

## Standard Authorization Request Form

Title of Proposed Standard: Protection System Maintenance (Project 2007-17)
Request Date: May 7, 2007

SAR Requestor Information	SAR Type <i>(Check a box for each one that applies.)</i>	
Name: System Protection and Controls Task Force (Attachment A)	<input type="checkbox"/>	New Standard
Primary Contact: Charles Rogers	X	Revision to existing Standards: PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs PRC-011-0 — UVLS System Maintenance and Testing PRC-017-0 — Special Protection System Maintenance and Testing
Telephone (517) 788-0027 Fax (517) 788-0917	X	Withdrawal of existing Standard
E-mail: cwrogers@cmsenergy.com	<input type="checkbox"/>	Urgent Action

<p><b>Purpose</b> (Describe the purpose of the standard — what the standard will achieve in support of reliability.)</p> <p>The purpose of standard PRC-005 should remain “To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.”</p>
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<p><b>Industry Need</b> (Provide a detailed statement justifying the need for the proposed standard, along with any supporting documentation.)</p> <p>In Order 693, the Federal Energy Regulatory Commission directed that changes be made to these standards.</p> <p>These standards should be consolidated into a single standard to reduce the costs of compliance and a number of technical short comings in these standards should be corrected to provide reliable performance when responding to abnormal system conditions.</p>
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**Brief Description** (Describe the proposed standard in sufficient detail to clearly define the scope in a manner that can be easily understood by others.)

Revise PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing, to consolidate PRC-005-1, PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs; PRC-011-0 — UVLS System Maintenance and Testing; and PRC-017-0 — Special Protection System Maintenance and Testing into a single maintenance and testing standard. Standards PRC-008-0, PRC-011-0, and PRC-017-0 would then be withdrawn.

The revised PRC-005 standard should address the issues raised in the FERC Order 693, the issues raised by stakeholders during the development of Version 0 and Phase III & IV standards (Attachment D), and the issues addressed in the SPCTF report “Assessment of PRC-005-1 – Transmission and Generation Protection System Maintenance and Testing; with implications for PRC-008-0, PRC-011-0, and PRC-017-0” (Attachment B) The revised standard should also address the comments submitted by stakeholders during the development of Version 0, and Phase III & IV and should reflect improvements identified in the Reliability Standards Review Guidelines. (Attachment C)

**Detailed Description:**

The PRC-005, 008, 011, and 017 reliability standards are intended to assure that Protection Systems are maintained and tested so as to provide reliable performance when responding to abnormal system conditions. It is the responsibility of the Transmission Owner, Generator Owner, and Distribution Provider to ensure the Protection Systems are maintained and tested in such a manner that the protective systems operate to fulfill their function.

Applicable to all four standards — The listed requirements do not provide clear and sufficient guidance concerning the maintenance and testing of the Protection Systems to achieve the commonly stated purpose which is “To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.”

- Applicable to PRC-017 — Part of the stated purpose in PRC-017 is: “To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.” The phrase “and misoperations are analyzed and corrected” is not clearly appropriate in a maintenance and testing standard. That is the purpose is more appropriate in PRC-003 and PRC-004, which relate to the analysis and mitigation of protection system misoperations. Analysis of correct operations or misoperations may be an integral part of condition-based maintenance processes, but need not be mandated in a maintenance standard.
- Applicable to all four standards — The standards should clearly state which power system elements are being addressed.
- Applicable to all four standards — The requirements should reflect the inherent differences between various protection system technologies.
- Applicable to all four standards — The terms “maintenance programs” and “testing programs” should be clearly defined in the glossary. The terms “maintenance” and “testing” are not interchangeable, and the requirements must be clear in their application. Additional terms may also have to be added to the glossary for clarity.
- Applicable to all four standards — The requirements of the existing standards, as stated, support time-based maintenance and testing, and should be expanded to include condition-based and performance-based maintenance and testing. The requirements for maintenance and testing procedures need to have more specificity to insure that the stated intent of the standards is met to support review by the compliance monitor.

The revised standard should also include the general improvements identified in the attached Reliability Standard Review Guidelines (Attachment C) and should address the comments submitted by stakeholders (Attachment D).

**Standards Authorization Request Form**

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**Reliability Functions**

<b>The Standard will Apply to the Following Functions</b> <i>(Check box for each one that applies.)</i>		
<input type="checkbox"/>	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
<input type="checkbox"/>	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
<input type="checkbox"/>	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
<input type="checkbox"/>	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
<input type="checkbox"/>	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
<input type="checkbox"/>	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
<input type="checkbox"/>	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
<input checked="" type="checkbox"/>	Transmission Owner	Owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
<input checked="" type="checkbox"/>	Distribution Provider	Delivers electrical energy to the End-use customer.
<input checked="" type="checkbox"/>	Generator Owner	Owns and maintains generation facilities.
<input type="checkbox"/>	Generator Operator	Operates generation unit(s) to provide real and reactive power.
<input type="checkbox"/>	Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
<input type="checkbox"/>	Market Operator	Interface point for reliability functions with commercial functions.
<input type="checkbox"/>	Load-Serving Entity	Secures energy and transmission service (and reliability-related services) to serve the End-use Customer.

**Reliability and Market Interface Principles**

<b>Applicable Reliability Principles</b> (Check box for all that apply.)	
<input checked="" type="checkbox"/>	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input checked="" type="checkbox"/>	2. The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk electric systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk electric systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber attacks.
<b>Does the proposed Standard comply with all the following Market Interface Principles?</b> (Select "yes" or "no" from the drop-down box.)	
1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes	
2. An Organization Standard shall not give any market participant an unfair competitive advantage. Yes	
3. An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes	
4. An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes	
5. An Organization Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes	

**Standards Authorization Request Form**

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***Related Standards***

<b>Standard No.</b>	<b>Explanation</b>

***Related SARs***

<b>SAR ID</b>	<b>Explanation</b>

***Regional Differences***

<b>Region</b>	<b>Explanation</b>
ERCOT	None
FRCC	None
MRO	None
NPCC	None
SERC	None
RFC	None
SPP	None
WECC	None

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## **NERC SPCTF Assessment of Standards:**

- **PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing**
- **PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs**
- **PRC-011-0 — UVLS System Maintenance and Testing**
- **PRC-017-0 — Special Protection System Maintenance and Testing**

**DRAFT 1.0**  
**March 8, 2007**

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A Technical Review of Standards

Prepared by the  
System Protection and Controls Task Force  
of the  
NERC Planning Committee

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This report and its attendant Standards Authorization Request were approved by the Planning Committee on March 21, 2007, for forwarding to the Standards Committee.

## **Introduction**

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When the original scope for the System Protection and Control Task Force was developed, one of the assigned items was to review all of the existing PRC-series Reliability Standards, to advise the Planning Committee of our assessment, and to develop Standards Authorization Requests, as appropriate, to address any perceived deficiencies.

This report presents the SPCTF's assessment of PRC-005-1 – Transmission and Generation Protection System Maintenance and Testing. The report includes the SPCTF's understanding of the intent of this standard and contains specific observations relative to the existing standard.

The SPCTF sees the parallel intent for each of the PRC-005, PRC-008, PRC-011, and PRC-017 as being maintenance and testing standards for different protective systems. In fact, PRC-005 & PRC-008, and PRC-011 & PRC-017 have very similar format respectively. Since all protective relay systems require some means of maintenance and testing, it would seem that all protective system maintenance and testing could be included in one standard regardless of scheme type. The SPCTF recommends that these four standards be reduced to one standard covering the issues detailed for PRC-005 on maintenance and testing.

These four standards were developed primarily by translating the requirements of an earlier Phase I Planning Standard; thus they have not been previously subjected to a critical review of the Requirements.

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## **Executive Summary**

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Reliability standards PRC-005, 008, 011, and 017 are intended to assure that Transmission & Generation Protection Systems are maintained and tested so as to provide reliable performance when responding to abnormal system conditions. It is the responsibility of the Transmission Owner, Generation Owner, and Distribution Provider to ensure the Transmission & Generation Protection Systems are maintained and tested in such a manner that the protective systems operate to fulfill their function.

Only PRC-005 will be commented on in detail although the other three standards have the same concerns.

SPCTF concluded that:

- Applicable to all four standards — The listed requirements do not provide clear and sufficient guidance concerning the maintenance and testing of the Protection Systems to achieve the commonly stated purpose which is “To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.”
- Applicable to PRC-017 — Part of the stated purpose in PRC-017 states: “To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.” The phrase “and misoperations are analyzed and corrected” is not clearly appropriate in a maintenance and testing standard. That is, the purpose is more appropriate in PRC-003 and PRC-004, which relate to the analysis and mitigation of protection system misoperations. Analysis of correct operations or misoperations may be an integral part of condition-based maintenance processes, but need not be mandated in a maintenance standard.
- Applicable to all four standards — The standards should clearly state which power system elements are being addressed.
- Applicable to all four standards — The requirements should reflect the inherent differences between different technologies of protection systems.
- Applicable to all four standards — The terms maintenance programs and testing programs should be clearly defined in the glossary. The terms “maintenance” and “testing” are not interchangeable, and the requirements must be clear in their application. Additional terms may also have to be added to the glossary for clarity.

- Applicable to all four standards — The requirements of the existing standards, as stated, support time-based maintenance and testing, and should be expanded to include condition-based and performance-based maintenance and testing. The R1.2 summary of maintenance and testing procedures needs to have some minimum defined sub-requirements to insure that the stated intent of the standards is met to support review by the compliance monitor.

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## **Assessment of PRC-005-1**

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### ***Purpose***

To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.
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A review of PRC-005 indicates that this standard is intended to assure that all affected entities have adequate maintenance and testing programs for their Protection Systems to ensure reliability. SPCTF agrees with the Purpose statement of PRC-005-1.

### ***General Comments***

The SPCTF offers the following general comments:

- None of the requirements within PRC-005-1 specifically indicate what minimum attributes should be included in protective system maintenance and testing procedures.
- For interval-based procedures, no allowable maximum interval is prescribed.
- None of the requirements in the existing PRC-005-1 reflect condition-based or performance-based maintenance and testing criteria.

Standard PRC-005 should clarify that two goals are being covered:

- The maintenance portion should have requirements that keep the protection system equipment operating within manufacturers' design specification throughout the service life.
- The testing portion should have requirements that verify that the functional performance of the protection systems is consistent with the design intent throughout the service life.

### **Applicability**

Applicability 4.3 suggests that the definition of a Protection System in the Glossary of Terms should

- 4.1.** Transmission Owners
- 4.2.** Generation Owners
- 4.3.** Distribution Providers that owns a transmission Protection System

clarify how a Distribution Provider may be the owner of a transmission Protection System.

### **Requirements**

#### **R1**

- R1.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall have a Protection System maintenance and testing program for Protection Systems that affect the reliability of the BES. The program shall include:
  - R1.1.** Maintenance and testing intervals and their basis.
  - R1.2.** Summary of maintenance and testing procedures.

The following clarifications should be made to Requirement R1:

- 1. How is the phrase “that affect the reliability of the BES” to be interpreted? The standard should clearly specify which Protection Systems are subject to the requirements.
- 2. The standard should clearly specify which components of the Generation Protection System are subject to the requirements.

The following clarifications should be made to Subparts R1.1 & R1.2:

- 1. Interval-based, condition-based, or performance-based maintenance and testing minimum criteria should be established within R1.1, including, but not limited to the following:
  - a. For time-based maintenance and testing programs, maximum maintenance intervals should be specified.
  - b. For condition-based or performance-based maintenance and testing programs, the program should have sufficient justification and documentation.
- 2. Definitions should be established for the terms “maintenance programs” and “testing programs.”
- 3. A minimum set of attributes to be included in maintenance and testing programs should be established within R1.2.

## R2

**R2.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall provide documentation of its Protection System maintenance and testing program and the implementation of that program to its Regional Reliability Organization on request (within 30 calendar days). The documentation of the program implementation shall include:

**R2.1.** Evidence Protection System devices were maintained and tested within the defined intervals.

**R2.2.** Date each Protection System device was last tested/maintained

The following clarification should be made to requirement R2:

- The appropriate entity should have their Protection System maintenance program and testing program and associated documentation, including maintenance records and testing records, available to its Regional Reliability Organization and NERC during audits or upon request within 30 days.

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## FERC Assessment of PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0

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In the October 20, 2006 Notice of Proposed Rulemaking for adoption of NERC Standards (Docket Number RM06-16-000), the Federal Energy Regulatory Commission commented on these four standards and proposed changes. The observations and proposals are excerpted from the NOPR and included below.

### ***PRC-005-1***

The Commission proposes to approve PRC-005-1 as mandatory and enforceable. In addition, we propose to direct that NERC develop modifications to the Reliability Standard as discussed below.

Proposed Reliability Standard PRC-005-1 does not specify the criteria to determine the appropriate maintenance intervals, nor do it specify maximum allowable maintenance intervals for the protection systems. The Commission therefore proposes that NERC include a requirement that maintenance and testing of these protection systems must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System.

Accordingly, giving due weight to the technical expertise of the ERO and with the expectation that the Reliability Standard will accomplish the purpose represented to the Commission by the ERO and that it will improve the reliability of the nation's Bulk-Power System, the Commission proposes to approve Reliability Standard PRC-005-1 as mandatory and enforceable. In addition, pursuant to section 215(d)(5) of the FPA and § 39.5(f) of our regulations, the Commission proposes to direct that NERC submit a modification to PRC-005-1 that includes a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System.

***PRC-008-0***

The Commission notes that the commenters generally share staff's concern that the proposed Reliability Standard does not specify the criteria to determine the appropriate maintenance intervals, nor does it specify maximum allowable maintenance intervals for the protection systems. The Commission agrees and proposes to require NERC to modify the proposed Reliability Standard to include a requirement that maintenance and testing of UFLS programs must be carried out within a maximum allowable interval that is appropriate to the type of relay used and the impact on the reliability of the Bulk-Power System.

Accordingly, the Commission proposes to approve Reliability Standard PRC-008-0 as mandatory and enforceable. In addition, the Commission proposes to direct that NERC submit a modification to PRC-008-0 that includes a requirement that maintenance and testing of UFLS programs must be carried out within a maximum allowable interval appropriate to the relay type and the potential impact on the Bulk-Power System.

***PRC-011-0***

PRC-011-0 does not specify the criteria to determine the appropriate maintenance intervals, nor does it specify maximum allowable maintenance intervals for the protection systems. The Commission proposes that NERC include a Requirement that maintenance and testing of these UFLS programs must be carried out within a maximum allowable interval that is appropriate to the type of the relay used and the impact of these UFLS on the reliability of the Bulk-Power System.

The Commission believes that Reliability Standard PRC-011-0 serves an important purpose in requiring transmission owners and distribution providers to implement their UVLS equipment maintenance and testing programs. Further, the proposed Requirements are sufficiently clear and objective to provide guidance for compliance.

Accordingly, giving due weight to the technical expertise of the ERO and with the expectation that the Reliability Standard will accomplish the purpose represented to the Commission by the ERO and that it will improve the reliability of the nation's Bulk-Power System, the Commission proposes to approve Reliability Standard PRC-011-0 as mandatory and enforceable. In addition, pursuant to section 215(d)(5) of the FPA and § 39.5(f) of our regulations, the Commission proposes to direct that NERC submit a modification to PRC-011-0 that includes a requirement that maintenance and testing of UVLS programs must be carried out within a maximum allowable interval appropriate to the applicable relay and the impact on the reliability of the Bulk-Power System.

### **PRC-017-0**

PRC-017-0 does not specify the criteria to determine the appropriate maintenance intervals, nor does it specify maximum allowable maintenance intervals for the protections systems. The Commission proposes to require NERC to include a requirement that maintenance and testing of these special protection system programs must be carried out within a maximum allowable interval that is appropriate to the type of relaying used and the impact of these special protection system programs on the reliability of the Bulk-Power System.

Accordingly, giving due weight to the technical expertise of the ERO and with the expectation that the Reliability Standard will accomplish the purpose represented to the Commission by the ERO and that it will improve the reliability of the nation's Bulk-Power System, the Commission proposes to approve Reliability Standard PRC-017-0 as mandatory and enforceable. In addition, pursuant to section 215(d)(5) of the FPA and § 39.5(f) of our regulations, the Commission proposes to direct that NERC submit a modification to PRC-017-0 that: (1) includes a requirement that maintenance and testing of these special protection system programs must be carried out within a maximum allowable interval that is appropriate to the type of relaying used; and (2) identifies the impact of these special protection system programs on the reliability of the Bulk-Power System.

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### **Other Activities Related to PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0**

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These four Standards are contained in several projects and draft SARs as part of the “Draft Reliability Standards Development Plan: 2007–2009”, which was approved by the NERC Board of Trustees.

The SPCTF recommends that standards PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0 be removed from the separate SARS in the Standards Development Plan, and that they be included in a new Standard Authorization Request for a single Protection System maintenance and testing standard.

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### **Conclusions and Recommendations**

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PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0 require additions, clarifications, and definitions to insure that the Protection Systems are properly maintained and tested.

The SPCTF recommends that standards PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0 be removed from the separate SARS in the “Draft Reliability Standards Development Plan: 2007–2009,” and that they be included in a new Standard Authorization Request for a single Protection System maintenance and testing standard.

SPCTF submits the attached SAR for that purpose of consolidating PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0 into a single standard to the Planning Committee for endorsement.

## **Standard Review Guidelines**

### **Applicability**

Does this reliability standard clearly identify the functional classes of entities responsible for complying with the reliability standard, with any specific additions or exceptions noted? Where multiple functional classes are identified is there a clear line of responsibility for each requirement identifying the functional class and entity to be held accountable for compliance? Does the requirement allow overlapping responsibilities between Registered Entities possibly creating confusion for who is ultimately accountable for compliance?

Does this reliability standard identify the geographic applicability of the standard, such as the entire North American bulk power system, an interconnection, or within a regional entity area? If no geographic limitations are identified, the default is that the standard applies throughout North America.

Does this reliability standard identify any limitations on the applicability of the standard based on electric facility characteristics, such as generators with a nameplate rating of 20 MW or greater, or transmission facilities energized at 200 kV or greater or some other criteria? If no functional entity limitations are identified, the default is that the standard applies to all identified functional entities.

### **Purpose**

Does this reliability standard have a clear statement of purpose that describes how the standard contributes to the reliability of the bulk power system? Each purpose statement should include a value statement.

### **Performance Requirements**

Does this reliability standard state one or more performance requirements, which if achieved by the applicable entities, will provide for a reliable bulk power system, consistent with good utility practices and the public interest?

Does each requirement identify who shall do what under what conditions and to what outcome?

### **Measurability**

Is each performance requirement stated so as to be objectively measurable by a third party with knowledge or expertise in the area addressed by that requirement?

Does each performance requirement have one or more associated measures used to objectively evaluate compliance with the requirement?

If performance results can be practically measured quantitatively, are metrics provided within the requirement to indicate satisfactory performance?

### **Technical Basis in Engineering and Operations**

Is this reliability standard based upon sound engineering and operating judgment, analysis, or experience, as determined by expert practitioners in that particular field?

### **Completeness**

Is this reliability standard complete and self-contained? Does the standard depend on external information to determine the required level of performance?

### **Consequences for Noncompliance**

In combination with guidelines for penalties and sanctions, as well as other ERO and regional entity compliance documents, are the consequences of violating a standard clearly known to the responsible entities?

## **Attachment C — Reliability Standard Review Guidelines**

### **Clear Language**

Is the reliability standard stated using clear and unambiguous language? Can responsible entities, using reasonable judgment and in keeping with good utility practices, arrive at a consistent interpretation of the required performance?

### **Practicality**

Does this reliability standard establish requirements that can be practically implemented by the assigned responsible entities within the specified effective date and thereafter?

### **Capability Requirements versus Performance Requirements**

In general, requirements for entities to have ‘capabilities’ (this would include facilities for communication, agreements with other entities, etc.) should be located in the standards for certification. The certification requirements should indicate that entities have a responsibility to ‘maintain’ their capabilities.

### **Consistent Terminology**

To the extent possible, does this reliability standard use a set of standard terms and definitions that are approved through the NERC reliability standards development process?

If the standard uses terms that are included in the NERC Glossary of Terms Used in Reliability Standards, then the term must be capitalized when it is used in the standard. New terms should not be added unless they have a ‘unique’ definition when used in a NERC reliability standard. Common terms that could be found in a college dictionary should not be defined and added to the NERC Glossary.

Are the verbs on the ‘verb list’ from the DT Guidelines? If not – do new verbs need to be added to the guidelines or could you use one of the verbs from the verb list?

## **Violation Risk Factors (Risk Factor)**

### **High Risk Requirement**

A requirement that, if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures;

or a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

### **Medium Risk Requirement**

A requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, violation of a medium risk requirement is unlikely to lead to bulk electric system instability, separation, or cascading failures;

or a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of a medium risk requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.

### Lower Risk Requirement

A requirement that, if violated, would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. A requirement that is administrative in nature;

or a requirement in a planning time frame that, if violated, would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. A planning requirement that is administrative in nature.

### Time Horizon

The drafting team should also indicate the time horizon available for mitigating a violation to the requirement using the following definitions:

- **Long-term Planning** — a planning horizon of one year or longer.
- **Operations Planning** — operating and resource plans from day-ahead up to and including seasonal.
- **Same-day Operations** — routine actions required within the timeframe of a day, but not real-time.
- **Real-time Operations** — actions required within one hour or less to preserve the reliability of the bulk electric system.
- **Operations Assessment** — follow-up evaluations and reporting of real time operations.

### Violation Severity Levels

The drafting team should indicate a set of violation severity levels that can be applied for the requirements within a standard. ('Violation severity levels' replace existing 'levels of non-compliance.')

The violation severity levels must be applied for each requirement and may be combined to cover multiple requirements, as long as it is clear which requirements are included and that all requirements are included.

**The violation severity levels should be based on the following definitions:**

- **Lower: mostly compliant with minor exceptions** — The responsible entity is mostly compliant with and meets the intent of the requirement but is deficient with respect to one or more minor details. Equivalent score: more than 95% but less than 100% compliant.
- **Moderate: mostly compliant with significant exceptions** — The responsible entity is mostly compliant with and meets the intent of the requirement but is deficient with respect to one or more significant elements. Equivalent score: more than 85% but less than or equal to 95% compliant.
- **High: marginal performance or results** — The responsible entity has only partially achieved the reliability objective of the requirement and is missing one or more significant elements. Equivalent score: more than 70% but less than or equal to 85% compliant.
- **Severe: poor performance or results** — The responsible entity has failed to meet the reliability objective of the requirement. Equivalent score: 70% or less compliant.

## **Attachment C — Reliability Standard Review Guidelines Compliance Monitor**

Replace, ‘Regional Reliability Organization’ with ‘Regional Entity’

### **Fill-in-the-blank Requirements**

Do not include any ‘fill-in-the-blank’ requirements. These are requirements that assign one entity responsibility for developing some performance measures without requiring that the performance measures be included in the body of a standard – then require another entity to comply with those requirements.

Every reliability objective can be met, at least at a threshold level, by a North American standard. If we need regions to develop regional standards, such as in under-frequency load shedding, we can always write a uniform North American standard for the applicable functional entities as a means of encouraging development of the regional standards.

### **Requirements for Regional Reliability Organization**

Do not write any requirements for the Regional Reliability Organization. Any requirements currently assigned to the RRO should be re-assigned to the applicable functional entity.

### **Effective Dates**

Must be 1<sup>st</sup> day of 1<sup>st</sup> quarter after entities are expected to be compliant – must include time to provide notice to responsible entities of the obligation to comply. If the standard is to be actively monitored, time for the Compliance Monitoring and Enforcement Program to develop reporting instructions and modify the Compliance Data Management System(s) both at NERC and Regional Entities must be provided in the implementation plan. The effective date should be linked to the NERC BOT adoption date.

### **Associated Documents**

If there are standards that are referenced within a standard, list the full name and number of the standard under the section called, ‘Associated Documents’.

### **Functional Model Version 3**

Review the requirements against the latest descriptions of the responsibilities and tasks assigned to functional entities as provided in pages 13 through 53 of the draft Functional Model Version 3.

**PRC-005-0 — Transmission Protection System Maintenance and Testing**

**Version 0 Comments:**

- This section should not move forward in Version 0. More procedure/data oriented, not really stand alone "standard" material but more tools or reference material for executing a standard
- R3-1.a – should breakers and switches be included in the list?
- M3-2 – what kind of evidence?
- M3-2 The "shall have evidence" phrase is vague and may be unnecessary considering that the requesting entity should know if its requested information is supplied.

**Phase III & IV Comments:**

- PRC 003 to 005 only address generator (and transmission) protective systems, without defining this term.
- Need to add language to ensure the Regional Requirements focus on the most impactful scenarios
- Modify applicability to clarify that the requirements are applicable to the following:
  - All protection systems on the bulk electric system.
  - All generation protection systems whose misoperations impact the bulk electric system
- There is no performance requirement or measure of effectiveness of a maintenance program required by the standard

**PRC-008-0 — Underfrequency Load Shedding Equipment Maintenance Programs**

**Version 0 Comments:**

- The language for protection system maintenance and testing programs should be consistent from standard to standard. The requirement in this standard should match Standard 063, Requirement R3-1. This will provide a consistent reporting requirement for all protection system.
- From standard 063.3: The Transmission Owner, Generator Owner and Distribution Provider that owns a transmission protection system shall have a transmission protection system maintenance and testing program in place. The program(s) shall include:
- From Standard 067.3: The Transmission Owner and Distribution Provider with a UFLS program (as required by its Regional Reliability Organization) shall have a UFLS equipment maintenance and testing program in place. This UFLS equipment maintenance and testing program shall include UFLS equipment identification, the schedule for UFLS equipment testing, and the schedule for UFLS equipment maintenance.
- The "shall have evidence" phrase is vague and may be unnecessary considering that the requesting entity should know if its requested information is supplied.

**PRC-011-0 — UVLS System Maintenance and Testing**

**Version 0 Comments:**

- The "shall have evidence" phrase is vague and may be unnecessary considering that the requesting entity should know if its requested information is supplied.
- UVLS : Under voltage load shedding should not be a requirement for all parties. Those who have shunt reactors can meet the objective by not shedding load but by shedding shunt reactors. Flexibility in achieving the desired goal is appropriate.

**PRC-017-0 — Special Protection System Maintenance and Testing**

**Version 0 Comments:**

- In f, it needs to be changed to require that the last two dates of testing and maintenance are kept. This is necessary to verify an action that is required bi-annually or bi-monthly.
- The "shall have evidence" phrase is vague and may be unnecessary considering that the requesting entity should know if its requested information is supplied.