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 IV.A.M2 and IV.A.M3, 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.
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4. The drafting team posted Draft 1 of the standard on April 21, 2005.

Description of Current Draft:

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Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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Cranking Path: A portion of the electric system that can be isolated and then energized to deliver electric power from a generation source to enable the startup of one or more other generating units.

A. Introduction

1. **Title:** System Restoration Plans

2. **Number:** EOP-005-1

3. **Purpose:** To ensure plans, procedures, and resources are available to restore the electric system to a normal condition in the event of a partial or total shut down of the system.

4. **Applicability**

   4.1. Transmission Operators.

   4.2. Balancing Authorities.

5. **Proposed Effective Date:** November 1, 2005.

B. Requirements

R1. Each Transmission Operator shall have a restoration plan to reestablish its electric system in a stable and orderly manner in the event of a partial or total shutdown of its system, including necessary operating instructions and procedures to cover emergency conditions, and the loss of vital telecommunications channels. Each Transmission Operator shall include the applicable elements listed in EOP-005 in developing a restoration plan.

R2. Each Transmission Operator shall review and update its restoration plan at least annually and whenever it makes changes in the power system network, and shall correct deficiencies found during the simulated restoration exercises.

R3. Each Transmission Operator shall develop restoration plans with a priority of restoring the integrity of the Interconnection.

R4. Each Transmission Operator shall coordinate its restoration plans with Balancing Authorities within its area, its Reliability Coordinator, and neighboring Transmission Operators and Balancing Authorities.

R5. Each Transmission Operator and Balancing Authority shall periodically test its telecommunication facilities needed to implement the restoration plan.

R6. Each Transmission Operator and Balancing Authority shall train its operating personnel in the implementation of the restoration plan. Such training shall include simulated exercises, if practicable.

R7. Each Transmission Operator and Balancing Authority shall verify the restoration procedure by actual testing or by simulation.

R8. Each Transmission Operator shall verify that the number, size, and location of system blackstart generating units are sufficient to meet Regional Reliability Organization restoration plan requirements.

R9. The Transmission Operator shall demonstrate, through simulation or testing, that its blackstart generating unit(s) can perform the startup functions as stated in the Transmission Operator's restoration plan. The Transmission Operator shall perform such simulation or testing at least every five years, and shall provide documentation to the Regional Reliability Organization on request.

R10. The Transmission Operator shall document the cranking paths or maintain cranking path diagrams, including initial switching requirements, associated between each blackstart generating unit and the unit(s) to be cranked and shall provide documentation to the Regional Reliability Organization upon request.

R11. Following a disturbance in which one or more areas of the Bulk Electric System become isolated or blacked out, the affected Transmission Operators and Balancing Authorities shall begin immediately to return the Bulk Electric System to normal.

R11.1. The affected Transmission Operators and Balancing Authorities shall work in conjunction with their Reliability Coordinator(s) to determine the extent and condition of the isolated area(s).

R11.2. The affected Transmission Operators and Balancing Authorities shall take the necessary actions to restore Bulk Electric System frequency to normal, including adjusting generation, placing additional generators online, or load shedding.

R11.3. The affected Balancing Authorities, working with their Reliability Coordinator(s), shall immediately review the Interchange Schedules between those Balancing Authority Areas or fragments of those Balancing Authority Areas within the separated area and make adjustments as needed to facilitate the restoration. The affected Balancing Authorities shall make all attempts to maintain the adjusted Interchange Schedules, whether generation control is manual or automatic.

R11.4. The affected Transmission Operators shall give high priority to restoration of off-site power to nuclear stations.

R11.5. The affected Transmission Operators may resynchronize the isolated area(s) with the surrounding area(s) when the following conditions are met:

R11.5.1. Voltage, frequency, and phase angle permit.

R11.5.2. The size of the area being reconnected and the capacity of the transmission lines effecting the reconnection and the number of synchronizing points across the system are considered.

R11.5.3. Reliability Coordinator(s) and adjacent areas are notified and Reliability Coordinator approval is given.

R11.5.4. Load is shed in neighboring areas, if required, to permit successful interconnected system restoration.

C. Measures

M1. The Transmission Operator shall, within 30 calendar days of a request, provide its Regional Reliability Organization with documentation of simulations or tests that demonstrate the blackstart units in its area are able to perform the functions of the restoration plan.

M2. The Transmission Operator shall, within 30 calendar days of a request, provide documentation or a diagram showing the number, size and location of system blackstart generating units and the associated cranking paths.

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 Operator must have its plan to reestablish its electric system available for review by the Regional Reliability Organization at all times.

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

1.4. Additional Compliance Information

The Transmission Operator 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: Plan exists but has not been reviewed annually.

2.2. Level 2: Plan exists but does not address one of the elements listed in Attachment 1-EOP-005.

2.3. Level 3: The Transmission Operator did not provide documentation or a diagram showing the number, size and location of system blackstart generating units and the associated cranking paths.

2.4. Level 4:

2.4.1 Plan exists but does not address two or more of the requirements in Attachment 1-EOP-005, or there is no restoration plan in place, or

2.4.2 The Transmission Operator's simulation or test results demonstrating that blackstart generating units can perform their intended functions were not provided, or the results were not compliant with the regional restoration plan.

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 II.D.M2, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Documentation of Data Reporting Requirements for Actual and Forecast Demands, Net Energy for Load, and Controllable Demand-Side Management**

2. Number: MOD-016-1

3. Purpose: Accurate, actual Demand data is needed to ensure that assessments and validation of past events and databases can be performed. Forecast Demand data is needed to perform future system assessments to identify the need for system reinforcements for continued reliability. In addition, to assist in proper real-time operating, Load information related to controllable Demand-Side Management (DSM) programs is needed.

4. Applicability

4.1. Regional Reliability Organization.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Regional Reliability Organization shall develop and maintain a procedure that identifies the scope and details of the actual and forecast (a) Demand data, (b) Net Energy for Load data, and (c) controllable DSM data to be reported for system modeling and reliability analyses. The procedure shall include all of the following:

R2. A requirement that each Load-Serving Entity develop a set of actual and forecast customer demand values for use in all its data reporting during a calendar year.

R3. A requirement that each Load-Serving Entity count each customer within its service territory once and only once in developing its actual and forecast customer demand values.

R4. A requirement that each Load-Serving Entity with a controllable DSM program identifies the amounts and locations of customer load designed to be curtailed with that DSM program.

R5. A requirement that each Load-Serving Entity update its actual and forecast customer demand values once each year according to a schedule.

R6. A requirement that each Regional Reliability Organization use the actual and forecast data provided by the Load-Serving Entities in conducting its reliability assessments.

R7. A schedule for each Load-Serving Entity to provide its actual and forecast demand data and the amount of customer load designed to be curtailed with a controllable DSM program to its Planning Authority and Regional Reliability Organization.

R8. The Regional Reliability Organization shall distribute its procedure for reporting customer Demand data to all Planning Authorities and Load-Serving Entities that work within its Region within 30 calendar days of approval. Measures

M1. The Regional Reliability Organization shall have evidence it provided its actual and forecast customer demand data reporting procedure within 30 calendar days of approval to each Planning Authority and Load Serving Entity that works within its Regional Reliability Organization. The Regional Reliability Organization's procedure for actual and forecast customer demand data shall contain all items identified in requirements R.1 to R.6.

C. 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

For the Regional Reliability Organization: Current version of the procedure.

For the auditor: Three years of audit information.

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: Not applicable.

2.2. Level 2: The procedure did not address one of the elements in requirement R1.

2.3. Level 3: Not applicable.

2.4. Level 4: Either the procedure did not address two or more of the required elements in requirement R1 or there was no procedure.

D. 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 I.F.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.
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6. Board adoption and effective date.	November 1, 2005

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Disturbance Monitoring Equipment: Device(s) capable of detecting and recording System electrical data during a Disturbance. Examples include sequence of event recorders, fault recorders, and dynamic disturbance recorders.

A. Introduction

1. Title: **Use of Disturbance Data to Develop and Maintain Models**

2. Number: MOD-022-1

3. Purpose: To ensure that system models remain current by using recorded disturbance data.

4. Applicability

4.1. Planning Authority

4.2. Transmission Planner

5. Proposed Effective Date: November 1, 2005

B. Requirements

R1. The Planning Authority and Transmission Planner shall each use recorded data from Disturbance Monitoring Equipment as required in PRC-002 R3.1 and PRC-002 R3.2 to develop, maintain, and enhance steady-state and dynamic models.

C. Measures

M1. The Planning Authority and Transmission Planner shall each provide evidence that recorded disturbance data was used to assess its steady state and dynamic models. This evidence shall be provided to the Regional Reliability Organization 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

The Planning Authority and Transmission Planner shall retain disturbance simulation results and updates they applied to steady-state and dynamic models as a result of those simulations for the current and last model update periods.

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

1.4. Additional Compliance Information

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

2. Levels of Non-Compliance

2.1. Level 1: Not applicable

2.2. Level 2: Available recorded data from Disturbance Monitoring Equipment of system disturbances that occurred since the most recent model update was used in steady state and/or dynamic simulations, but needed model changes identified by the simulations were not incorporated in steady-state and/or dynamic models.

2.3. Level 3: Not applicable

2.4. Level 4: Available recorded data from Disturbance Monitoring Equipment of system disturbances that occurred since the most recent model update was not used in steady state and/or dynamic simulations.

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 II.B.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.
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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Regional Reliability Organization Procedures for Verifying Generator Equipment Data**

2. Number: MOD-023-1

3. Purpose: To verify generator modeling and equipment data to be used in planning and operating reliability studies.

4. Applicability

4.1. Regional Reliability Organization.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Regional Reliability Organization shall establish and maintain procedures to address verification of generator modeling and equipment data. These procedures shall include but not be limited to 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. Acceptable methods for model and data verification, including but not limited to manufacturer data, performance tracking, simulation, analysis, and testing.

R1.3. Periodicity and schedule of model and data verification.

R1.4. Data verification parameters to be reported, including:

R1.4.1. Generator gross and net real power capability.

R1.4.2. Generator gross and net reactive power capability.

R1.4.3. Speed/load governor controls.

R1.4.4. Excitation systems, including voltage regulator controls, limiters, compensators, and power system stabilizers, if applicable.

R2. The Regional Reliability Organization shall make its procedures available to the Generator Owners, Generator Operators, and Transmission Planners affected by the procedure.

R2.1. The Regional Reliability Organization shall make approved revisions to the procedure available to the affected responsible entities within 30 calendar days.

R3. The Regional Reliability Organization shall provide its procedures to NERC on request.

C. