

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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Please use this form to submit comments on Set One of the Phase III & IV Drafting Team's fourth draft of the standards PRC-002 (Define Regional Disturbance Monitoring and Reporting Requirements) and PRC-018 (Disturbance Monitoring Equipment Installation and Data Reporting). Comments must be submitted by **May 3, 2006**. You must submit the completed form by e-mailing it to [sarcomm@nerc.com](mailto:sarcomm@nerc.com) with the words "Phase III & IV" in the subject line. If you have questions please contact Maureen Long at [maureen.long@nerc.net](mailto:maureen.long@nerc.net) or 813-468-5998.

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<b>Individual Commenter Information</b>	
(Complete this page for comments from one organization or individual.)	
Name:	
Organization:	
Telephone:	
E-mail:	
NERC Region	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input type="checkbox"/> 1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/> 2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/> 3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/> 4 — Transmission-dependent Utilities
<input type="checkbox"/> RFC	<input type="checkbox"/> 5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/> 6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/> 7 — Large Electricity End Users
<input type="checkbox"/> WECC	<input type="checkbox"/> 8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/> 9 — Federal, State, Provincial Regulatory or other Government Entities

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**Group Comments (Complete this page if comments are from a group.)**

**Group Name:** Midwest Reliability Organization (MRO)  
**Lead Contact:** Wayne Guttormson  
**Contact Organization:** MRO - NERC Standards Review Subcommittee  
**Contact Segment:** 2  
**Contact Telephone:** 306-566-2166  
**Contact E-mail:** wguttormson@saskpower.com

<b>Additional Member Name</b>	<b>Additional Member Organization</b>	<b>Region*</b>	<b>Segment*</b>
Terry Bilke	MISO	MRO	2
Al Boesch	NPPD	MRO	2
Robert Coish	MHEB	MRO	2
Dennis Florom	LES	MRO	2
Ken Goldsmith	ALT	MRO	2
Todd Gosnell	OPPD	MRO	2
Jim Maenner	WPSC	MRO	2
Darrick Moe, Chair	WAPA	MRO	2
Pam Oreschnick	XEL	MRO	2
Dave Rudolph	BEPC	MRO	2
Tom Mielnik	MEC	MRO	2
Dick Pursley	GRE	MRO	2
Joe Knight, Secretary	MRO	MRO	2
27 Additional MRO Members	Companies not named above	MRO	2

\*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on the prior page.

**Background Information**

Please review the drafting team's consideration of the comments submitted with the third draft of these standards and then review the drafting team's conforming changes made to the standards. The 'red line' versions of PRC-002 and PRC-018 show the changes made to the third draft of these standards.

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

The drafting team believes that the most significant changes made to PRC-002 and PRC-018 are:

- PRC-002 was revised to more clearly focus on the 'functional' requirements and not on requirements of any specific piece of equipment. The intent is to have each region establish functional requirements and then allow facility owners to use any equipment or any combination of equipment to meet those requirements.
- The functional requirements common to all disturbance monitoring equipment (DME) that had been identified in PRC-002 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 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).
- The levels of non-compliance in PRC-018 were modified to address all requirements.

Most other changes made to the standards were made to improve consistency in format.

The drafting team asks you to consider your acceptance of these changes in answering the following questions.

**Please read the background information and review the revised standards before responding to the following questions. You do not need to answer all questions.**

**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

Comments:

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

Yes

No

The MRO understands the difficulty in setting Compliance Levels, however it is unclear what the percentages being used to measure compliance are based on and how they relate to reliability? For example in Level 4 why is less than 70% considered to be such a serious violation, without an explanation or rationale the listed percentages seem arbitrary. How is the Ballot Body supposed to determine if this is appropriate? The MRO recommends that the SDT revise the compliance levels based on removing the percentages and focusing on simply not meeting the requirements. Also the MRO does not see the need to have a Level 4 Non-Compliance for a standard dealing with DME performance requirements relating to an after the fact measurement. This will not have a major effect on the real-time reliability of the bulk electric system. Comments:

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

Yes

No

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The MRO recommends that the proposed effective date for PRC-002 be extended from nine months to at least a year after BOT adoption. The regions already have a lot of work to accomplish. This is not the only standard out there for implementation. As well, there has to be better coordination between standards regarding implementation timelines and impacts on region and entity workloads. For the PRC-002 DME Definition, the MRO suggests removal of the references to specific devices, such as protective relays and phasor measurement units to keep it in line with focusing on the function of the device. Otherwise you may wish to list generator AVR's and power system stabilizers as examples of devices that can also provide disturbance monitoring capabilities.

The MRO suggests that the SDT consider some sort of grandfathering for existing DME's that do not meet these new performance requirements. Replacing the installed base of existing DME's represents a significant outlay of resources, and could delay the installation of other needed DME's.

For PRC-002 R4.5 the MRO recommends deletion of this requirement. The MRO questions the wisdom of placing any unapproved standard, IEEE or otherwise, as a requirement even with the explanatory note given. How is the Ballot Body supposed to approve an open-ended commitment to any standard not defined when financial penalties may be associated with not meeting it? Either it is a requirement now or it is not.

For PRC-002 R3.2.2 the MRO suggests that the SDT use consistent units for sampling rates in the standard, for example 960 samples per second listed in R3.2.2 is equivalent to the 16 samples per cycle listed in R2.2.2.

For PRC-018 R1.2 the MRO suggests that the SDT clarify the intent further. Is it the intent of the requirement that even if disturbance data is retrieved the data on the DME can not be erased until after 10 days, or can the data be erased as long as any retrieved data is saved for 10 days? The MRO suggests the following language, "Recorded data from each Disturbance shall be capable of retrieval from the DME for 10 days. As well, is 10 days an appropriate measure for retrievability of data when it also depends on how much storage capacity the DME has and the number of events it is exposed to.

For PRC-018 R6 the MRO recommends that the SDT extend the proposed effective date for already installed DME from six months to a year. Many entities will require a longer transition period to develop such a program if they do not have one already. As well, the MRO recommends that the SDT refer to the SAC a request to consolidate all maintenance and testing requirements regarding DME's, and protective relays into one standard.

For the PRC-018 Measures the MRO recommends that the SDT specifically list the Requirements that are associated with each Measure for clarity. Each Requirement is supposed to have an associated Measure.

Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Ron Falsetti	
Organization:	IESO	
Telephone:	905-855-6178	
E-mail:	ron.falsetti@ieso.ca	
NERC Region	Registered Ballot Body Segment	
<input type="checkbox"/> ERCOT	<input type="checkbox"/>	1 — Transmission Owners
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- The levels of non-compliance in PRC-018 were modified to address all requirements.

Most other changes made to the standards were made to improve consistency in format.

The drafting team asks you to consider your acceptance of these changes in answering the following questions.



**Please read the background information and review the revised standards before responding to the following questions. You do not need to answer all questions.**

**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

(i) Moving the DME's time synchronization requirements to PRC-018-1 is not necessary. In fact, this move has resulted in convoluting the latter standard – both in requirements and in measures and compliance. Synchronizing requirements are part and partial of the technical requirements that apply to the recording devices, which should remain in PRC-002-1. The SDT's rationale that the move would ensure consistency across all regions does not appear to be well-founded. Keeping them in PRC-002-1 can also achieve this objective since NERC standards are applied industry-wide. Regional specific requirements, in this context, would be restricted to the location and other specific monitoring and recording requirements detailed in R1 to R3 of PRC-002-1.

(ii) Moving the concerned requirement out of PRC-002-1 does not necessarily make this standard more clear cut or standalone. In fact, since the RROs are responsible for meeting the requirements stipulated in this standard, it makes more sense to also stipulate in this standard that the Regions include the specified time synchronization requirements in their regional requirements. Comments:

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

Yes

No

The first sentence in R1.1 is sufficient to provide the needed requirement. All DMEs must be synchronized to a universal time standard. The second sentence and its reference to "a station clock" is confusing, and the 1 millisecond is so stringent that some DMEs may not be able to meet. We suggest this sentence be removed. Comments:

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

Yes

No

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(i). Measure M1: With R1 added (from PRC-002-1), M1 is now very convoluted. This should not be case if R1 stays in PRC-002-1 and is stipulated as “shall be included in regional requirements”.

(ii). Measure M4: M4, as written, is a requirement repeating R6. It should be reworded in the context of, for example, “shall have evidence or documentation to demonstrate R6 is met”.

(iii). Compliance Level 2.4.4: the sentence “Documentation of the DME maintenance and testing program, or its implementation, was not provided” needs clarification. Suggest to reword it to read something similar to 2.2.5, for example: “Documentation of the DME maintenance and testing program was not provided, or no evidence that the testing program did occur within the identified intervals”.  
Comments:

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

Yes

No

(i) PRC-002 and PRC-018 should be restructured to meet their respective purposes, i.e. that PRC-002 is intended to stipulate the requirements to ensure that Regional Reliability Organizations establish technical, data and location requirements for installation of Disturbance Monitoring Equipment (DME), whereas PRC-018 is intended to stipulate the requirements for ensuring that DMEs are installed and that disturbance data is reported in accordance with regional requirements to facilitate analyses of events; for example R1.1 of PRC-018 is better suited in PRC-002

(ii) R1, R2 and R3 of PRC-002 as written could result in the RRO stipulating the locations for installing DMEs. Responsible entities within the region may have their own specific needs to install DMEs at other locations. Moreover, preferred locations to install DMEs to meet regional needs would normally be coordinated with the responsible entities. We suggest the leading sentences of R1, R2 and R3 be reworded to include only the monitoring and recording requirements, and add a sentence at the end of each of these three requirements to require that the RRO shall coordinate with responsible entities within the region to identify the location for SMD installation.

(iii) For each of R1, R2 and R3 in PRC-002, there needs to be a requirement on the minimum availability of the DMEs. One of the findings of the 2003 blackout investigation was that some DMEs were found not operational. We believe this is an important requirement to ensure that installed DMEs are operational when called upon (i.e. when unavailability is otherwise not detected during routine maintenance and testing.)

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E-mail:	
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**Group Comments (Complete this page if comments are from a group.)**

**Group Name:** CP9, Reliability Standards Working Group  
**Lead Contact:** Guy V. Zito  
**Contact Organization:** Northeast Power Coordinating Council  
**Contact Segment:** 2  
**Contact Telephone:** 212-840-1070  
**Contact E-mail:** gzito@npcc.org

<b>Additional Member Name</b>	<b>Additional Member Organization</b>	<b>Region*</b>	<b>Segment*</b>
David Kiguel	Hydro One Networks	NPCC	1
Ralph Rufrano	New York Power Authority	NPCC	1
Peter Lebro	National Grid US	NPCC	1
Kathleen Goodman	ISO-New England	NPCC	2
Greg Campoli	New York ISO	NPCC	2
Al Adamson	New York State Rel. Council	NPCC	2
Bill Shemley	ISO-New England	NPCC	2
Murale Gopinathan	Northeast Utilities	NPCC	1
Roger Champagne	TransEnergie HydroQuebec	NPCC	1
Alden Briggs	New Brunswick System Operator	NPCC	2
Jim Ingleson	New York ISO	NPCC	2
Donald Nelson	MA Dept. Tel. and Energy	NPCC	9
Guy V. Zito	Northeast Power Coord. Council	NPCC	2
Al Adamson	New York State Rel. Council	NPCC	2
Ron Falsetti	The IESO, Ontario	NPCC	2

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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

NPCC Participating members believe it is inappropriate to move the DME's time synchronization requirements R1.1 to PRC-018 Comments:

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

Yes

No

Section R1.1. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available at this IEEE address: <http://www.pes-psrc.org/i/1workgroup.html> - After arriving at that address, choose working group I11 - "Timing Considerations for Event Reconstruction." Comments:

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

Yes

No

Comments:

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

Yes

No

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Measure M4: M4, as written, is a requirement repeating R6. It should be reworded in the context of, for example, "shall have evidence or documentation to demonstrate R6 is met".

Compliance Level 2.4.4: the sentence "Documentation of the DME maintenance and testing program, or its implementation, was not provided" needs clarification.

Suggest to reword it to read something similar to 2.2.5, for example:

"Documentation of the DME maintenance and testing program was not provided, or no evidence that the testing program did occur within the identified intervals".

R1, R2 and R3 of PRC-002 as written could result in the RRO stipulating the locations for installing DMEs. Responsible entities within the region may have their own specific needs to install DMEs at other locations. Moreover, preferred locations to install DMEs to meet regional needs would normally be coordinated with the responsible entities. We suggest the leading sentences of R1, R2 and R3 be reworded to include only the monitoring and recording requirements, and add a sentence at the end of each of these three requirements to require that the RRO shall coordinate with responsible entities within the region to identify the location for SMD installation.

For each of R1, R2 and R3 in PRC-002, there needs to be a requirement on the minimum availability of the DMEs. One of the findings of the 2003 blackout investigation was that some DMEs were found not operational. We believe this is an important requirement to ensure that installed DMEs are operational when called upon (i.e. when unavailability is otherwise not detected during routine maintenance and testing.)

In PRC-018-1, fifth dash under Proposed Effective Date: NPCC participating members suggest revising the sentence "100% compliant 6 months after installation for DMEs installed to meet Regional Reliability Organization requirements per Reliability Standard PRC-002 Requirements 1, 2 and 3. This needs clarification.

There are some legacy DME which fail to meet the standards to some degree. We believe the 4 year replacement time is too short in cases of a small degree of deficiency. We suggest that the four year time frame apply to locations which are not covered by DME or covered with DME which is entirely inadequate. We suggest an 8 year time frame for cases where the DME is deficient in only one or two of the requirements defined in either PRC-002 or PRC-008. Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Charles Rogers	
Organization:	Consumers Energy	
Telephone:	517-788-0027	
E-mail:	cwr Rogers@cmsenergy.com	
NERC Region	Registered Ballot Body Segment	
<input type="checkbox"/> ERCOT	<input type="checkbox"/>	1 — Transmission Owners
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1. Do you agree with the drafting team's modification that moved the 'functional' requirements that should be common across all regions from PRC-002 into PRC-018?

Yes

No

Comments:

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

Yes

No

PRC-018 R1.1 should be changed to read as follows: "Internal clocks in DME devices shall be synchronized to within 2 ms. of Universal Coordinated Time (UTC).

The requirement as stated in PRC-018 Draft 4 R1.1 can not be met with commercially available equipment normally used by utilities without incurring extreme costs. This observation is shared by the commenter, NERC SPCTF, IEEE PSRC Working Group I11, and NPCC Working Group SP-6.

An analysis by the NPCC Working Group SP-6 of actual performance of time synchronized DME illustrates that this equipment is not even close to meeting the R1.1 of PRC-018 Draft 4. They have issued a report which, in Appendix F, presents observed performance from Digital Fault Recorders with local GPS clock synchronism, which represents the ideal methods. This report lists observed time variation of -1 to +2 ms. relative to UTC. Comments:

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

Yes

No

The reference to a percentage of required locations would allow the entity to "game" compliance with the standard. For example, an entity could have 100 locations which require DME, and have DME installed at the 90 smallest, least significant locations, and have only perhaps 20-30% of the total required system elements monitored. Comments:

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

Yes

No

PRC-018 R1.1 MUST be modified to reflect actual equipment capabilities. Comments:

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	John E. Sullivan	
Organization:	Ameren	
Telephone:	(314) 554-3833	
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NERC Region	Registered Ballot Body Segment	
<input type="checkbox"/> ERCOT	<input type="checkbox"/> 1 — Transmission Owners	
<input type="checkbox"/> FRCC	<input type="checkbox"/> 2 — RTOs, ISOs, Regional Reliability Councils	
<input type="checkbox"/> MRO	<input type="checkbox"/> 3 — Load-serving Entities	
<input type="checkbox"/> NPCC	<input type="checkbox"/> 4 — Transmission-dependent Utilities	
<input type="checkbox"/> RFC	<input type="checkbox"/> 5 — Electric Generators	
<input type="checkbox"/> SERC	<input type="checkbox"/> 6 — Electricity Brokers, Aggregators, and Marketers	
<input type="checkbox"/> SPP	<input type="checkbox"/> 7 — Large Electricity End Users	
<input type="checkbox"/> WECC	<input type="checkbox"/> 8 — Small Electricity End Users	
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/> 9 — Federal, State, Provincial Regulatory or other Government Entities	



**Background Information**

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

The drafting team believes that the most significant changes made to PRC-002 and PRC-018 are:

- PRC-002 was revised to more clearly focus on the 'functional' requirements and not on requirements of any specific piece of equipment. The intent is to have each region establish functional requirements and then allow facility owners to use any equipment or any combination of equipment to meet those requirements.
- The functional requirements common to all disturbance monitoring equipment (DME) that had been identified in PRC-002 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 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).
- The levels of non-compliance in PRC-018 were modified to address all requirements.

Most other changes made to the standards were made to improve consistency in format.

The drafting team asks you to consider your acceptance of these changes in answering the following questions.

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**Enter All Comments in Simple Text Format.**

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

Yes

No

R1 belongs with the technical requirements in standard PRC-002. Comments:

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

Yes

No

It is not certain that technical requirements regarding time synchronization can be met. See comments from NERC-SPCTF committee. Comments:

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

Yes

No

As long as technical requirements specified in the standards can be met by equipment manufacturers. Comments:

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

Yes

No

PRC-002-1:

R1: Previously, MAIN requirements did not require sequence of event recording. Significant upgrade costs may be incurred if this requirement is imposed.



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R2.1.3: Previously, MAIN requirements did not require the ability to determine Polarizing currents and voltages (R2.1.3.3), frequency (R2.1.3.4), and Megawatts and Megavars (R2.1.3.5) from DFR data. This could result in significant upgrade cost.

R3.1.1: The list of considerations is of no practical use from the perspective of being measurable or enforceable.

R4.4 and R5: Many older DFRs may not support the COMTRADE format or renaming of files. MAIN requirements allow hardcopy, facsimile, email, and COMTRADE submittals. Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:		
Organization:		
Telephone:		
E-mail:		
NERC Region		Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
<input type="checkbox"/> RFC	<input type="checkbox"/>	5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/>	6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
<input type="checkbox"/> WECC	<input type="checkbox"/>	8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/>	9 — Federal, State, Provincial Regulatory or other Government Entities



### **Background Information**

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

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  - Each local clock shall be synchronized to within one millisecond of Coordinated Universal Time (UTC).
- The levels of non-compliance in PRC-018 were modified to address all requirements.

Most other changes made to the standards were made to improve consistency in format.

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**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

Section R1.1. PHI supports the comments of the PC SPCTF. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available as described in the SPCTF comments Comments:

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

Yes

No

Comments:

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

Yes

No

Comments:

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Thomas E. Owens	
Organization:	Dominion Electric Transmission	
Telephone:	804-257-4693	
E-mail:	tom_owens@dom.com	
NERC Region	<input type="checkbox"/>	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
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**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Since we have no clear definition of functional verses non-functional, it matters not. For example, how is sample rate (PRC-002) a functional requirement and time sync (PRC-018) not? It appears that the transmission owner will need to comply with whatever is written in both PRC-002-1 and PRC-018-1, so having transmission owner requirements in two documents is something we will have to live with. Comments:

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

Yes

No

Regarding R1.1, the two different requirements of 2 milliseconds of UTC and 1 millisecond time stamp for the DME response is confusing. This does not agree with background information that states 1 millisecond and 1 millisecond. Why not simply say that Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC) and the resolution of the DME shall be 1 millisecond or less. This provides an overall accuracy within 3 milliseconds for comparing data between the various DMEs. By the way, a device with a 16 samples per cycle (960 samples per second) sample rate cannot technically have a 1 millisecond resolution (16.7 milliseconds divided by 16 samples is 1.04 milliseconds resolution). The phrase at the end of the last sentence... measured with the local station's clock is confusing and should be deleted.

Also concerning R1.1, the time stamp in our DME records is satellite synchronized but shown as local time (either EST or EDT) because our operating centers, disturbance databases and everything else uses our local time. We disagree that UTC time should be coded into the DME records. We think that should be acceptable.

Comments:

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

Yes

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No

In PRC-018-1 regarding Section D Compliance item 1.3, we do not understand what we are being asked to retain. What does it mean to ... retain any changes to the data on DMS installations and any Disturbance data ... for three years? Owners can keep an up-to-date list of our equipment and keep data we supplied to the region, but keeping a history trail on equipment seems unnecessary. Regions should be the responsible entity for keeping that information.

In PRC-018-1 regarding Section D Compliance item 2.4.3, we feel that a level 4 non-compliance for R1 is too strict when one DME is not time synched. We suggest different levels of non-compliance based on percentages like those stated for R2 and R4 (see items 2.4.1 and 2.4.2).

Comments:

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

Yes

No

Comments for PRC-002-1

The definition of Fault Recorder ends with ... This may include protective relays. We suggest this last sentence be removed and Protective Relays included in the footnote at bottom of page with PMUs. Protective relays can also be used as an SER device and in the future may even function as a DDR.

Regarding R1, we suggest the abbreviation of SER be approved for use to refer to sequence of event recording equipment. As such modify the wording to say - The Regional Reliability Organization shall establish. . . for Sequence of Events Recording (SER) equipment. Also modify the definition accordingly. This would be similar to the acronym DDR, which is used in the definition of a Dynamic Disturbance Recorder.

Regarding R2, we suggest the abbreviation of DFR be approved for use to refer to fault recording equipment. Since the requirements in PRC-002 are specifying a digital file format and magnetic tape recorders cannot meet this requirement, the only type fault recorders that could then exist will be digital fault recorders (DFRs). As such modify the wording to say - The Regional Reliability Organization shall establish. . . for Digital Fault Recording Equipment (DFR) equipment. Also modify the definition accordingly.

Regarding R2.2.2 and R3.2.2, be consistent when specifying sampling rate. R2.2.2 says 16 samples per cycle and R3.2.2 says 960 samples per second. These are the same sample rate. Change one to agree with the other, possibly using 960 samples per second.

Regarding R3.2.1, capability for continuous recording could mean that the device can record continuously but this feature may be turned off. Continuous recording should be considered optional or at the discretion of the regions. Triggered DDR devices

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should be acceptable as DDRs. If a triggered DDR can capture the desired events, the need for continuous recording should be waived. As such triggering requirements and recording duration requirements should be added.

Regarding Paragraph R4.4, reporting data in a COMTRADE format is fine for DFRs (maybe even SERs) but not for DDRs. It should also be noted that this paragraph should apply only to reporting requirements, not data storage requirements. As such, conversion of vendor proprietary file formats to COMTRADE is only required when reporting or sharing data.

DDR typically store RMS values, frequency and phase angles. Also in R3.2.2 a DDR is required to record RMS values. There is no provision in COMTRADE for storing RMS values, phase angles, or real and imaginary components of a signal. Since recorded RMS values do not reflect waveform data (without additional information) this type of recording falls outside the COMTRADE standard. Further, programs designed to read COMTRADE files would not properly interpret the files from DDRs. The industry (IEEE) should develop some other file format to be used as a DDR standard file format. Until this happens some other format besides COMTRADE should be allowed for DDR data, possibly a format suitable for importing into a database.

The COMTRADE format is structured for instantaneously sampled data; that is, a number (usually large) of digitally-sampled analog data points, which may be greater or less than zero (described in Section 3.3, C37.111 IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems (1999)). Each file line containing digitized analog data includes one field for the number of digital counts that reflects the instantaneous magnitude of the signal. Several lines are needed to reconstruct a waveform. COMTRADE is structured to store transient data; there is no provision in the Standard to indicate that the data in a COMTRADE file is any other type. Section 1.1 of IEEE C37.111 states that the COMTRADE standard - defines a format for files containing transient waveform and event data.

Regarding Paragraph R4.5, many recorders do not presently name files in accordance with the C37.232 IEEE Recommended Practice for Naming Time Sequence Data Files. Approval of this standard is still pending. Many vendors will have to make software or hardware enhancements to comply. Unless vendors conform to this standard, each file would have to be renamed. The compliance footnote #2 should be changed to allow a period of time after the standard is approved, possibly two to four years, for facility owners to become compliant with the COMNAMES naming convention. Again it should only apply to reporting and sharing data, not for data storage.

Comments for PRC-018-1

Regarding R1.2, data recorded by some existing DMEs and some newer ones have limited memory and cannot be configured to ... be retrievable for 10 days. The settings in the DMEs typically have a maximum number of records as the limit not the number of days of data. The transmission owner needs flexibility on this requirement because in many cases the data is retrieved from the DME within several days of the event and whether the DME retains 3 days or 10 days of data is irrelevant. This may require hardware and software changes by the DME vendors and possibly unnecessary DME replacements by transmission owners to comply.

Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Mike McDonald	
Organization:	Ameren	
Telephone:	314-554-3551	
E-mail:	mikemcdonald@ameren.com	
NERC Region	<input type="checkbox"/>	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

Section R1.1. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available at this IEEE address: <http://www.pes-psrc.org/i/1workgroup.html> - After arriving at that address, choose working group I11 - "Timing Considerations for Event Reconstruction." Comments:

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

Yes

No

In MAIN there was no requirement for SOE - each microprocessor based reaily provided such data but unless RTUs are modernized and communciations added (both at very high cost) I don't see how this can be done in the time allocatied - especially DFR installations tha ttypically cost \$200-250, 000 each to get installed with many system outages to wire in. Comments:

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

Yes

No

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Section R3.1.3.1 summarizes 3 values without specification of what these are - for instance Voltage (all three phase-to-neutral voltages or just one? This was much more elaborate in R2.2.3. These should be comparably specified. Compliance of the RRO is appropriate - it needs to get completed. However, compliance in terms of equipment upgrades and new installations of DMEs needs to be based on criticality of the upgrade as well as the overall cost to the owner. Since each RRO has its own members as participants in the drafting of its own requirements, you can easily defeat the overall purpose of these 'standards' as knowing that there is a huge cost to many of these issues, the local RROs will simply make their requirements so soft that little actually will need to be done - as they can't afford it without outside funding. NERC should provide an oversight of the selection of location of DMEs where it applies to the transportation of power to insure that events can be analyzed. Making 'requirements' of selecting locations based on 'voltage sensitive areas' is not, as I understand it, part of NERC's charge. All of section R.3 is so broad that it is neither of practical use, measurable or enforceable. It appears to me that you have completely left out monitoring the communications paths of the relay that protects the EHV system and is critical in insuring proper clearing of transmission faults and the stability of the system. Comments:



**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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Please use this form to submit comments on Set One of the Phase III & IV Drafting Team's fourth draft of the standards PRC-002 (Define Regional Disturbance Monitoring and Reporting Requirements) and PRC-018 (Disturbance Monitoring Equipment Installation and Data Reporting). Comments must be submitted by **May 3, 2006**. You must submit the completed form by e-mailing it to [sarcomm@nerc.com](mailto:sarcomm@nerc.com) with the words "Phase III & IV" in the subject line. If you have questions please contact Maureen Long at [maureen.long@nerc.net](mailto:maureen.long@nerc.net) or 813-468-5998.

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  - Do not** use numbering or bullets in any data field.
  - Do not** use quotation marks in any data field.
  - Do not** submit a response in an unprotected copy of this form.

<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	David A. Powell	
Organization:	FirstEnergy Corp.	
Telephone:	330-761-7722	
E-mail:	dapowell@firstenergycorp.com	
NERC Region	Registered Ballot Body Segment	
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
<input checked="" type="checkbox"/> RFC	<input type="checkbox"/>	5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/>	6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
<input type="checkbox"/> WECC	<input type="checkbox"/>	8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/>	9 — Federal, State, Provincial Regulatory or other Government Entities



### **Background Information**

Please review the drafting team's consideration of the comments submitted with the third draft of these standards and then review the drafting team's conforming changes made to the standards. The 'red line' versions of PRC-002 and PRC-018 show the changes made to the third draft of these standards.

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

The drafting team believes that the most significant changes made to PRC-002 and PRC-018 are:

- PRC-002 was revised to more clearly focus on the 'functional' requirements and not on requirements of any specific piece of equipment. The intent is to have each region establish functional requirements and then allow facility owners to use any equipment or any combination of equipment to meet those requirements.
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**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

SOE and fault recording functions should be allowed to have a time synchronized to within 5 ms. of the UTC to accommodate existing relay equipment to be used for these functions to avoid significant equipment replacements. Comments:

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

Yes

No

Comments:

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

Yes

No

The footnote in the DME definition should include "PMU and any other equipment capable of meeting the DME technical and functional requirements". Some SCADA RTU and relay equipment can support the SOE function. Then the reference to protective relays could be removed from the second bullet. There is a typo in PRC-002-1 Section R3 (Phrases) should be Phases. PRC-018-1 Section 2.2.2 has a typo (Organization is spelled wrong). Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Charles Kevin Luke	
Organization:	Florida Power & Light Co.	
Telephone:	(561) 694-4685	
E-mail:	kevin_luke@fpl.com	
NERC Region	<input type="checkbox"/>	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input checked="" type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
<input type="checkbox"/> RFC	<input type="checkbox"/>	5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/>	6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
<input type="checkbox"/> WECC	<input type="checkbox"/>	8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/>	9 — Federal, State, Provincial Regulatory or other Government Entities



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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

Requirement R1.1 in PRC-018-1 second sentence should be changed to "The time stamp cannot be greater than one millisecond from the time the condition is acknowledged by the input device. As noticed in NPCC SP6 the accuracy of time stamping is based on the device and its recognition of the occurrence. This factor will vary from device and application. The review of the data record would reveal this information and at that time the record could be named with this timed stamp coded in the name of the file. This requirement needs further clarification and definition. Comments:

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

Yes

No

Comments:

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

Yes

No

R3.6 through R3.8 should be removed. These values constantly change and maintaining such a database is impossible to maintain accuracy during an on going



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bases. Therefore R3.1 through R3.5 should be maintained for compliance and R3.6 through 3.8 reported only when a Regional Reliability Organization - identified event is recorded and data is submitted.

The Proposed Effective Dates also raise a concern that are listed in PRC-018-1. The economic impact of these imposed requirements are unknown at this time due to the pending definition of the issuance of the regional requirements. This could vary to be in the amounts of millions of dollars per year for the next four years. Would prefer to see stretched out to five or seven years.

Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Robert Coish	
Organization:	Manitoba Hydro	
Telephone:	(204) 487-0756	
E-mail:	rgcoish@hydro.mb.ca	
NERC Region		Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
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1. Do you agree with the drafting team's modification that moved the 'functional' requirements that should be common across all regions from PRC-002 into PRC-018?

Yes

No

However, does it really matter if the common requirements are in PRC-002 or in PRC-018? In either case, they will apply to all regions. For example, R2.2.2 and R3.2.2 in PRC-002 will still apply within all regions. If this is not the case, then should these requirements also be moved to PRC-018 for consistency? Comments:

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

Yes

No

In R1.1 the words "or better" are redundant as that is the meaning of the word "within" earlier in the sentence. In R1.1 second sentence, "the input device" is ambiguous. It could mean (a) the most upstream device in the measuring system or it could mean (b) the DME itself. If it means (b), then to improve clarity we suggest that "the input device" be replaced with "the input to the DME". Note that despite this requirement the time stamp error to the time of the initiating event may significantly exceed two milliseconds due to inherent delays in upstream components in existing measurement systems. We assume the intended meaning is not (a) because then the two millisecond requirement would not be achievable in many cases due to inherent delays in components upstream of the DME. Comments:

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

Yes

No

Comments:

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Yes

No

(1) R1.2 in PRC-018 needs clarification. (2) In PRC-018 Data Retention tracking and retaining any (potentially numerous) changes to the data on DME installations for three years would be onerous and is probably not necessary as long as Disturbance data submitted is properly documented and is retained for three years. (3) In PRC-018 proposed effective dates, what criteria will be used to determine percentages of compliance? (4) In PRC-002, 2.1.2, R7 should be R6. (5) In PRC-018, Levels of Non-compliance 2.1.1, replace the word its with the word the. Comments:

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Organization:	
Telephone:	
E-mail:	
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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

In the second sentence in Requirement R1.1, the word "reached" should be replaced by "is acknowledged by". The accuracy of time stamping is based on the device and its recognition of the occurrence. This factor will vary by device and application and a review of the data record will allow the record to be accurately synchronized.

Comments:

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

Yes

No

Comments:

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

Yes

No

In requirement R3.1.1 in PRC-002-1, there is a requirement for the region to develop criteria for the selecting the location for Dynamic Disturbance Recording (DDR) equipment based on a list of possible location types. This is not a requirement in R2.1.1 for fault recorders. The concern is that with the long list of possible location types, how can the region demonstrate (during compliance activities) that it

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considered all of these factors. Therefore, this list should be deleted and this requirement should parallel R2.1.1.

Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	John Ferraro	
Organization:	Northeast Utilities	
Telephone:	860-665-6743	
E-mail:	ferrajr@nu.com	
NERC Region	<input type="checkbox"/>	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
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1. Do you agree with the drafting team's modification that moved the 'functional' requirements that should be common across all regions from PRC-002 into PRC-018?

Yes

No

Comments:

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

Yes

No

Section R1.1. We believe realization of this requirement is beyond the capability of today's equipment. R1.1. should be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available at this IEEE address: <http://www.pes-psrc.org/i/1workgroup.html> - After arriving at that address, choose working group I11 - "Timing Considerations for Event Reconstruction."

Also, R1.1 assumes that each station with DME is equipped with a local clock. This is not true for entities using a form of network time protocol for synchronization.

Comments:

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

Yes

No

The structure of the Levels of Non-Compliance is troublesome. Assume that an entity has met all the requirements imposed by the RRO with the exception of having missed a certain trigger setting called for by the RRO per PRC-002-1, R2.2.3. It's likely that the entity has made the same mistake at all of the designated DME locations. Even though the entity has complied with all other requirements, it has been 100% non-compliant with all of the requirements in R2. This non-compliance structure would cause the entity to be Level 4 non-compliant for a relatively minor oversight. This would be true for any minor oversight that was common to an entity's DME installations. Comments:

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

Yes

No

PRC-018-1, R1.2. States that "recorded data from each Disturbance shall be retrievable for ten days." However, the DME definitions allow that relays may be used in fault recording applications. In the event of a series of lightning strikes in a fairly short period of time, it's quite possible that relay records will be overwritten before the data can be recovered. In this situation, it would not be possible to satisfy the conditions of R1.2. Even centralized data collection software applications may not be sufficient to prevent this problem, and could impose undue cyber-security costs to implement. Either an exception is needed for installations using relays with limited memory, or the definition allowing the use of relays needs to be more limiting regarding the capabilities of the relays used in such a capacity.

Also, PRC-002-1, R3.2.1 calls for a requirement for continuous recording capability. This position will effectively force the upgrade or replacement of DDRs that have been performing satisfactorily on a triggered basis on behalf of those entities who had the foresight to install such devices in the first place. This seems inordinately punitive. I suggest rewording to permit the continued use of installed technology.

Comments:



**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

Please use this form to submit comments on Set One of the Phase III & IV Drafting Team's fourth draft of the standards PRC-002 (Define Regional Disturbance Monitoring and Reporting Requirements) and PRC-018 (Disturbance Monitoring Equipment Installation and Data Reporting). Comments must be submitted by **May 3, 2006**. You must submit the completed form by e-mailing it to [sarcomm@nerc.com](mailto:sarcomm@nerc.com) with the words "Phase III & IV" in the subject line. If you have questions please contact Maureen Long at [maureen.long@nerc.net](mailto:maureen.long@nerc.net) or 813-468-5998.

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Neil Shockey	
Organization:	Southern California Edison	
Telephone:	626-302-4604	
E-mail:	neil.shockey@sce.com	
NERC Region	<input type="checkbox"/>	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
<input type="checkbox"/> RFC	<input type="checkbox"/>	5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/>	6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
<input checked="" type="checkbox"/> WECC	<input type="checkbox"/>	8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/>	9 — Federal, State, Provincial Regulatory or other Government Entities



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- PRC-002 was revised to more clearly focus on the 'functional' requirements and not on requirements of any specific piece of equipment. The intent is to have each region establish functional requirements and then allow facility owners to use any equipment or any combination of equipment to meet those requirements.
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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Comments:

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

Yes

No

Comments:

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

Yes

No

Comments:

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

Yes

No

PRC-002 R2. On the issue of electrical quantities to be measured and/or monitored, SCE is concerned with the specific use of the term "three phase to neutral voltages." We believe that NERC's DME applies to locations within Regional areas, where disturbances will result in a need for their people to gather event recordings from mostly high voltage (usually over 115 kV) lines. Yet, in the event inter-Utility connections are lower voltage, where they may not have phase to neutral voltages available, rather only phase-to-phase voltages are available. We are concerned that if the NERC document has compliance statements that hold Utilities to only the monitoring of phase-to-neutral voltages, will the Utilities be obligated to install new

## **Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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primary voltage equipment, or will they be given exceptions? On the issue of Megawatts and megavars, most fault recorders do not specifically record these quantities. Most Utilities use Fault Recorders for the purposes of validating the proper operation of protective relaying systems, and the currents and voltages that are present during a fault. Thus, when defining recording channels for an FR, Watts and Vars are considered to be operating and dynamic system quantities, so they are not typically recorded in real-time, in FR's. However, newer technology DFRs can typically use a feature known as "calculated channels," where the Watts and/or Vars on a particular line and/or bank element can be calculated and plotted, from the recorded current and voltage data from an FR. These Watt and Var quantities are definitely something that's very helpful in post-disturbance analysis; We are concerned that this section is showing that these quantities are to be recorded in FR's, and that a number of Utilities' FR systems will not be able to comply, given the age and vintage of their FR's.

R3. Under the DDR's section on Technical Requirements, there is a paragraph that addresses the sample rates of the DDR devices. We are uncertain as to why there was mention of specific sample rates here, along with the number of records per second. This is probably fine, but it seems to be somewhat inconsistent with the comparable section within the FR requirement (R2), where there is only mention of a minimum sampling rate of 16 samples per cycle.

R1., R2., and R3. It appears that any references to data retention considerations may have been inadvertently removed from these sections. Maybe this was intended, but in looking at the WECC's guidelines, it appears here, so we believe that the NERC may want to use some similar language, to prompt Regions to consider data retention periods, accordingly.

The rest of PRC-002-1 has a number of changes, mostly re-defining the paragraph designations, etc. They may want to check all of the cross-references, once all the revisions have been incorporated, since it appears that some of the cross-references may not be correct, in the draft.

PRC-018 R3. The addition of the "date last tested" raises concern to SCE. Most Utilities have limited field resources, so SCE is not personally aware of too many Utilities that test their SER's and FR's. If this becomes a compliance issue, which it appears that it will, SCE can see some ways that people may try to satisfy this requirement (including some very large Utilities): a. date of the DME's last recording, b. date last time the DME had major channel re-work, c. date of last configuration file changes, d. spot-verify analog and digital channels work during event analysis, or e. complete verification of all analog and digital channel operations. All of us that use the event recordings from DME's to analyze system events realize the importance and value of regular checks, and even some limited field testing and/or channel calibration, of DME's yet a reasonable approach should be used that is not overburdensome. Comments:

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<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:	Fred Ipock	
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NERC Region	Registered Ballot Body Segment	
<input type="checkbox"/> ERCOT	<input checked="" type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input checked="" type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
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<input checked="" type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
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*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

However, PRC-002-1 would be clearer if the DME introduction included a background information statement: "The PRC-002-1 intent is to have each region establish 'functional disturbance monitoring requirements' and then allow facility owners to use any equipment or any combination of equipment to meet those requirements. NERC is not requiring separate devices for SOE's, DFR's, & DDR's."

There are no continuous recording disturbance monitors to my knowledge in SPP. I still object to the PRC-002-1 Requirement 3 DDR "continuous recording" (versus triggered event) type of disturbance monitoring, especially considering that 1 or 2mS time stamping accuracy is needed and then the continuous monitoring only records 6 records per second, i.e. records captured and stored at 10 cycle intervals. How can it be assumed that the event desired to be captured will occur at the sampled interval? I talked to one of the high end DFR equipment manufacturers (that traditionally does triggered events at high sample rates) and it appeared to me that, although the vendor may have capability to continuously record, that software changes and product development is required to accomplish the intent of PRC-002-1. If what is really desired by requirement 3 is an operating system performance (not disturbance) type of monitoring similar to a phasor monitoring unit (PMU), then consider deleting the DDR continuous recording requirement and creating a separate performance standard that is intended to track operational performance, not disturbance issues. If a hybrid type disturbance monitor is desired that will act to both continuously record system performance and trigger for disturbance events, the PRC requirements need clarified. Comments:

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

Yes

No

I still do not believe that there are off the shelf products to meet the 2 mS time stamping requirement as described by PRC-002-1 & PRC-018-1. Although there are GPS clocks with better than 1 mS capability, there are clock to equipment interface issues (including associated communications connection delays) and equipment time sync processing time delays that probably make the proposed time sync 2 (or 4) mS standard not technically achievable.

NERC's draft #3 PRC-002-1 & PRC-018-1 permitted 4 mS time stamping and this was reduced to 2 mS under draft 4. Under draft 3 review comments, SPP SPCWG objected to the 4 mS and requested consideration of a slightly longer time. I still

### Comment Form for Fourth Posting of Set One of Phase III & IV Standards

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object to the lower 2 mS requirement and request a slightly longer delay for total response (including processing and connection delays) of monitoring equipment. From NERC's response to SPP's draft 3 comments, SCADA systems with 1mS SOE capabilities (that actually have about 4 to 6 mS, i.e. 1/4 to 1/3 cycle, response due to interface and processing time delays) are not acceptable for meeting the SOE requirement. With two to five cycle breakers the SCADA systems with the 1 mS SOE feature should have been acceptable SOE devices in my opinion. If the RTU is time stamping to provide the 1mS SOE SCADA record, which is different than the SCADA master time stamping report, why is not SCADA (with RTU 1mS time stamping) permitted as a SOE device? I realize that at the DFR's at a local substation may need a better time stamp than the 4 to 6 mS response of SCADA RTU and/or especially the SCADA master time stamped event that may be up to a few seconds off, but the SCADA system SOE report provides an automatic summary of the events throughout the various substations in a company's network. The SCADA system (network) sequence of operations can be fairly accurately and easily reviewed by a SCADA SOE report without manually needing to combine and summarize many DFR records from several substation disturbance monitors / locations. Comments:

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

Yes

No

For proposed effective dates under PRC-018-1 A.5 Requirements 1 & 2, (considering there are no continuous recording disturbance monitors within SPP, the budget process and potentially costly capital improvements, the study process, the design and equipment procurement process, and the system operating constraints for outages,) the 50%, 75%, & 100% compliant times should be lengthened/adjusted to 3, 4, & 5 years or more instead of 2, 3, & 4 years. If the "continuous recording" is removed from the requirement, then the proposal as stated is acceptable. SPP has been installing DDR's based upon event triggering.

Do not agree with the 2mS time sync requirement because of communications interface and equipment processing delays. Request consideration to changing/lengthening the 2 mS time sync or clarifying time sync application so compliance is more easily accomplished. For the minimum DME sampling rate of 16 samples per cycle, it appears to me with internal processing within the DME device there will likely be more than 2 mS resolution?

Agree, per PRC-018-1 R5, that DME data recorded should be archived for three years. Do not agree with PRC-018-1 Compliance D.1.3 that "any changes to the DME installation" be retained for three years. A scope increase from the (DME data storage) requirement appears to have been inserted into the compliance section. If the DME (substation / power plant) installation (as built) drawings are modified and are no longer applicable at a site, then there should not be a requirement to store for three years old obsolete drawings that were associated with older designs. Obsolete drawings, if improperly accessed and used, may cause safety or operational problems when working at the site. Compliance section 1.3 should only refer to DME event record storage.

Comments:

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

Yes

No

Comments:

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Organization: I		
Telephone:		
E-mail:		
NERC Region		Registered Ballot Body Segment
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Group Comments (Complete this page if comments are from a group.)

**Group Name:** ITCTransmission  
**Lead Contact:** Jim Cyrulewski  
**Contact Organization:** ITCTransmission  
**Contact Segment:** Transmission Owners  
**Contact Telephone:** 248-374-7130  
**Contact E-mail:** jcyrulewski@itctransco.com

Additional Member Name	Additional Member Organization	Region*	Segment*
Jack Soehren	ITCTransmission	RFC	1
Van Greening	ITCTransmission	RFC	1

\*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on the prior page.

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Yes

No

Comments:

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

Yes

No

Since most devices have debounce filtering that can delay the time stamp by a minimum of 4 milliseconds, a time stamp variance of 1 millisecond is not practical..

Comments:

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

Yes

No

Comments:

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

Yes

No

Proposed changes to PRC-002-1 and PRC-018-1 Standards

PRC-002-1

Page 1 Definition of Terms Used in Standard

## **Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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- Sequence of event recorders which record equipment chronological response to an event with a typical resolution of 1 millisecond.
- Fault recorders, which record actual waveform data depicting the system primary voltages and currents as they exist during an event.

Footnote applies to DDRs only and should read:

Phasor Measurement Units that meet the functional requirements of DDRs may qualify as DMEs.

Page 2 A. Introduction:

3.Purpose should have added at the end "and verify system models."

B. Requirements:

Page 4 R4.4 Provision for reporting Fault and Dynamic Disturbance data in COMTRADE.... Add a sentence at the end "Sequence data in ASCII table or CSV file."

Page 5 D. Levels of Non-Compliance:

2.1.2 End should be changed to reference R6 (there is no R7).

PRC-018-1

B. Requirements

Page 2 R1.1 Since most devices have debounce filtering that can delay the time stamp by a minimum of 4 milliseconds, a timestamp variance of 1 millisecond is not realistic.

Page 3 R1.2 Needs to be written specifically for each type of DME. Fault data should be retrievable for a longer period (minimum 3 months) than Dynamic and Sequence data.

Need more requirements under R1 to address data storage in non-volatile memory and the ability of the DME to function absent of AC power to the installation site.

Page 3 R3.7 Because they are typically not monitored by DMEs, remove disconnect and alarm status. Comments:



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<b>Individual Commenter Information</b>	
(Complete this page for comments from one organization or individual.)	
Name:	Harish Mehta, Jim Hackett
Organization:	Mehta Tech, Inc.
Telephone:	563-285-9151
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NERC Region	Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input type="checkbox"/> 1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/> 2 — RTOs, ISOs, Regional Reliability Councils
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**Group Comments (Complete this page if comments are from a group.)**

**Group Name:**

**Lead Contact:**

**Contact Organization:**

**Contact Segment:**

**Contact Telephone:**

**Contact E-mail:**

Additional Member Name	Additional Member Organization	Region*	Segment*

\*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on the prior page.

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Yes

No

Comments:

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

Yes

No

The words SAMPLE and CONDITION need clear definition. For example, the word sample is used both for measurement and also for calculated result or the condition (trigger) marker/flag when the marker/flag along with the measurements is stored in a record. Additionally, the calculated value such as frequency or an RMS value do not have the precise association with time as is the case for a measurement. Furthermore, the word condition is subject to many different interpretations, in the sense that a fault recorder does not just record faults and does not know the condition of the power system or that a rate of change is not an instant-specific condition. The second sentence refers to local station's clock. A local station's clock is not necessarily the same as the GPS clock receiver used with the recording device. There is some possibility of the use of more than one GPS clock at a given site, especially if any device ends up with a dedicated GPS clock/receiver or it outputs a time signal for use by another device. Comments:

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

Yes

No

Comments:

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

## Comment Form for Fourth Posting of Set One of Phase III & IV Standards

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Yes

No

The three DME recording functions, fault, sequence of events and disturbance, produce recordings with different types of data having very different attributes. One common time stamp accuracy of less than 2 milliseconds from UTC is practical for some data types, such as measurements and is inappropriate for others, such as the results of frequency and other calculations. In our view, the absolute accuracy of the time stamp must be appropriate for the end application. A single accuracy requirement of less than 2 milliseconds for all data types in DME recordings is not practical. Comments:

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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Please use this form to submit comments on Set One of the Phase III & IV Drafting Team's fourth draft of the standards PRC-002 (Define Regional Disturbance Monitoring and Reporting Requirements) and PRC-018 (Disturbance Monitoring Equipment Installation and Data Reporting). Comments must be submitted by **May 3, 2006**. You must submit the completed form by e-mailing it to [sarcomm@nerc.com](mailto:sarcomm@nerc.com) with the words "Phase III & IV" in the subject line. If you have questions please contact Maureen Long at [maureen.long@nerc.net](mailto:maureen.long@nerc.net) or 813-468-5998.

**ALL DATA ON THIS FORM WILL BE TRANSFERRED AUTOMATICALLY TO A DATABASE.**

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  - Do not** submit a response in an unprotected copy of this form.

<b>Individual Commenter Information</b>		
(Complete this page for comments from one organization or individual.)		
Name:		
Organization:		
Telephone:		
E-mail:		
NERC Region		Registered Ballot Body Segment
<input type="checkbox"/> ERCOT	<input type="checkbox"/>	1 — Transmission Owners
<input type="checkbox"/> FRCC	<input type="checkbox"/>	2 — RTOs, ISOs, Regional Reliability Councils
<input type="checkbox"/> MRO	<input type="checkbox"/>	3 — Load-serving Entities
<input type="checkbox"/> NPCC	<input type="checkbox"/>	4 — Transmission-dependent Utilities
<input type="checkbox"/> RFC	<input type="checkbox"/>	5 — Electric Generators
<input type="checkbox"/> SERC	<input type="checkbox"/>	6 — Electricity Brokers, Aggregators, and Marketers
<input type="checkbox"/> SPP	<input type="checkbox"/>	7 — Large Electricity End Users
<input type="checkbox"/> WECC	<input type="checkbox"/>	8 — Small Electricity End Users
<input type="checkbox"/> NA – Not Applicable	<input type="checkbox"/>	9 — Federal, State, Provincial Regulatory or other Government Entities

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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**Group Comments (Complete this page if comments are from a group.)**

**Group Name:** ISO/RTO Council (IRC)  
**Lead Contact:** Charles Yeung  
**Contact Organization:** SPP  
**Contact Segment:** 2  
**Contact Telephone:** 832-724-6142  
**Contact E-mail:** cyeung@spp.org

Additional Member Name	Additional Member Organization	Region*	Segment*
Anota Lee	AESO		2
Bill Phillips	MISO		2
Al DiCaprio	PJM		2
Ron Falsetti	IESO		2
Sam Jones	ERCOT		2
Mike Calimano	NYISO		2
Peter Brandien	ISONE		2

\*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on the prior page.

