

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure II.B.M2, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1 - 30, 2005
2. Conduct 1 st ballot.	January 3 – 12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13 - 16, 2006
4. Conduct 2 nd ballot.	January 17 – 26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6 – February 6, 2006
6. Board adoption.	February 6, 2006
7. Effective date.	Phased – April 1, 2006 for RRO requirements; January 1, 2007 for GOW requirements

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

A. Introduction

- 1. Title:** Verification of Generator Gross and Net Real Power Capability
- 2. Number:** MOD-024-1
- 3. Purpose:** To ensure accurate information on generator gross and net Real Power capability is available for steady-state models used to assess Bulk Electric System reliability.
- 4. Applicability**
 - 4.1.** Regional Reliability Organization.
 - 4.2.** Generation Owner.
- 5. Proposed Effective Dates:**

Requirement 1 and Requirement 2 -April 1, 2006.

Requirement 3 -January 1, 2007.

B. Requirements

- R1.** The Regional Reliability Organization shall establish and maintain procedures to address verification of generator gross and net Real Power capability. These procedures shall include the following:
 - R1.1.** Generating unit exemption criteria including documentation of those units that are exempt from a portion or all of these procedures.
 - R1.2.** Criteria for reporting generating unit auxiliary loads.
 - R1.3.** Acceptable methods for model and data verification, including any applicable conditions under which the data should be verified. Such methods can include use of manufacturer data, commissioning data, performance tracking, and testing, etc.
 - R1.4.** Periodicity and schedule of model and data verification and reporting.
 - R1.5.** Information to be verified and reported:
 - R1.5.1.** Seasonal gross and net Real Power generating capabilities.
 - R1.5.2.** Real power requirements of auxiliary loads.
 - R1.5.3.** Method of verification, including date and conditions.
- R2.** The Regional Reliability Organization shall provide its generator gross and net Real Power capability verification and reporting procedures, and any changes to those procedures, to the Generator Owners, Generator Operators, Transmission Operators, Planning Authorities, and Transmission Planners affected by the procedure within 30 calendar days of the approval.
- R3.** The Generator Owner shall follow its Regional Reliability Organization's procedures for verifying and reporting its gross and net Real Power generating capability per R1.

C. Measures

- M1.** The Regional Reliability Organization shall have available for inspection the procedures for the verification and reporting of generator gross and net Real Power capability in accordance with R1.
- M2.** The Regional Reliability Organization shall have evidence that its procedures, and any revisions to those procedures, for verification and reporting of generator gross and net Real Power capability were provided to affected Generator Owners, Generator Operators,

Transmission Operators, Planning Authorities, and Transmission Planners within 30 calendar days of approval.

- M3.** The Generator Owner shall have evidence it provided verified information of its generator gross and net Real Power capability, consistent with that Regional Reliability Organization's procedures.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

For Regional Reliability Organization: NERC

For Generator Owner: Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Regional Reliability Organization shall retain both the current and previous versions of the procedures.

The Generator Owner shall retain information from the most current and prior verification.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization and Generator Owner shall each demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance for Regional Reliability Organization:

- 2.1. Level 1:** There shall be a level one non-compliance if either of the following conditions is present:

2.1.1 Procedures did not meet one of the following requirements: R1.1, R1.2, R1.4

2.1.2 No evidence that procedures were distributed as required in R2.

- 2.2. Level 2:** There shall be a level two non-compliance if **both** of the following conditions are present:

2.2.1 Procedures did not meet two of the following requirements: R1.1, R1.2, R1.4

2.2.2 No evidence that procedures were distributed as required in R2.

- 2.3. Level 3:** Procedures did not meet R1.3.

- 2.4. Level 4:** Procedures did not meet either R1.5.1, R1.5.2 or R1.5.3

3. Levels of Non-Compliance for Generator Owner:

- 3.1. Level 1:** Complete, verified generator data were provided for 98% or more but less than 100% of a generator owner's units as required by the Regional procedures.
- 3.2. Level 2:** Complete, verified generator data were provided for than 96% or more, but less than 98% of a generator owner's units as required by the Regional procedures.
- 3.3. Level 3:** Complete, verified generator data were provided for 94% or more, but less than 96% of a generator owner's units as required by the Regional procedures.
- 3.4. Level 4:** Complete, verified generator data were provided for less than 94% less of a generator owner's units as required by the Regional procedures.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard MOD-025-1 — Verification of Generator Gross and Net Reactive Power Capability

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure II.B.M3, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments.	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption.	February 6, 2006
7. Effective date.	Phased — January 1, 2007 for RRO requirements; January 1, 2008–January 1, 2012 for GOW requirements

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard MOD-025-1 — Verification of Generator Gross and Net Reactive Power Capability

A. Introduction

1. **Title:** Verification of Generator Gross and Net Reactive Power Capability
2. **Number:** MOD-025-1
3. **Purpose:** To ensure accurate information on generator gross and net Reactive Power capability is available for steady-state models used to assess Bulk Electric System reliability.
4. **Applicability**
 - 4.1. Regional Reliability Organization.
 - 4.2. Generator Owner.
5. **Proposed Effective Dates:**

Requirement 1 and Requirement 2 – January 1, 2007

Requirement 3:

 - January 1, 2008 – 1st 20% compliant
 - January 1, 2009 – 2nd 20% compliant
 - January 1, 2010 – 3rd 20% compliant
 - January 1, 2011 – 4th 20% compliant
 - January 1, 2012 – 5th 20% compliant

B. Requirements

- R1. The Regional Reliability Organization shall establish and maintain procedures to address verification of generator gross and net Reactive Power capability. These procedures shall include the following:
 - R1.1. Generating unit exemption criteria including documentation of those units that are exempt from a portion or all of these procedures.
 - R1.2. Criteria for reporting generating unit auxiliary loads.
 - R1.3. Acceptable methods for model and data verification, including any applicable conditions under which the data should be verified. Such methods can include use of commissioning data, performance tracking, engineering analysis, testing, etc.
 - R1.4. Periodicity and schedule of model and data verification and reporting.
 - R1.5. Information to be reported:
 - R1.5.1. Verified maximum gross and net Reactive Power capability (both lagging and leading) at Seasonal Real Power generating capabilities as reported in accordance with Reliability Standard MOD-024 Requirement 1.5.1.
 - R1.5.2. Verified Reactive Power limitations, such as generator terminal voltage limitations, shorted rotor turns, etc.
 - R1.5.3. Verified Reactive Power of auxiliary loads.
 - R1.5.4. Method of verification, including date and conditions.
- R2. The Regional Reliability Organization shall provide its generator gross and net Reactive Power capability verification and reporting procedures, and any changes to those procedures, to the

Standard MOD-025-1 — Verification of Generator Gross and Net Reactive Power Capability

Generator Owners, Generator Operators, Transmission Operators, Planning Authorities, and Transmission Planners affected by the procedure within 30 calendar days of the approval.

- R3.** The Generator Owner shall follow its Regional Reliability Organization's procedures for verifying and reporting its gross and net Reactive Power generating capability per R1.

C. Measures

- M1.** The Regional Reliability Organization shall have available for inspection the procedures for the verification and reporting of generator gross and net Reactive Power capability in accordance with R1.
- M2.** The Regional Reliability Organization shall have evidence that its procedures, and any revisions to these procedures, for verification and reporting of generator gross and net Reactive Power capability were provided to affected Generator Owners, Generator Operators, Transmission Operators, Planning Authorities, and Transmission Planners within 30 calendar days of approval.
- M3.** The Generator Owner shall have evidence it provided verified information of its generator gross and net Reactive Power capability, consistent with that Regional Reliability Organization's procedures.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

For Regional Reliability Organization: NERC.

For Generator Owner: Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Regional Reliability Organization shall retain both the current and previous version of the procedures.

The Generator Owner shall retain information from the most current and prior verification.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization and Generator Owner shall each demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance for Regional Reliability Organization:

- 2.1. Level 1:** There shall be a level one non-compliance if either of the following conditions is present:

2.1.1 Procedures did not meet one of the following requirements: R1.1, R1.2 or R1.4.

2.1.2 No evidence that procedures were distributed as required in R2.

Standard MOD-025-1 — Verification of Generator Gross and Net Reactive Power Capability

- 2.2. **Level 2:** Procedures did not meet two or three of the following requirements: R1.1, R1.2 or R1.4.
 - 2.3. **Level 3:** Procedures did not meet R1.3.
 - 2.4. **Level 4:** Procedures did not meet R1.5.1, R1.5.2, R1.5.3, or R1.5.4.
3. **Levels of Non-Compliance for Generator Owner:**
- 3.1. **Level 1:** Complete, verified generator data were provided for 98% or more but less than 100% of a Generator Owner's units as required by the Regional procedures.
 - 3.2. **Level 2:** Complete, verified generator data were provided for than 96% or more, but less than 98% of a Generator Owner's units as required by the Regional procedures.
 - 3.3. **Level 3:** Complete, verified generator data were provided for 94% or more, but less than 96% of a Generator Owner's units as required by the Regional procedures.
 - 3.4. **Level 4:** Complete, verified generator data were provided for less than 94% less of a Generator Owner's units as required by the Regional procedures.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is the Version 0 PRC-002 modified to include a translation of planning measure I.F.M3, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is the 3rd draft of the standard to be posted for industry comment from December 1, 2005 – January 14, 2006.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Review comments from industry posting; post consideration of comments.	January 15–30, 2006
2. Post standards and implementation plan for 30-day pre-ballot review.	February 1–March 2, 2006
3. Conduct 1 st ballot.	March 2–12, 2006
4. Consider comments submitted with 1 st ballot; post consideration of comments	March 13–18, 2006
5. Conduct 2 nd ballot.	March 18–March 28, 2006
6. Post standards and implementation plan for 30-day review by Board.	March 1–30, 2006
7. Board adoption date.	April 6, 2006
8. Effective date.	January 1, 2007

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Disturbance Monitoring Equipment (DME): Devices capable of recording system data pertaining to a Disturbance. Such equipment includes the following categories of recorders:

- Sequence of event recorders, which record equipment response to the event
- Fault recorders, which record actual waveform data replicating the system primary voltages and currents. This may include protective relays.
- Dynamic Disturbance Recorders (DDRs), which record incidents that portray power system behavior during dynamic events such as low-frequency (0.1 Hz – 3 Hz) oscillations and abnormal frequency or voltage excursions

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

A. Introduction

1. **Title:** Define Regional Disturbance Monitoring and Reporting Requirements
2. **Number:** PRC-002-1
3. **Purpose:** Ensure that Regional Reliability Organizations establish requirements for installation of Disturbance Monitoring Equipment and reporting of Disturbance data to facilitate analyses of events.
4. **Applicability**
 - 4.1. Regional Reliability Organization.
5. **Proposed Effective Date:** January 1, 2007.

B. Requirements

- R1. The Regional Reliability Organization shall establish the following installation requirements for sequence of event recording equipment:
 - R1.1. Location and monitoring requirements, including the following:
 - R1.1.1. Criteria for equipment location (e.g. by voltage, geographic area, station size, etc.).
 - R1.1.2. Protection System devices to be monitored.
 - R1.2. Equipment requirements, including the following:
 - R1.2.1. Each device shall record events with a resolution of one millisecond or better.
 - R1.2.2. Each device shall be synchronized to within four milliseconds of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.
- R2. The Regional Reliability Organization shall establish the following installation requirements for Fault Recording Equipment:
 - R2.1. Location, monitoring and recording requirements, including the following:
 - R2.1.1. Criteria for equipment location (e.g. by voltage, geographic area, station size, etc.).
 - R2.1.2. Elements to be monitored at each location
 - R2.1.3. Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:
 - R2.1.3.1. Three phase to neutral voltages
 - R2.1.3.2. Three phase currents and neutral currents
 - R2.1.3.3. Polarizing currents and voltages, if used
 - R2.1.3.4. Frequency
 - R2.1.3.5. Megawatts and megavars
 - R2.2. Equipment requirements, including the following:
 - R2.2.1. Recording duration requirements.
 - R2.2.2. Minimum sampling rate of 16 samples per cycle.

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

- R2.2.3.** Each device shall be synchronized to within four milliseconds of Coordinated Universal Time (UTC). The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.
- R2.2.4.** Event triggering requirements.
- R2.2.5.** Data retention capabilities (e.g., length of time data is to be available for retrieval).
- R3.** The Regional Reliability Organization shall establish the following installation requirements for Dynamic Disturbance Recording (DDR) Equipment¹:
- R3.1.** Location and monitoring requirements including the following:
- R3.1.1.** Criteria for equipment location giving consideration to the following:
- Site(s) in or near major load centers
 - Site(s) in or near major generation clusters
 - Site(s) in or near major voltage sensitive areas
 - Site(s) on both sides of major transmission interfaces
 - A major transmission junction
 - Elements associated with Interconnection Reliability Operating Limits
 - Major EHV interconnections between control areas
 - Coordination with neighboring Regions within the interconnection
- R3.1.2.** Elements and number of phrases to be monitored at each location.
- R3.1.3.** Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:
- R3.1.3.1.** Voltage, current and frequency
- R3.1.3.2.** Megawatts and megavars
- R3.2.** Equipment requirements, including the following:
- R3.2.1.** For installations effective three years after Board of Trustee adoption, capability for continuous recording.
- R3.2.2.** Each device shall be time synchronized to UTC within four milliseconds. The recorded time may be expressed as local time, as long as the local time zone used is clearly stated.
- R3.2.3.** Each device shall sample data at a rate of at least 1600 samples per second and shall record the RMS value of electrical quantities at a rate of at least 6 records per second.
- R4.** The Regional Reliability Organization shall establish the following requirements for the storage and retention of the Disturbance data for specific system Disturbance events.

^{1 1} These requirements do not address Phasor Measurement Units (PMUs).

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

- R4.1.** All continuously recording DDRs installed after January 1, 2008 shall retain data for at least ten days.
- R4.2.** All captured DME data for Regional Reliability Organization-identified events shall be archived for at least three years.
- R5.** The Regional Reliability Organization shall establish requirements for facility owners to report Disturbance data recorded by their DME installations. The data reporting requirements shall include the following:
 - R5.1.** Criteria for events that require the collection of data from DMEs.
 - R5.2.** List of entities that must be provided with recorded Disturbance data.
 - R5.3.** Timetable for response to data request.
 - R5.4.** Availability of recorded Disturbance data in COMTRADE format (in conformance with IEEE Std. C37.111-1999 or its successor standard).
 - R5.5.** Naming of data files in conformance with the IEEE Recommended Practice for Naming Time Sequence Data Files (C37.232)².
 - R5.6.** Data content requirements and guidelines.
- R6.** The Regional Reliability Organization shall establish requirements for DME maintenance and testing.
- R7.** The Regional Reliability Organization shall provide its requirements (and any revisions to those requirements) including those for DME installation; Disturbance data reporting; Disturbance data storage and retention; and DME maintenance and testing to the affected Transmission Owners and Generator Owners within 30 calendar days of approval of those requirements.
- R8.** The Regional Reliability Organization shall periodically (at least every five years) review, update and approve its Regional requirements for Disturbance monitoring and reporting.

C. Measures

- M1.** The Regional Reliability Organization's requirements for the installation of Disturbance Monitoring Equipment shall address Requirements 1 through 3.
- M2.** The Regional Reliability Organization's requirements for storage and retention of Disturbance data shall include all elements identified in Requirement 4.
- M3.** The Regional Reliability Organization's Disturbance monitoring data reporting requirements shall include all elements identified in Requirement 5.
- M4.** The Regional Reliability Organization shall have requirements for the maintenance and testing of DME equipment as required in Requirement 6.
- M5.** The Regional Reliability Organization shall have evidence it provided its Regional Disturbance monitoring and reporting requirements as required in Requirement 7.
- M6.** The Regional Reliability Organization shall have evidence it conducted a review at least once every five years of its regional requirements for Disturbance monitoring and reporting.

D. Compliance

² Compliance with this requirement is not effective until the IEEE Standard is approved.

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Regional Reliability Organization shall retain documentation of its DME requirements and any changes to it for three years.

The Compliance Monitor will retain its audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization shall demonstrate compliance through providing its documentation of Disturbance Monitoring and Reporting requirements or self-certification as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: There shall be a level one non-compliance if either of the following conditions exist:

2.1.1 Disturbance reporting requirements were not specified as required in R5.1 through R5.5.

2.1.2 DME maintenance and testing requirements were not specified.

2.2. Level 2: There shall be a level two non-compliance if any of the following conditions exist:

2.2.1 Equipment characteristics were not specified for one or more types of DMEs

2.2.2 Time synchronization requirements were not specified for one or more of the DMEs as required in R1.2.2, R2.2.3, and R3.2.2.

2.2.3 Requirements do not provide criteria for equipment location or criteria for monitored elements or monitored quantities as required R1.1, R2.1 and R3.1.

2.3. Level 3: Disturbance data storage and retention requirements were not specified for one or more of the DMEs as required in R4.

2.4. Level 4: Disturbance monitoring and reporting requirements were not available or were not provided to Transmission Owners and Generator Owners.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking

Standard PRC-002-1 — Define Regional Disturbance Monitoring and Reporting Requirements

--	--	--	--

Standard PRC-003-1 — Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is the Version 0 PRC-003 modified to include a translation of planning measure III.C.M10, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption date.	February 6, 2006
7. Effective date.	May 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Misoperation:

- Any failure of a Protection System element to operate within the specified time when a fault or abnormal condition occurs within a zone of protection.
- Any operation for a fault not within a zone of protection (other than operation as backup protection for a fault in an adjacent zone that is not cleared within a specified time for the protection for that zone).
- Any unintentional Protection System operation when no fault or other abnormal condition has occurred unrelated to on-site maintenance and testing activity.

Corrective Action Plan: A list of actions and an associated timetable for implementation to remedy a specific problem.

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

Standard PRC-003-1 — Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems

A. Introduction

1. **Title:** Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems
2. **Number:** PRC-003-1
3. **Purpose:** To ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.
4. **Applicability**
 - 4.1. Regional Reliability Organization.
5. **Proposed Effective Date:** May 1, 2006.

B. Requirements

- R1. Each Regional Reliability Organization shall establish, document and maintain its procedures for, review, analysis, reporting and mitigation of transmission and generation Protection System Misoperations. These procedures shall include the following elements:
 - R1.1. The Protection Systems to be reviewed and analyzed for Misoperations (due to their potential impact on BES reliability).
 - R1.2. Data reporting requirements (periodicity and format) for Misoperations.
 - R1.3. Process for review, analysis follow up, and documentation of Corrective Action Plans for Misoperations.
 - R1.4. Identification of the Regional Reliability Organization group responsible for the procedures and the process for approval of the procedures.
- R2. Each Regional Reliability Organization shall maintain and periodically update documentation of its procedures for review, analysis, reporting, and mitigation of transmission and generation Protection System Misoperations.
- R3. Each Regional Reliability Organization shall distribute procedures in Requirement 1 and any changes to those procedures, to the affected Transmission Owners, Distribution Providers that own transmission Protection Systems, and Generator Owners within 30 calendar days of approval of those procedures.

C. Measures

- M1. The Regional Reliability Organization shall have procedures for the review, analysis, reporting and mitigation of transmission and generation Protection System Misoperations as defined in R1.
- M2. The Regional Reliability Organization shall have evidence it maintained and periodically updated its procedures for review, analysis, reporting and mitigation of transmission and generation Protection System Misoperations as defined in Requirement 2.
- M3. The Regional Reliability Organization shall have evidence it provided its procedures for the review, analysis, reporting and mitigation of transmission and generation Protection System Misoperations to the affected Transmission Owners, Distribution Providers that own transmission Protection Systems, and Generator Owners as defined in Requirement 3.

D. Compliance

1. **Compliance Monitoring Process**
 - 1.1. **Compliance Monitoring Responsibility**

Standard PRC-003-1 — Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems

NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Regional Reliability Organization shall retain documentation of its procedures for analysis of transmission and generation Protection System Misoperations and any changes to those procedures for three years.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: Procedures were not reviewed and updated within the review cycle period as required in R2.

2.2. Level 2: Procedures did not include one of the elements defined in R1.1 through R1.4.

2.3. Level 3: Procedures did not include two or more of the elements defined in R1.1 through R1.4.

2.4. Level 4: There shall be a level four non-compliance if either of the following conditions exist:

2.4.1 No evidence of Procedures.

2.4.2 Procedures were not provided to the affected Transmission Owners, Distribution Providers that own transmission Protection Systems, and Generator Owners as defined in R3.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard PRC-004-1 — Analysis and Mitigation of Transmission and Generation Protection System Misoperations

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is the Version 0 PRC-004 modified to include a translation of planning measure III.C.M11, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 – 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption date.	February 6, 2006
7. Effective date.	August 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard PRC-004-1 — Analysis and Mitigation of Transmission and Generation Protection System Misoperations

A. Introduction

1. **Title:** Analysis and Mitigation of Transmission and Generation Protection System Misoperations
2. **Number:** PRC-004-1
3. **Purpose:** Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.
4. **Applicability**
 - 4.1. Transmission Owner.
 - 4.2. Distribution Provider that owns a transmission Protection System.
 - 4.3. Generator Owner.
5. **Proposed Effective Date:** August 1, 2006.

B. Requirements

- R1.** The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization's procedures developed for Reliability Standard PRC-003 Requirement 1.
- R2.** The Generator Owner shall analyze its generator Protection System Misoperations, and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization's procedures developed for PRC-003 R1.
- R3.** The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Reliability Organization, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Reliability Organization's procedures developed for PRC-003 R1.

C. Measures

- M1.** The Transmission Owner, and any Distribution Provider that owns a transmission Protection System shall each have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Reliability Organization procedures developed for PRC-003 R1.
- M2.** The Generator Owner shall have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Reliability Organization's procedures developed for PRC-003 R1.
- M3.** Each Transmission Owner, and any Distribution Provider that owns a transmission Protection System, and each Generator Owner shall have evidence it provided documentation of its Protection System Misoperations, analyses and Corrective Action Plans according to the Regional Reliability Organization procedures developed for PRC-003 R1.

D. Compliance

1. **Compliance Monitoring Process**

Standard PRC-004-1 — Analysis and Mitigation of Transmission and Generation Protection System Misoperations

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Transmission Owner, and Distribution Provider that own a transmission Protection System and the Generator Owner that owns a generation Protection System shall each retain data on its Protection System Misoperations and each accompanying Corrective Action Plan until the Corrective Action Plan has been executed or for 12 months, whichever is later.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Transmission Owner, and any Distribution Provider that owns a transmission Protection System and the Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance for Transmission Owners and Distribution Providers that own a Transmission Protection System:

2.1. Level 1: Documentation of Misoperations is complete according to PRC-004 R1, but documentation of Corrective Action Plans is incomplete.

2.2. Level 2: Documentation of Misoperations is incomplete according to PRC-004 R1 and documentation of Corrective Action Plans is incomplete.

2.3. Level 3: Documentation of Misoperations is incomplete according to PRC-004 R1 and there are no associated Corrective Action Plans.

2.4. Level 4: Misoperations have not been analyzed and documentation has not been provided to the Regional Reliability Organization according to Requirement 3.

3. Levels of Non-Compliance for Generator Owners

3.1. Level 1: Documentation of Misoperations is complete according to PRC-004 R2, but documentation of Corrective Action Plans is incomplete.

3.2. Level 2: Documentation of Misoperations is incomplete according to PRC-004 R2 and documentation of Corrective Action Plans is incomplete.

3.3. Level 3: Documentation of Misoperations is incomplete according to PRC-004 R2 and there are no associated Corrective Action Plans.

3.4. Level 4: Misoperations have not been analyzed and documentation has not been provided to the Regional Reliability Organization according to R3.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard PRC-004-1 — Analysis and Mitigation of Transmission and Generation Protection System Misoperations

0	April 1, 2005	Effective Date	New
---	---------------	----------------	-----

Standard PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is the Version 0 PRC-005 modified to include a translation of planning measure III.C.M12, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption date.	February 6, 2006
7. Effective date.	May 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard PRC-005-1 — Transmission and Generation Protection System Maintenance and Testing

A. Introduction

1. **Title:** **Transmission and Generation Protection System Maintenance and Testing**
2. **Number:** PRC-005-1
3. **Purpose:** To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.
4. **Applicability**
 - 4.1. Transmission Owner.
 - 4.2. Generator Owner.
 - 4.3. Distribution Provider that owns a transmission Protection System.
5. **Proposed Effective Date:** May 1, 2006.

B. Requirements

- 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.
- 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.

C. Measures

- M1. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System that affects the reliability of the BES, shall have an associated Protection System maintenance and testing program as defined in Requirement 1.
- M2. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System that affects the reliability of the BES, shall have evidence it provided documentation of its associated Protection System maintenance and testing program and the implementation of its program as defined in Requirement 2.

D. Compliance

1. **Compliance Monitoring Process**
 - 1.1. **Compliance Monitoring Responsibility**

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System, shall retain evidence of the implementation of its Protection System maintenance and testing program for three years.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Transmission Owner and any Distribution Provider that owns a transmission Protection System and the Generator Owner that owns a generation Protection System, shall each demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: Documentation of the maintenance and testing program provided was incomplete as required in R1, but records indicate maintenance and testing did occur within the identified intervals for the portions of the program that were documented.

2.2. Level 2: Documentation of the maintenance and testing program provided was complete as required in R1, but records indicate that maintenance and testing did not occur within the defined intervals.

2.3. Level 3: Documentation of the maintenance and testing program provided was incomplete, and records indicate implementation of the documented portions of the maintenance and testing program did not occur within the identified intervals.

2.4. Level 4: Documentation of the maintenance and testing program, or its implementation, was not provided.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

Standard PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure I.F.M2 and I.F.M4, which were not included in the approval Version 0 reliability standards because they required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is the 3rd draft of the standard to be posted for industry comment from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Review comments from industry posting; post consideration of comments.	January 15–30, 2006
• Post standards and implementation plan for 30-day pre-ballot review.	February 1–March 2, 2006
2. Conduct 1 st ballot.	March 2–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	March 13–18, 2006
4. Conduct 2 nd ballot.	March 18–28, 2006
5. Post standards and implementation plan for 30-day review by Board.	March 1–30, 2006
6. Board adoption date.	April 6, 2006
7. Effective dates: <ul style="list-style-type: none">– 100% compliant Requirement 2 through Requirement 5 for already installed DME– 25% compliant with Requirement 1– 50% compliant with Requirement 1– 75% compliant with Requirement 1– 100% compliant with Requirement 1	October 1, 2007 April 1, 2008 April 1, 2009 April 1, 2010 April 1, 2011

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting

A. Introduction

1. **Title:** **Disturbance Monitoring Equipment Installation and Data Reporting**
2. **Number:** PRC-018-1
3. **Purpose:** Ensure that Disturbance Monitoring Equipment (DME) is installed and that Disturbance data is reported in accordance with regional requirements to facilitate analyses of events.
4. **Applicability**
 - 4.1. Transmission Owner.
 - 4.2. Generator Owner.
5. **Proposed Effective Dates:**

Requirement 1:

 - 25% compliant by April 1, 2008
 - 50% compliant by April 1, 2009
 - 75% compliant by April 1, 2010
 - 100% compliant by April 1, 2011

Requirement 2 through Requirement 5:

 - 100% compliant by October 1, 2007 for already installed DME

B. Requirements

- R1.** The Transmission Owner and Generator Owner shall install DME in accordance with the Regional Reliability Organization installation requirements (Reliability Standard PRC-002 Requirements 1 through 3).
- R2.** The Transmission Owner and Generator Owner shall maintain, and report to the Regional Reliability Organization on request, the following data on its installed DME:
 - R2.1.** Type of DME (sequence of event recorder, fault recorder, or dynamic disturbance recorder).
 - R2.2.** Make and model of equipment.
 - R2.3.** Installation location.
 - R2.4.** Resolution of time synchronization.
 - R2.5.** Monitored Elements.
 - R2.6.** Monitored Protection System Devices.
 - R2.7.** Monitored electrical quantities.
 - R2.8.** Operational status.
 - R2.9.** Date last tested.
- R3.** The Transmission Owner and Generator Owner shall each store and retain its Disturbance data (recorded by DMEs) in accordance with its Regional requirements (PRC-002 Requirement R4).

Standard PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting

- R4.** The Transmission Owner and Generator Owner shall each provide Disturbance data (recorded by DMEs) in accordance with the Regional requirements (PRC-002 Requirement R5).
- R5.** The Transmission Owner and Generator Owner shall have a DME maintenance and testing program in accordance with the Regional requirements (Reliability Standard PRC-002 Requirement R6).

C. Measures

- M1.** The Transmission Owner and Generator Owner shall each have evidence that its DME is installed in accordance with its associated Regional Reliability Organization's requirements.
- M2.** The Transmission Owner and Generator Owner shall each maintain the data listed in Requirement 2.1 through 2.9 on all its installed DME, and shall have evidence it provided this data to its Regional Reliability Organization within 30 calendar days of a request.
- M3.** The Transmission Owner and Generator Owner shall each have evidence it stored and retained its recorded Disturbance data in accordance with its associated Regional Reliability Organization's requirements.
- M4.** The Transmission Owner and Generator Owner shall each have evidence it provided recorded Disturbance data to all entities in accordance with its associated Regional Reliability Organization's requirements.
- M5.** The Transmission Owner and Generator Owner shall each have evidence its DME maintenance and testing program is in accordance with its associated Regional Reliability Organization's requirements.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Transmission Owner and Generator Owner shall retain any changes to the data on DME installations and any Disturbance data provided to the Regional Reliability Organization for three years.

The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Transmission Owner and Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: There shall be a level one non-compliance if either of the following conditions is present:

- 2.1.1** DME that meets all Regional installation requirements (in accordance with Requirement 1) were installed at 75% or more but not all of the locations.

Standard PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting

- 2.1.2 Recorded Disturbance data that meets all Regional data requirements (in accordance with Requirement 3) was provided for 75% or more but not all of the locations.
- 2.2. **Level 2:** There shall be a level two non-compliance if either of the following conditions is present:
 - 2.2.1 DME that meets all Regional installation requirements (in accordance with R1) were installed at 50% or more but less than 75% of the locations.
 - 2.2.2 Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for 50% or more but less than 75% of the locations.
- 2.3. **Level 3:** There shall be a level three non-compliance if either of the following conditions is present:
 - 2.3.1 DME that meets all Regional installation requirements (in accordance with R1) were installed at 25% or more but less than 50% of the locations.
 - 2.3.2 Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for 25% or more but less than 50% of the locations.
- 2.4. **Level 4:** There shall be a level four non-compliance if either of the following conditions is present:
 - 2.4.1 DME that meets all Regional installation requirements (in accordance with R1) were installed at less than 25% of the locations.
 - 2.4.2 Recorded Disturbance data that meets all Regional data requirements (in accordance with R3) was provided for less than 25% of the locations.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard PRC-019-1 — Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure III.C.M8, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is the 3rd draft of the standard to be posted for industry review while the standard is field tested.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Review revised standard and results of field test for industry comment.	To be determined
2. Consider comments submitted with 3 rd posting; post consideration of comments	To be determined
3. Post standards and implementation plan for 30-day pre-ballot review.	To be determined
4. Conduct 1 st ballot.	To be determined
5. Consider comments submitted with 1 st ballot; post consideration of comments	To be determined
6. Conduct 2 nd ballot.	To be determined
7. Post standards and implementation plan for 30-day review by Board.	To be determined
8. Board adoption.	To be determined
9. Effective date.	To be determined

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard PRC-019-1 — Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection

A. Introduction

1. **Title:** Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection
2. **Number:** PRC-019-1
3. **Purpose:** Ensure generator voltage regulator controls and limit functions are coordinated with the generator's capabilities and protective relays.
4. **Applicability**
 - 4.1. Regional Reliability Organization.
 - 4.2. Generator Owner.
5. **Proposed Effective Dates:** To be determined:
 - One year beyond Board of Trustee adoption for Requirement 1
 - Two years beyond Board of Trustee adoption 1st 20% compliant with Requirement 2 and Requirement 3
 - Three years beyond Board of Trustee adoption 2nd 20% compliant with R2, R3
 - Four years beyond Board of Trustee adoption 3rd 20% compliant with R2, R3
 - Five years beyond Board of Trustee adoption 4th 20% compliant with R2, R3
 - Six years beyond Board of Trustee adoption 5th 20% compliant with R2, R3

B. Requirements

- R1.** The Regional Reliability Organization shall establish and maintain criteria for exemptions to any of the Generator Owner requirements in R2.
- R2.** Unless exempted by the Regional Reliability Organization in accordance with R1, the Generator Owner shall have study results that show it verified that its generator voltage regulator controls and limit functions are coordinated with the generator's capabilities and protective relays. This study shall include the following:
 - R2.1.** Plots, or data that could be plotted for the following:
 - R2.1.1.** Generator capability curve, including specification of nominal voltage, ambient air or cooling temperature, or hydrogen pressure.
 - R2.1.2.** Steady state over-excitation limiter and under-excitation limiter control characteristics.
 - R2.1.3.** MW limit of the prime mover.
 - R2.1.4.** Any other limit that could restrict the megawatt or megavar capability.
 - R2.1.5.** Loss of excitation / field protective relay characteristics.
 - R2.1.6.** Volts-per-hertz protection settings including volts-per-hertz limiters in the automatic voltage regulator.
- R3.** The Generator Owner shall have the information in R2.1.1 through R2.1.6 available to show to the Regional Reliability Organization upon request (within 30 calendar days).

C. Measures

Standard PRC-019-1 — Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection

- M1.** The Regional Reliability Organization shall, within 30 calendar days of a request, provide to Generator Owners its exemption criteria defined in accordance with R1.
- M2.** The Generator Owner shall have evidence it showed the Regional Reliability Organization the information identified in R2.1 through R2.1.6 within 30 calendar days of a request.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

NERC for the Regional Reliability Organization.

Regional Reliability Organization for Generator Owners.

1.2. Compliance Monitoring Period and Reset Timeframe

The compliance reset period is one calendar year.

1.3. Data Retention

The Generator Owner shall retain all current information needed to show coordination. The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization and Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: The Regional Reliability Organization did not provide the exemption criteria in accordance with R1.

2.2. Level 2: The Generator Owner information on coordination of the generator voltage regulator controls and limit functions does not address one of the requirements identified in accordance with R2.1.1 through R2.1.6.

2.3. Level 3: Not applicable.

2.4. Level 4: The Generator Owner information on coordination of the generator voltage regulator controls and limit functions does not address two or more of the requirements identified in accordance with R2.1.1 through R2.1.6.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure III.E.M2, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 1, 2005.
4. The drafting team posted Draft 1 of the standard on April 1, 2005.
5. The drafting team posted Draft 2 of the standard on October 1, 2005

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17 – 26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption.	February 6, 2006
7. Effective date.	May 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

A. Introduction

- 1. Title:** Under-Voltage Load Shedding Program Database
- 2. Number:** PRC-020-1
- 3. Purpose:** Ensure that a Regional database is maintained for Under-Voltage Load Shedding (UVLS) programs implemented by entities within the Region to mitigate the risk of voltage collapse or voltage instability in the Bulk Electric System (BES). Ensure the UVLS database is available for Regional studies and for dynamic studies and simulations of the BES.
- 4. Applicability**
 - 4.1.** Regional Reliability Organization with entities that own or operate a UVLS program.
- 5. Proposed Effective Date:** May 1, 2006.

B. Requirements

- R1.** The Regional Reliability Organization shall establish, maintain and annually update a database for UVLS programs implemented by entities within the Region to mitigate the risk of voltage collapse or voltage instability in the BES. This database shall include the following items:
 - R1.1.** Owner and operator of the UVLS program.
 - R1.2.** Size and location of customer load, or percent of connected load, to be interrupted.
 - R1.3.** Corresponding voltage set points and overall scheme clearing times.
 - R1.4.** Time delay from initiation to trip signal.
 - R1.5.** Breaker operating times.
 - R1.6.** Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems.
- R2.** The Regional Reliability Organization shall provide the information in its UVLS database to the Planning Authority, the Transmission Planner, or other Regional Reliability Organizations and to NERC within 30 calendar days of a request.

C. Measures

- M1.** The Regional Reliability Organization shall have evidence that it established and annually updated its UVLS database to include all elements in Requirement 1.1 through 1.6.
- M2.** The Regional Reliability Organization shall have evidence that it provided the information in its UVLS database to the requesting entities and to NERC in accordance with Requirement 2.

D. Compliance

- 1. Compliance Monitoring Process**
 - 1.1. Compliance Monitoring Responsibility**

NERC.
 - 1.2. Compliance Monitoring Period and Reset Timeframe**

One calendar year.
 - 1.3. Data Retention**

The Regional Reliability Organization shall retain the current and prior annual updated database. The Compliance Monitor shall retain all audit data for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization shall demonstrate compliance through self certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: Did not update its UVLS database annually.

2.2. Level 2: UVLS program database information provided, but did not include all of the items identified in R1.1 through R1.6.

2.3. Level 3: Not applicable.

2.4. Level 4: Did not provide information from its UVLS program database.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
----------------	-------------	---------------	------------------------

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure III.E.M1, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption.	February 6, 2006
7. Effective date.	August 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

A. Introduction

1. **Title:** Under-Voltage Load Shedding Program Data
2. **Number:** PRC-021-1
3. **Purpose:** Ensure data is provided to support the Regional database maintained for Under-Voltage Load Shedding (UVLS) programs that were implemented to mitigate the risk of voltage collapse or voltage instability in the Bulk Electric System (BES).
4. **Applicability**
 - 4.1. Transmission Owner that owns a UVLS program.
 - 4.2. Distribution Provider that owns a UVLS program.
5. **Proposed Effective Date:** August 1, 2006

B. Requirements

- R1. Each Transmission Owner and Distribution Provider that owns a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall annually update its UVLS data to support the Regional UVLS program database. The following data shall be provided to the Regional Reliability Organization for each installed UVLS system:
 - R1.1. Size and location of customer load, or percent of connected load, to be interrupted.
 - R1.2. Corresponding voltage set points and overall scheme clearing times.
 - R1.3. Time delay from initiation to trip signal.
 - R1.4. Breaker operating times.
 - R1.5. Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems. .
- R2. Each Transmission Owner and Distribution Provider that owns a UVLS program shall provide its UVLS program data to the Regional Reliability Organization within 30 calendar days of a request.

C. Measures

- M1. Each Transmission Owner and Distribution Provider that owns a UVLS program shall have documentation that its UVLS data was updated annually and includes all items specified in Requirement 1.1 through 1.5.
- M2. Each Transmission Owner and Distribution Provider that owns a UVLS program shall have evidence it provided the Regional Reliability Organization with its UVLS program data within 30 calendar days of a request.

D. Compliance

1. **Compliance Monitoring Process**
 - 1.1. **Compliance Monitoring Responsibility**

Regional Reliability Organization.
 - 1.2. **Compliance Monitoring Period and Reset Timeframe**

One calendar year.
 - 1.3. **Data Retention**

Each Transmission Owner and Distribution Provider that owns a UVLS program shall retain a copy of the data submitted over the past two years.

The Compliance Monitor shall retain all audit data for three years.

1.4. Additional Compliance Information

Transmission Owner and Distribution Provider shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: Did not update its UVLS data annually.

2.2. Level 2: UVLS data was provided, but did not address one of the items identified in R1.1 through R1.5.

2.3. Level 3: UVLS data was provided, but did not address two or more of the items identified in R1.1 through R1.5.

2.4. Level 4: Did not provide any UVLS data.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure III.E.M5, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 19, 2005.
4. The drafting team posted Draft 1 of the standard on April 21, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is a pre-ballot version of the standard to be posted for industry review from December 1 - 30, 2005.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Post standards and implementation plan for 30-day pre-ballot review.	December 1–30, 2005
2. Conduct 1 st ballot.	January 3–12, 2006
3. Consider comments submitted with 1 st ballot; post consideration of comments.	January 13–16, 2006
4. Conduct 2 nd ballot.	January 17–26, 2006
5. Post standards and implementation plan for 30-day review by Board.	January 6–February 6, 2006
6. Board adoption.	February 6, 2006
7. Effective date.	May 1, 2006

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

A. Introduction

1. **Title:** Under-Voltage Load Shedding Program Performance
2. **Number:** PRC-022-1
3. **Purpose:** Ensure that Under Voltage Load Shedding (UVLS) programs perform as intended to mitigate the risk of voltage collapse or voltage instability in the Bulk Electric System (BES).
4. **Applicability**
 - 4.1. Transmission Operator that operates a UVLS program.
 - 4.2. Distribution Provider that operates a UVLS program.
 - 4.3. Load-Serving Entity that operates a UVLS program.
5. **Proposed Effective Date:** May 1, 2006

B. Requirements

- R1. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall analyze and document all UVLS operations and Misoperations. The analysis shall include:
 - R1.1. A description of the event including initiating conditions.
 - R1.2. A review of the UVLS set points and tripping times.
 - R1.3. A simulation of the event, if deemed appropriate by the Regional Reliability Organization. For most events, analysis of sequence of events may be sufficient and dynamic simulations may not be needed.
 - R1.4. A summary of the findings.
 - R1.5. For any Misoperation, a Corrective Action Plan to avoid future Misoperations of a similar nature.
- R2. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall provide documentation of its analysis of UVLS program performance to its Regional Reliability Organization within 90 calendar days of a request.

C. Measures

- M1. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall have documentation of its analysis of UVLS operations and Misoperations in accordance with Requirement 1.1 through 1.5.
- M2. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall have evidence that it provided documentation of its analysis of UVLS program performance within 90 calendar days of a request by the Regional Reliability Organization.

D. Compliance

1. Compliance Monitoring Process
 - 1.1. **Compliance Monitoring Responsibility**

Regional Reliability Organization.
 - 1.2. **Compliance Monitoring Period and Reset Timeframe**

One calendar year.

1.3. Data Retention

Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall retain documentation of its analyses of UVLS operations and Misoperations for two years. The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

Transmission Operator, Load-Serving Entity, and Distribution Provider shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Levels of Non-Compliance

2.1. Level 1: Not applicable.

2.2. Level 2: Documentation of the analysis of UVLS performance was provided but did not include one of the five requirements in R1.

2.3. Level 3: Documentation of the analysis of UVLS performance was provided but did not include two or more of the five requirements in R1.

2.4. Level 4: Documentation of the analysis of UVLS performance was not provided.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------

Standard PRC-024-1 — Generator Performance During Frequency and Voltage Excursions

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

This proposed standard is a translation of planning measure III.C.M7, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

1. A SAR was posted from December 2, 2004, through January 7, 2005.
2. The SAC appointed a standard drafting team on January 13, 2005.
3. The drafting team posted its response to SAR comments and all other historical comments on April 1, 2005.
4. The drafting team posted Draft 1 of the standard on April 1, 2005.
5. The drafting team posted Draft 2 of the standard on September 1, 2005.

Description of Current Draft:

This is the 3rd draft of the standard to be posted for industry review while the standard is field tested.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Review revised standard and results of field test for industry comment.	To be determined
2. Consider comments submitted with 3 rd posting; post consideration of comments	To be determined
3. Post standards and implementation plan for 30-day pre-ballot review.	To be determined
4. Conduct 1 st ballot.	To be determined
5. Consider comments submitted with 1 st ballot; post consideration of comments	To be determined
6. Conduct 2 nd ballot.	To be determined
7. Post standards and implementation plan for 30-day review by Board.	To be determined
8. Board adoption.	To be determined

Standard PRC-024-1 — Generator Performance During Frequency and Voltage Excursions

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

No new definitions are proposed for this standard.

Standard PRC-024-1 — Generator Performance During Frequency and Voltage Excursions

A. Introduction

1. **Title:** Generator Performance During Frequency and Voltage Excursions
2. **Number:** PRC-024-1
3. **Purpose:** To ensure that generators remain connected to the electrical grid during voltage and frequency excursions and are not normally tripped manually or by preset protection schemes during frequency and voltage excursions.
4. **Applicability**
 - 4.1. Regional Reliability Organizations.
 - 4.2. Generator Owners.
 - 4.3. Transmission Owners.
5. **Proposed Effective Dates: To be determined:**

Requirement 1 through Requirement 6 – One year beyond Board of Trustee adoption

Requirement 7 – Two years beyond Board of Trustee adoption

B. Requirements

- R1. The Regional Reliability Organization shall establish requirements for generators to remain connected during system frequency and voltage excursions expressed as a function of:
 - R1.1. Time duration in seconds or cycles.
 - R1.2. Amplitude or magnitude of the excursion.
 - R1.3. Relationship between time and amplitude or magnitude.
- R2. The Regional Reliability Organization shall establish and maintain requirements for generators to remain connected during frequency and voltage excursions. These requirements shall include:
 - R2.1. Coordination between the generator under frequency protection and the regional Under Frequency Load Shedding (UFLS) program.
 - R2.2. Coordination of generator protection, including back-up protection, with transmission Protection Systems.
- R3. The Regional Reliability Organization shall establish and maintain criteria for exemptions to any of the regional requirements established in accordance with R1 and R2.
- R4. The Regional Reliability Organization shall establish and maintain a procedure for handling variances (i.e., different criteria or methods) from the Regional Reliability Organization's requirements established in R1 and R2, including steps for requesting and approving such variances.
- R5. The Regional Reliability Organization shall provide documentation of its excursion requirements, exemptions, and variance procedure to the Transmission Owners and Generator Owners within its Region within 30 calendar days of approval.
- R6. The Regional Reliability Organization shall, at least every five years, review and, as necessary, update its requirements, exemption criteria, and variance procedure.
- R7. Generator Owners and Transmission Owners shall comply with the regional requirements for coordination of generator protection defined in R2 and any approved variances.

C. Measures

- M1.** The Regional Reliability Organization shall, within 30 calendar days of a request, provide NERC with its requirements, exemption criteria, and variance procedure for generators to withstand excursions in voltage and frequency.
- M2.** The Regional Reliability Organization shall have evidence it provided the requirements, criteria and procedures to the Transmission Owners and Generator Owners within its Region within 30 calendar days of approval.
- M3.** The Regional Reliability Organization shall have evidence it reviewed and updated its requirements, criteria and procedures as required in R6.
- M4.** Generator Owners and Transmission Owners shall, within 30 calendar days of a request, provide the Regional Reliability Organization with documentation that it met the regional requirements for coordination of generator protection defined in R1 and R2 and any approved regional variances.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

NERC for Regional Reliability Organizations.

Regional Reliability Organizations for Generator Owners and Transmission Owners.

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year.

1.3. Data Retention

The Regional Reliability Organization shall retain its current and previous criteria revision.

The Compliance Monitor shall retain any audit data for three years.

Generator Owners and Transmission Owners shall maintain documentation required in M4 for three years.

1.4. Additional Compliance Information

The Regional Reliability Organization, Generator Owner, and Transmission Owner shall demonstrate compliance through the following methods, as determined by the Compliance Monitor: Self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event).

Standard PRC-024-1 — Generator Performance During Frequency and Voltage Excursions

2. **Levels of Non-Compliance for Regional Reliability Organization:**
 - 2.1. **Level 1:** Did not meet R3, R4, or R6
 - 2.2. **Level 2:** Did not meet one of the following requirements: R1.1, R1.2, R1.3, R2.1, or R2.2.
 - 2.3. **Level 3:** Did not meet R5.
 - 2.4. **Level 4:** Did not meet more than one of the following requirements: R1.1, R1.2, R1.3, R.2.1, or R2.2.
3. **Levels of Non-Compliance for Generator Owner and Transmission Owner:**
 - 3.1. **Level 1:** Not applicable.
 - 3.2. **Level 2:** Did not meet one of the regional requirements defined in R1.1, R1.2, R1.3, R2.1, or R2.2 and any approved regional variances.
 - 3.3. **Level 3:** Not applicable.
 - 3.4. **Level 4:** Did not meet more than one of the regional requirements defined in R1.1, R1.2, R1.3, R.2.1, and R2.2 and any approved Regional variances.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
---------	------	--------	-----------------