and device 86's (lockouts). SOE's may be in a relay, a DRF device, SCADA record, or separate piece of equipment.

Response: The standard sets the functional requirement that the time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. SCADA was not originally designed to meet the purpose of this standard. It was designed sometime ago for other purposes and monitoring of far more equipment.

In the draft PRC-002-1 standard there is reference to "elements to be monitored" (DFR'S) versus "protection system devices to be monitored" (DDR's). There is a subtle difference in required monitoring between DFR and DDR. Is that intentional by NERC?

Response: Yes, it is intended.

The proposed PRC-002-1 standard R2.1.3 requires certain electrical quantities to be recorded ...sufficient to determine : three phase to neutral voltages, three phase and neutral currents, polarizing currents and voltages (if used), frequency, megawatts and megavars. Most fault locating relays will easily capture and display three phase to neutral voltages, three phase and neutral currents, but the other items are not generally a direct output of the relay and must be derived. Significant manpower may be required to provide this derived data, if it is requested as a result of a standard. Polarizing voltages are generally developed within the microprocessor relay and may not be capable of being easily derived. Although polarizing currents may be input to a microprocessor relay, these currents may not be easily displayed by the relay. Likewise, although frequency, watts, and vars may be shown by the relay's meter display, these quantities are not generally direct event outputs from a fault locating relay or DFR device. It is recommended the NERC standard only require the typical quantities available from a microprocessor relay or DFR device, i.e. three phase to neutral voltages, three phase and neutral currents. Again manufacturers should be made aware of NERC's desire for the other quantities to be direct outputs from relays/DRF equipment and work toward new technology that provides this information. Once the product development cycle has matured and there are ready to use, off the shelf materials from multiple vendors that can be specified and purchased, only then NERC should consider adding the requirement for polarizing currents, polarizing voltages, frequency, megawatts and megavars. The SPP does not desire to have the PRC requirements to derive values for frequency, megawatts, megavars, polarizing voltages or polarizing currents. It is preferred that when the technology is widely available in various manufacturers' products to directly capture this information that NERC then add these requirements.

Response: The standard indicated that the information need not be recorded directly but must be monitored in such a way that it can be determined.

PRC-002-1 requirement R7 appears to require the Regional Reliability Organization (RRO) to provide its requirements for DME's to TO's and GO's within 30 days of approval of the NERC standard. This is much too fast a response by the RRO. The SPP SPCWG only meets about two times a year and whatever SPP Criteria changes are to be implemented because of NERC standards must be approved by the SPP Market and Operating Policy Committee (MOPC) at one of their quarterly meetings. There may be a six-month to one-year lag time to permit RRO to react to changing Criteria. Then there needs to be more lag time for projects already under design, procurement, and/or construction by the TO's and GO's. If the NERC standard is indicating that once the region has reviewed the NERC requirements and updated the SPP criteria, and then SPP has 30 days to notify the SPP members, such a 30 day notice arrangement is acceptable.

Response: The proposed effective date for PRC-002 and PRC-018 has been revised to reflect timing between the Regional requirements issuance and owner compliance.

6. Looking at PRC-002-1: I would like to say that PRC-002-1 appears to be very thorough. It should be sufficient to reduce the possibility of misinterpretation and subsequent errant situations by the Regional Reliability Organization and Transmission Owners. I feel that is desirable. However, as I am a layman in several aspects of Disturbance Monitoring Equipment (such as SER and DDR equipment), I can not tell you if these requirements are "real world available today". That is, I wouldn't know if these requirements (what, where, how, when) are fully practical and functional. Essentially I have some concerns:

1. I question whether we (Transmission Owner and/or Reliability Organization) will now be able to comply or will not comply.
2. If we were to find that we were not compliant, I can not well say what it would take to become compliant and I can't tell you how much it would cost the to become compliant and
3. I can not say how much it would cost to maintain compliance (if being compliant requires enhanced equipment, or enhanced processes).

Response: This appears to be an email submitted for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018.

Looking at PRC-018-1: As noted above, I would like to say that PRC-018-1 appears to be very thorough. It should be sufficient to reduce the possibility of misinterpretations and subsequent errant situations by the Regional Reliability Organization and Transmission Owners. I feel that is desirable. In summary:

I note a strong reliance on individual Transmission Owner (TO) rather than the Region Reliability organization. The TO will need to get fully cognizant of what he needs to record, how he needs to report, when he needs to report and how long to keep records and reports.

Also I note that a significant part of the measures are somewhat trivial. In moment-by-moment confidence of whether you are in compliance. Sufficient evidence appears to be, at minimum, a copy of the email note you sent to SPP saying you are in compliance.

Yet, it seems to be nontrivial in that you need precise documentation that you said what you comply or don't comply (where an expert would need to be capable and be available to respond to "self-certification inquiries" as required). In other words, I think the Transmission Owner may need to funnel issues of compliance through the expert and not let anyone else in his organization "knee jerk reply" on these questions of compliance. I expect that they may float in unexpectedly rather than on a planned periodic basis.

Response: This appears to be an email submitted for discussion within SPP, and does not make recommendations for specific changes to PRC-002 or PRC-018.

II. For NERC format reporting of SPP review comments see separate Word document/file known as Phase III & IV Standard Comments Part 2 (Draft 3 PRC-002-1 & PRC-018-1) SPP Response to NERC.doc}:

Response: Please see the responses added to the comments.

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

Standard Sections	NERC Draft 3 Standard Description	Agree	Disagree	Modifications Desired
A	Introduction - - PRC-002-1	Yes		See attached supporting Word file with general comments that further explain the SPP review of this draft standard.
Response: See responses to comments on attached word file.				
1	Title Define Regional Disturbance Monitoring and Reporting Requirements	Yes		
2	PRC-002-1	Yes		
3	Purpose: Ensure that Regional Reliability Organizations establish requirements for installation of Disturbance Monitoring Equipment and reporting of Disturbance data to facilitate analyses of events.	Yes		
4	Applicability	Yes		
4.1	Regional Reliability Organization.	Yes		
5	Proposed effective date: January 1, 2007.	Yes		Conditional on NERC standard implementation on timely basis (Adopted by NERC by targeted April 6, 2006 date and that DDR requirement is revised to be triggered events) . See Word file comments.
Response: The 'effective dates' on the standards were revised so they are a number of months or years beyond the BOT adoption date. See responses to comments on attached word file.				
B	Requirements	Yes		
R1	The Regional Reliability Organization shall establish the following installation requirements for sequence of event recording equipment:	NO	X	Separation of SOEs, DFR, and DDRs seem to imply that all these devices must be individually installed and reported upon. Various single devices may include the SOE and DFR functions. The older planning standard permitted greater flexibility.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.				
R1.1	Location & Monitoring requirement, including the following:	Yes		
R1.1.1	Criteria for equipment location (e.g. by voltage,	Yes		

Consideration of Comments on 3rd Draft of PRC-002 and PRC-018

		geographic area, station size, etc.).			
R1.1.2		Protection System devices to be monitored	Yes		Add breakers as devices to be SOE monitored.
Response: The standard does not provide a list of devices to be monitored – this is up to the Region to specify.					
R1.2.		Equipment requirements, including the following	Yes		
R1.2.1		Each device shall record events with a resolution of one millisecond or better.	Yes		Acceptable provided existing SCADA systems with 5 milliseconds resolution are grandfathered as meeting requirements.
Response: The standard sets the functional requirement that the time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. SCADA was not originally designed to meet the purpose of this standard. It was designed sometime ago for other purposes and monitoring of far more equipment.					
R1.2.2		Each device shall be synchronized to within four milliseconds of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.	No	X	Time Sync to 5 milliseconds, not 4. Most manufacturers should ensure that their SOE/DME/DDR's have the capability to express time stamping like NERC desires before making such a requirement. Most SPP companies are using their local time and that should not be an exception to the standard.
Response: The time synchronization requirements were consolidated and moved to PRC-018 to ensure that they would be consistent across all Regions. The revised requirements state:					
<ul style="list-style-type: none"> • The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. • Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated. 					
R2		The Regional Reliability Organization shall establish the following installation requirements for Fault Recording Equipment:	Yes		
R2.1		Location, monitoring and recording requirements, including the following:	Yes		
R2.1.1		Criteria for equipment location (e.g. by voltage, geographic area, station size, etc.).	Yes		
R2.1.2		Elements to be monitored at each location	Yes		Provided that additional CT's, VT's, CCVT, etc are not required to be added just to meet this disturbance standard, i.e. if normal protection or

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					metering do not require the sensing equipment to be installed, then this standard should not be applied just to acquire DME monitoring. For example in a breaker & a half scheme there may only be one voltage sensing device for sync check and the disturbance standard shall not be used to force use of three CCVT's
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					
R2.1.3		Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:	Yes		
R2.1.3.1		Three phase to neutral voltages	Yes		
R2.1.3.2		Three phase currents and neutral currents	Yes		
R2.1.3.3		Polarizing currents and voltages, if used	No	X	Relays with fault recording features may not easily provide polarizing current and voltage magnitudes and/or waveform information. Voltage polarization is probably not a separate VT input to a relay today, i.e. this function is performed inside the relay. If these are to be required quantities then manufacturers should develop proven relay products that yield the information NERC is requesting. If DFRs (not relays) are used, the recording of polarizing currents, if used, is not a concern.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					
R2.1.3.4		Frequency	NO	X	This is not a normal output of a DFR or relay when a disturbance event is captured. It should not be a requirement for a manual process to be used to determine frequency when an event occurs. If frequency is to be a required quantity for a captured event, then manufacturers should develop proven products that yield the information NERC is requesting
Response: The Region may not require the installation of any DFRs – but if DFRs are required, they must have this capability. Note that this is not necessarily an 'output' - R2.1.3 states that electrical quantities to be recorded for each monitored element have to be sufficient to determine frequency.					

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R2.1.3.5		Megawatts and megavars	NO	X	These are not normal outputs of a DFR or relay when a disturbance event is captured. It should not be a requirement for a manual process to be used to determine watts and vars when an event occurs. If watts and vars are to be required quantities for captured events, then manufacturers should develop proven products that yield the information NERC desires.
<p>Response: The Region may not require the installation of any DFRs – but if DFRs are required, they must have this capability. Note that this is not necessarily an ‘output’ - R2.1.3 states that electrical quantities to be recorded for each monitored element have to be sufficient to determine megawatts and megavars.</p>					
R2.2		Equipment requirements, including the following	Yes		
R2.2.1		Recording duration requirements.	Yes		
R2.2.2		Minimum sampling rate of 16 samples per cycle.	Yes		
R.2.2.3		Each device shall be synchronized to within four milliseconds of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.	NO	X	Time Sync to 5 milliseconds not 4. Most vendors should ensure that their SOE/DME/DDR have the capability to time stamp like NERC desires before making such a requirement. Most SPP companies are using their local time and that should not be an exception to the standard.
<p>Response: The time synchronization requirements were consolidated and moved to PRC-018 to ensure that they would be consistent across all Regions. The revised requirements state:</p> <ul style="list-style-type: none"> • The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. • Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated. 					
R2.2.4		Event triggering requirements	Yes		
R.2.2.5		Data retention capabilities (e.g., length of time data is to be available for retrieval).	Yes		
R3		The Regional Reliability Organization shall establish the following installation requirements for Dynamic Disturbance Recording (DDR) Equipment1:	NO	X	The definition of DDR as continuous recording devices is a deviation from old planning standards. Almost all of SPP's DME devices are triggered event type of equipment. Continuous monitoring and continuous recording thereto has not been proven in

					the marketplace to SPP's knowledge. The region will immediately be out of compliance if continuous recording is required. Considering that financial penalties may occur for non compliance, it is not desirable to have a mandate that requires continuous recording based upon adoption of new technology &/or IEEE standards, when the products in the marketplace have not been proven and established long enough for wide acceptance. If the DDR were to relate to the one box, high end DRF recorders with triggered events of say about 30 cycles SPP has no objections. NERC needs to consider how to move the industry towards new technologies without the fear of financial penalties. Many new products must progress through a product development cycle before they become viable.
<p>Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided. Note that the Region may not require the installation of any DDRs, but if they are required, they must meet the minimum set of criteria identified.</p>					
R3.1		Location and monitoring requirements including the following:	Yes		
R3.1.1		<p>Criteria for equipment location giving consideration to the following:</p> <ul style="list-style-type: none"> • Site(s) in or near major load centers • Site(s) in or near major generation clusters • Site(s) in or near major voltage sensitive areas • Site(s) on both sides of major transmission interfaces • A major transmission junction • Elements associated with Interconnection Reliability Operating Limits • Major EHV interconnections between control areas • Coordination with neighboring Regions within the interconnection 	Yes		
R3.1.2		Elements and number of phrases to be monitored at each location.	Yes		Correct phrases to phases
<p>Response: This typographical error was corrected.</p>					

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R3.1.3		Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:	NO	X	Consider deleting reference to – sufficient to determine the following. Instead state: Electrical quantities to be recorded for each monitored element shall be:
Response: The original language allows greater flexibility in meeting the requirement with a wider array of devices, so this recommendation was not adopted.					
R3.1.3.1		Voltage and current	Yes		Voltages and Currents are typical outputs of DFR type devices.
Response: These electrical quantities don't need to be outputs – but the device(s) used must be capable of determining voltage and current.					
		frequency	NO	X	Although frequency may be a meter displayed quantity within a device, frequency is not typically a captured event output of a DFR device or relay. Manufacturers need to implement new technology to provide frequency as a direct quantity recorded and outputted. NERC should not require manual derivation of this quantity. If absolutely needed, it is recognized that frequency is probably derivable, but at a significant manpower cost.
Response: Frequency doesn't need to be an output – but the device(s) used must be capable of determining frequency.					
R3.1.3.2		Megawatts and megavars	NO	X	Watts & vars are not typically captured event outputs of a DFR device or relay. Manufacturers need to implement new technology to provide watts & vars as a direct quantity recorded and outputted when an event is captured. NERC should not require manual derivation of these quantities. If absolutely needed, it is recognized that watts & vars are probably derivable, but at a significant manpower cost.
Response: These electrical quantities don't need to be outputs – but the device(s) used must be capable of determining megawatts and megavars.					
R3.2		Equipment requirements, including the following:	Yes		
R3.2.1		For installations effective three years after Board of Trustee adoption, capability for continuous recording.	NO	X	Technology/equipment needs developed and proven before it is a mandated requirement. There may be significant technology improvements needed (working out of equipment performance and reporting bugs, etc.) before compliance may be met and how will financial penalties be handled for non-compliance when technology has not caught up with

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					desires?
<p>Response: This capability does exist. The intent in phasing this in over a number of years was to give entities time to acquire and install the devices.</p>					
R3.2.2		Each device shall be time synchronized to UTC within four milliseconds. The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.	NO	X	Time Sync to 5 milliseconds, not 4. Most vendors should ensure that their SOE/DME/DDR's have the capability to time stamp like NERC desires before making such a requirement. Most SPP companies are using their local time and that should not be an exception to the standard. Older DME 's that may not have this accuracy in time stamping should be grandfathered as acceptable devices.
<p>Response: The time synchronization requirements were consolidated and moved to PRC-018 to ensure that they would be consistent across all Regions. The revised requirements state:</p> <ul style="list-style-type: none"> • The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. • Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated. 					
R3.2.3		Each device shall sample data at a rate of at least 1600 samples per second and shall record the RMS value of electrical quantities at a rate of at least 6 records per second.	Yes		Acceptable provided continuous recording DDR equipment is proven technology by multiple manufacturers and readily available in the marketplace today.
<p>Response: This capability does exist. The intent in phasing this in over a number of years was to give entities time to acquire and install the devices.</p>					
R4		The Regional Reliability Organization shall establish the following requirements for the storage and retention of the Disturbance data for specific system Disturbance events.	Yes		
R4.1		Continuously recording DDRs installed after January 1, 2008 shall retain data for at least ten days.	NO	X	It is believed that NERC required external triggering in the old planning standards. Thus permit, but not require, continuous recording. However, furnish some clarifications on what & how data capturing should differ if continuous recording is required. There is confusion regarding whether or not DDR waveform capturing is required and if additional data capturing is required if utilizing continuous recording

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					and an event occurs that should have more frequent documentation of measured quantities.
<p>Response: The data retention requirements were consolidated and moved to PRC-018 to ensure consistency across all regions. The requirement to retain data for 10 days ensures that there is data to analyze events.</p>					
R4.2		All captured DME data for Regional Reliability Organization-identified events shall be archived for at least three years.	Yes		
R5		The Regional Reliability Organization shall establish requirements for facility owners to report Disturbance data recorded by their DME installations. The data reporting requirements shall include the following:	Yes		
R5.1		Criteria for events that require the collection of data from DMEs.	Yes		
R.5.2		List of entities that must be provided with recorded Disturbance data.	Yes		
R5.3		Timetable for response to data request.	Yes		
R5.4		Availability of recorded Disturbance data in COMTRADE format (in conformance with IEEE Std. C37.111-1999 or its successor standard).	Yes		Provided this Comtrade format requirement is readily available in multiple products and the requirement is applicable for only new installations and existing equipment not meeting the Comtrade format is grandfathered as acceptable.
<p>Response: The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear. The intent of having a standard naming convention is to make the file contents clear to the person trying to reconstruct an event.</p>					
R5.5		Naming of data files in conformance with the IEEE Recommended Practice for Naming Time Sequence Data Files (C37.232)2.	NO	X	Consider deleting this naming requirement. File naming, per IEEE standard, is not readily available and proven in most products that exist today. Although there may be an IEEE standard, the standard is new enough that products have not been fully developed with consistent naming provisions. There may be some concerns of security of information given to outside parties, if too precise of a location and type of equipment is furnished in the naming convention. SPP companies have not had many issues with existing file names, but we have not had to evaluate large-scale regional blackouts

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					either.
Response: A footnote was added to clarify that compliance with this requirement is delayed until the IEEE standard is approved.					
R5.6		Data content requirements and guidelines.	Yes		
R6		The Regional Reliability Organization shall establish requirements for DME maintenance and testing.	Yes		However, SCADA systems, having SOE functionality, should not require any routine maintenance testing. Protective relays used as DFR devices should only be required to be tested, maintained, & reported under the relaying standards, so that testing, maintenance, & reporting redundancy is not required by the DME standard. When reviewing frequency of testing, one should evaluate self-monitoring DMEs capability to automatically report to SCADA any malfunction problems. This might permit extending or possibly eliminating the period for testing and maintenance.
Response: The standard sets the functional requirement that the time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. SCADA was not originally designed to meet the purpose of this standard. It was designed sometime ago for other purposes and monitoring of far more equipment.					
R7		The Regional Reliability Organization shall provide its requirements (and any revisions to those requirements) including those for DME installation; Disturbance data reporting; Disturbance data storage and retention; and DME maintenance and testing to the affected Transmission Owners and Generator Owners within 30 calendar days of approval of those requirements.	Yes		Acceptable provided the RRO (SPP) has adequate time to review NERC standards, then develop and have approved more detailed SPP criteria that supports the NERC requirements.
Response: The drafting team has no control over SPP processes.					
R8		The Regional Reliability Organization shall periodically (at least every five years) review, update and approve its Regional requirements for Disturbance monitoring and reporting.	Yes		
C		Measures	Yes		
M1		The Regional Reliability Organization's requirements for the installation of Disturbance Monitoring	Yes		Would like to see PRC-002-1 requirements 1, 2, & 3 combined under only one requirement. Disturbance

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		Equipment shall address Requirements 1 through 3.			monitoring is a system of equipment that may or may not include a separate sequence of equipment device. The SOE may be associated with SCADA/RTU equipment or it may be a part of the DFR record or microprocessor relay event. Consider moving the DDR continuous recording requirement to the new standard that will address Phasor Monitoring Units. Both DDR's (continuous recording) & PMU's are relatively new technology issues.
Response: Industry commenters have already expressed their support for the separation as shown in the standard. In addition the standard has been revised to state that PMUs may be used provided they meet the functional requirements in the standard.					
M2		The Regional Reliability Organization's requirements for storage and retention of Disturbance data shall include all elements identified in Requirement 4.	Yes		
M3		The Regional Reliability Organization's Disturbance monitoring data reporting requirements shall include all elements identified in Requirement 5.	Yes		Except that new standard should consider eliminating the file naming format.
Response: The file naming format won't be required until the associated IEEE Standard is approved.					
M4		The Regional Reliability Organization shall have requirements for the maintenance and testing of DME equipment as required in Requirement 6.	Yes		Except redundant testing, maintenance, and reporting should not be required if a DME (such as microprocessor relay used as a DFR) is tested, maintained and reported upon under a different standard.
Response: This is for the Regions to determine. The commenter is encouraged to participate with the Region.					
M5		The Regional Reliability Organization shall have evidence it provided its Regional Disturbance monitoring and reporting requirements as required in Requirement 7.	Yes		
M6		The Regional Reliability Organization shall have evidence it conducted a review at least once every five years of its regional requirements for Disturbance monitoring and reporting.	Yes		
D		Compliance	Yes		
1.		Compliance Monitoring Process	Yes		
1.1		Compliance Monitoring Responsibility NERC	Yes		

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1.2		Compliance Monitoring Period and Reset Timeframe One calendar year.	Yes		
1.3		Data Retention The Regional Reliability Organization shall retain documentation of its DME requirements and any changes to it for three years. The Compliance Monitor will retain its audit data for three years.	Yes		
1.4		Additional Compliance Information The Regional Reliability Organization shall demonstrate compliance through providing its documentation of Disturbance Monitoring and Reporting requirements or self certification as determined by the Compliance Monitor.	Yes		
2		Levels of Non-Compliance	Yes		
2.1		Level 1: There shall be a level one non-compliance if either of the following conditions exist:	Yes		
2.1.1		Disturbance reporting requirements were not specified as required in R5.1 through R5.5.	Yes		Except for grandfathering old DMEs without Comtrade formats & except for IEEE standard for naming data files.
<p>Response: The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear. The intent of having a standard naming convention is to make the file contents clear to the person trying to reconstruct an event.</p> <p>Compliance with the file naming requirement isn't required until the IEEE Standard is approved.</p>					
2.1.2		DME maintenance and testing requirements were not specified.	Yes		Except allow for reference to a relay testing and maintenance record if the DFR data is acquired from a relay. Eliminate redundancy in testing and maintenance if a device has multiple uses and is tested under a differing standard.
<p>Response: This is for the Regions to determine. The commenter is encouraged to participate with the Region.</p>					
2.2		Level 2: There shall be a level two non-compliance if any of the following conditions exist:	Yes		
2.2.1		Equipment characteristics were not specified for one or more types of DMEs	NO	X	SPP desires to recognize: a system of devices provide the DME data, separate SOE boxes/equipment are not necessary considering this is available as a part of other equipment, and that

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					reporting should be streamlined and not redundant.
<p>Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.</p>					
2.2.2		Time synchronization requirements were not specified for one or more of the DMEs as required in R1.2.2, R2.2.3, and R3.2.2.	Yes		Provided existing equipment is grandfathered.
<p>Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.</p>					
2.2.3		Requirements do not provide criteria for equipment location or criteria for monitored elements or monitored quantities as required R1.1, R2.1 and R3.1.	Yes		
2.3		Level 3: Disturbance data storage and retention requirements were not specified for one or more of the DMEs as required in R4.	Yes		
2.4		Level 4: Disturbance monitoring and reporting requirements were not available or were not provided to Transmission Owners and Generator Owners.	Yes		
E		Regional Differences			
		None identified.			

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A		Introduction - - PRC-018-1	Yes		See attached supporting Word file with general comments that further explain the SPP review of this draft standard.
Response: See responses to comments on attached word file.					
1		Title: Disturbance Monitoring Equipment Installation and Data Reporting	Yes		
2		Number PRC-018-1	Yes		
3		Purpose: Ensure that Disturbance Monitoring Equipment (DME) is installed and that Disturbance data is reported in accordance with regional requirements to facilitate analyses of events.	Yes		
4		Applicability	Yes		
4.1		Transmission Owner.	Yes		
4.2		Generator Owner.	Yes		
5		Proposed Effective Dates: Requirement 1: – 25% compliant by April 1, 2008 – 50% compliant by April 1, 2009 – 75% compliant by April 1, 2010 – 100% compliant by April 1, 2011 Requirement 2 through Requirement 5: – 100% compliant by October 1, 2007 for already installed DME			
B		Requirements	Yes		
R1		The Transmission Owner and Generator Owner shall install DME in accordance with the Regional Reliability Organization installation requirements (Reliability Standard PRC-002 Requirements 1 through 3).	Yes		However, agreement is conditional upon changes recommended in SPP comments submitted for PRC-002-1, i.e. do not have separate reporting requirements 1, 2, & 3 for SOEs, DFRs, & DDRs. Consider DMEs as a group of equipment.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					
R2		The Transmission Owner and Generator Owner shall maintain, and report to the Regional Reliability	Yes		

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		Organization on request, the following data on its installed DME:			
R2.1		Type of DME (sequence of event recorder, fault recorder, or dynamic disturbance recorder).	Yes		Acceptable provided one DME report is required and not separate device (SOE, DFR, DDR) reports.
Response: The Region will establish the reporting requirements.					
R2.2		Make and model of equipment	Yes		
R2.3		Installation location.	Yes		Acceptable provided not too precise of coordinates (such as longitude & latitude) are required.
Response: The Region will establish the installation location requirements.					
R2.4		Resolution of time synchronization.	Yes		
R2.5		Monitored Elements.	Yes		
R2.6		Monitored protection System Devices.	NO	X	Consider deleting this requirement or better explain. This is confusing as to what is really desired. Disturbance monitoring equipment (DMEs) if they are DFR relays, are a part of the protection system devices, which are relays and associated communications system, voltage & current sensing devices, batteries and DC control circuits. Voltage and current sensing are part of the monitored electrical quantities in R2.7.
Response: This requirement was modified and now states, 'Monitored devices such as circuit breaker, disconnect status, alarms, etc.					
R2.7		Monitored electrical quantities.	Yes		
R2.8		Operational status.	Yes		It was assumed this meant in-service and functional versus out of service or not properly functional.
Response: Agree.					
R2.9		Date last tested.	Yes		
R3		The Transmission Owner and Generator Owner shall each store and retain its Disturbance data (recorded by DMEs) in accordance with its Regional requirements (PRC-002 Requirement R4).	Yes		Except consider eliminating the continuous recording requirement.
Response: Commenters have supported the requirement as stated in the standard.					
R4		The Transmission Owner and Generator Owner shall each provide Disturbance data (recorded by DMEs) in accordance with the Regional requirements (PRC-002	Yes		Except consider eliminating the IEEE naming convention requirement.

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		Requirement R5).			
Response: Compliance with the IEEE file naming requirement is delayed until the IEEE standard is approved.					
R5		The Transmission Owner and Generator Owner shall have DME maintenance and testing program in accordance with the Regional requirements Reliability Standard PRC-002Requirement R6).	Yes		Except consider eliminating the redundant maintenance and testing if relays are the device providing the DRF data and relays are tested and maintained by another standard.
Response: If a relay is used as a DDR then there must be a maintenance and testing program in place that meets the Region's requirements. The drafting team cannot guarantee that each Region's maintenance and testing program requirements for DDRs will be identical to the Region's requirements for protection systems.					
C		Measures	Yes		
M1		The Transmission Owner and Generator Owner shall each have evidence that its DME is installed in accordance with its associated Regional Reliability Organization's requirements.			
M2		The Transmission Owner and Generator Owner shall each maintain the data listed in Requirement 2.1 through 2.9 on all its installed DME, and shall have evidence it provided this data to its Regional Reliability Organization within 30 calendar days of a request.	Yes		Consider eliminating R2.6
Response: This information is needed by the Region to verify that the collection of DDRs will support the Region's ability to analyze system disturbances.					
M3		The Transmission Owner and Generator Owner shall each have evidence it stored and retained its recorded Disturbance data in accordance with its associated Regional Reliability Organization's requirements.	Yes		
M4		The Transmission Owner and Generator Owner shall each have evidence it provided recorded Disturbance data to all entities in accordance with its associated Regional Reliability Organization's requirements	Yes		
M5		The Transmission Owner and Generator Owner shall each have evidence its DME maintenance and testing program is in accordance with its associated Regional Reliability Organization's requirements.	Yes		

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D		Compliance	Yes		
1.		Compliance Monitoring Process	Yes		
1.1		Compliance Monitoring Responsibility Regional Reliability Organization.	Yes		
1.2		Compliance Monitoring Period and Reset Timeframe One calendar year.	Yes		
1.3		Data Retention The Transmission Owner and Generator Owner shall retain any changes to the data on DME installations and any Disturbance data provided to the Regional Reliability Organization for three years.	NO	X	Consider deleting reference to retaining DME installation data after changes have been made. Only current as built installation data should be retained. Obsolete installation data because of changes may be confusing information if retained and accessed by field &/or office personnel. This old information may create a working hazard & cause safety problems. As DFR equipment changes occur (such as installation drawings and software/programming updates), old records normally need purged to prevent obsolete information from accidentally being used improperly. Only brief drawing change or setting change revision notes should be retained. As far as captured DME event data submittal to RRO being retained, that is not normally an issue.
Response: The drafting team understands your concern but set the requirement so that analysis of past events will be based on installation at the time of the past event. The owner will need to archive the older information, possibly in another location, so as not to confuse personnel.					
1.4		Additional Compliance Information The Transmission Owner and Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.	Yes		
2		Levels of Non-Compliance	Yes		
2.1		Level 1: There shall be a level one non-compliance if either of the following conditions is present:	Yes		Acceptable provided existing DMEs are grandfathered & SPP existing location criteria are not impacted by the revised DME standard.
Response: See responses to comments on attached word file.					
2.1.1		DME that meets all Regional installation requirements	Yes		

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		(in accordance with Requirement 1) were installed at 75% or more but not all of the locations.			
2.1.2		Recorded Disturbance data that meets all Regional data requirements (in accordance with Requirement 3) was provided for 75% or more but not all of the locations.	Yes		
2.2		Level 2: There shall be a level two non-compliance if either of the following conditions is present:	Yes		Acceptable provided existing DMEs are grandfathered & SPP existing location criteria are not impacted by the revised DME standard.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					
2.2.1		DME that meets all Regional installation requirements (in accordance with R1) were installed at 50% or more but less than 75% of the locations.			
2.2.2		Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for 50% or more but less than 75% of the locations.			
2.3		Level 3: There shall be a level three non-compliance if either of the following conditions is present:	Yes		Acceptable provided existing DMEs are grandfathered & SPP existing location criteria are not impacted by the revised DME standard.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					
2.3.1		DME that meets all Regional installation requirements (in accordance with R1) were installed at 25% or more but less than 50% of the locations.			
2.3.2		Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for 25% or more but less than 50% of the locations.			
2.4		Level 4: There shall be a level four non-compliance if either of the following conditions is present:	Yes		Acceptable provided existing DMEs are grandfathered & SPP existing location criteria are not impacted by the revised DME standard.
Response: The standards were revised to clarify that the focus is on the functional requirements and not on a specific piece of equipment. Any combination of equipment can be used as long as the functional requirements and data acquisition can be provided.					

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2.4.1		DME that meets all Regional installation requirements (in accordance with R1) were installed at less than 25% of the locations.			
2.4.2		Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for less than 25% of the locations.			
E		Regional Differences			
		None identified.			

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The NERC PRC-002-1 & PRC-018-1 review comment form contained the below clarifications, but comments could not be added on the NERC form for these clarifications. Thus, SPP SPCWG comments are shown below in Italics relative to information on NERC's form.

Major Changes to PRC-002 and PRC-018 Following 2nd Posting:

During the second posting of PRC-002 and PRC-018, the drafting team asked stakeholders if the requirements for Dynamic Disturbance Recorders should be removed from PRC-002 and PRC-018 and placed into two new standards. Most commenters indicated that the requirements should remain in PRC-002 and PRC-018 and requested that the requirements be modified to ensure that many existing installations could meet the standards' requirements.

The drafting team made the following major changes to PRC-002:

- Definition of Disturbance Monitoring Equipment: Removed the requirement of 'continuous' recording.
SPP SPCWG agrees with this action.

Response: Thank you for your support.

- Definition of protection System: Removed, 'power circuit breakers' from the list of elements considered to be part of a protection system.
SPP SPCWG agrees with this action. However, for the SOE time stamping feature of a DME device, breakers should be included.

Response: The definition of Protection System was revised and approved with another standard – the revised definition did not include power circuit breakers.

- Removed requirements that are more characteristic of new Phasor Measurement Units (PMUs).
SPP SPCWG agrees with this action. Also NERC should consider removing DDR continuous recording as a DME requirement and include that under the PMU standard or another future standard.

Response: The continuous recording capability does exist today and is useful. Most stakeholders seemed to support its inclusion in the standard.

- Changed the time synchronization requirements for sequence of event recorders and dynamic disturbance recorders so they both require that the device be synchronized to within four milliseconds of Coordinated Universal Time (UTC).
SPP SPCWG disagrees and requests that a 5-millisecond time synchronizing be allowed.

Response: The time synchronization requirements were consolidated and moved to PRC-018 to ensure that they would be consistent across all Regions. The revised requirements state:

- The time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock.
- Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.

[Redacted]

- Modified the requirement for continuous recording to indicate that this only applies to devices installed more than 3 years beyond the date the Board of Trustees adopts the standard.
SPP SPCWG disagrees and requests that continuous recording be removed from the current DME standard. If continuous recording must be retained as a part of the standard then be very restrictive (i.e. define where NERC thinks these devices need to be located) as to where it is required. Can SCADA systems sample at less frequency (say every few seconds) and capture/store the data desired so that a large investment is not required for separate continuous recording equipment?

Response: The standard sets the functional requirement that the time stamp cannot be greater than one millisecond from the time the condition reached the input device, measured with the local station's clock. SCADA was not originally designed to meet the purpose of this standard. It was designed sometime ago for other purposes and monitoring of far more equipment.

- Modified the recording requirements of DDRs from 30 samples/second to 6 records/second.
If continuous recording is a DDR requirement, then this change is acceptable.

Response: Continuous recording is a DDR requirement.

Some commenters suggested that data cannot be provided in COMTRADE format. The drafting team would like to know if this is a significant issue.

For some existing equipment, records in Comtrade formats may be a problem, and SPP requests that existing equipment, which does not meet the Comtrade format, be grandfathered, as acceptable. Although new equipment will have Comtrade format, manual alignment of data and coordination among different DMEs are still issues. There needs to be product development to display many vendors Comtrade records on the same report / graphs.

Response: The recording does not need to be in COMTRADE format – but the recorded data needs to be shared in COMTRADE format. The standard was revised to make this more clear. The intent of having a standard naming convention is to make the file contents clear to the person trying to reconstruct an event.