**Background Information**

Please review the drafting team's consideration of the comments submitted with the third draft of these standards and then review the drafting team's conforming changes made to the standards. The 'red line' versions of PRC-002 and PRC-018 show the changes made to the third draft of these standards.

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

The drafting team believes that the most significant changes made to PRC-002 and PRC-018 are:

- PRC-002 was revised to more clearly focus on the 'functional' requirements and not on requirements of any specific piece of equipment. The intent is to have each region establish functional requirements and then allow facility owners to use any equipment or any combination of equipment to meet those requirements.
- The functional requirements common to all disturbance monitoring equipment (DME) that had been identified in PRC-002 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 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).
- The levels of non-compliance in PRC-018 were modified to address all requirements.

Most other changes made to the standards were made to improve consistency in format.

The drafting team asks you to consider your acceptance of these changes in answering the following questions.



**Please read the background information and review the revised standards before responding to the following questions. You do not need to answer all questions.**

**Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

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

Yes

No

Moving the DME's time synchronization requirements to PRC-018-1 is not necessary. In fact, this move has resulted in convoluting the latter standard – both in requirements and in measures and compliance. Synchronizing requirements are part and partial of the technical requirements that apply to the recording devices, which should remain in PRC-002-1. The SDT's rationale that the move would ensure consistency across all regions does not appear to be well-founded. Keeping them in PRC-002-1 can also achieve this objective since NERC standards are applied industry-wide. Regional specific requirements, in this context, would be restricted to the location and other specific monitoring and recording requirements detailed in R1 to R3 of PRC-002-1.

Moving the concerned requirement out of PRC-002-1 does not necessarily make this standard more clear cut or standalone. In fact, since the RROs are responsible for meeting the requirements stipulated in this standard, it makes more sense to also stipulate in this standard that the Regions include the specified time synchronization requirements in their regional requirements. Comments:

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

Yes

No

The first sentence in R1.1 is sufficient to provided the needed requirement. All DMEs must be synchronized to a universal time standard. Also, we believe realization of this requirement is beyond the capability of today's equipment. We suggest R1.1 be changed to read as follows: "Internal Clocks in DME devices shall be synchronized to within 2 ms. or less of Universal Coordinated Time scale (UTC)." Background material on this area is available at this IEEE address: <http://www.pes-psrc.org/i/1workgroup.html> - After arriving at that address, choose working group I11 - "Timing Considerations for Event Reconstruction." Comments:

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

Yes

**Comment Form for Fourth Posting of Set One of Phase III & IV Standards**

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No

(i) Measure M1: With R1 added (from PRC-002-1), M1 is now very convoluted. This should not be case if R1 stays in PRC-002-1 and is stipulated as "shall be included in regional requirements".

(ii) Measure M4: M4, as written, is a requirement repeating R6. It should be reworded in the context of, for example, "shall have evidence or documentation to demonstrate R6 is met".

(iii) Compliance Level 2.4.4: the sentence "Documentation of the DME maintenance and testing program, or its implementation, was not provided" needs clarification. Suggest to reword it to read something similar to 2.2.5, for example: "Documentation of the DME maintenance and testing program was not provided, or no evidence that the testing program did occur within the identified intervals".

(iv) While we didn't comment on previous drafts, we feel that the arbitrary levels of non-compliance (such as 90% instead of 75%( do not provide the correct guidance to the industry. If it is critical that these devices be installed for reliability then there should only be one level of non-compliance (level 3 or 4). If however these devices are being installed to assist after the fact analysis, then the non-compliance level should only be a level 1 or 2. Comments:

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

Yes

No

(i) PRC-002 and PRC-018 should be restructured to meet their respective purposes, i.e. that PRC-002 is intended to stipulate the requirements to ensure that Regional Reliability Organizations establish technical, data and location requirements for installation of Disturbance Monitoring Equipment (DME), whereas PRC-018 is intended to stipulate the requirements for ensuring that DMEs are installed and that disturbance data is reported in accordance with regional requirements to facilitate analyses of events.

(ii) In PRC-018-1, fifth dash under Proposed Effective Date: suggest to revise the sentence "100% compliant 6 months after installation for DMEs installed to meet Regional Reliability Organization requirements per Reliability Standard PRC-002 Requirements 1, 2 and 3, as it doesn't read right.

(iii) There are some legacy DMEs which fail to meet the standards to some degree only. We feel the 4 year replacement time is too short in cases of small degree of deficiency. We suggest that the four year time framewould apply to locations which are not covered by DME or covered with DME which is entirely inadequate, but for cases where the DMEs are difficient in only one of the requirments defined in either PRC-002 or PRC-018, an 8 year time frame to be more practical. The result would provide for better coverage since this would focus the current effort on areas where the DMEs do not exist. Comments:

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<b>Individual Commenter Information</b>	
(Complete this page for comments from one organization or individual.)	
Name:	
Organization:	
Telephone:	
E-mail:	
NERC Region	Registered Ballot Body Segment
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**Group Name:** NERC System Protection and Control Task Force  
**Lead Contact:** Charles Rogers  
**Contact Organization:** Consumers Energy  
**Contact Segment:** Load Serving Entity  
**Contact Telephone:** 517-788-0027  
**Contact E-mail:** cwrogers@voyager.net

<b>Additional Member Name</b>	<b>Additional Member Organization</b>	<b>Region*</b>	<b>Segment*</b>
W Mark Carpenter	TXU Energy Delivery	ERCOT	
David Angell	Idaho Power	WECC	
Deven Bhan	WAPA	MRO	
Joseph Burdis	PJM Interconnection	RFC	
John Ciufu	Hydro One	NPCC	
Jim Ingleson	NYISO	NPCC	
Fred Ipock	Springfield City Utilities	SPP	
Bill Kennedy	Kennedy and Associates		
Michael McDonald	Ameren	SPP	
William Miller	Exelon	RFC	
John Mulhausen	Florida Power and Light	FRCC	
James D Roberts	TVA	SERC	
Evan Sage	PEPCO Holdings	RFC	
Bob Stuart	Elequant		
John Sykes	Salt River Project	WECC	
Phil Tatro	National Grid USA	NPCC	
Henry Miller	AEP	RFC	
Phil Winston	Georgia Power	SERC	
Baj Agrawal	Arizona Public Service	WECC	
Jon Daume	BPA	WECC	
Tom Wiedman	Wiedman Power System Consulting		
Bob Cummings	NERC		

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Comments:

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Yes

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Comments:

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Yes

No

Comments: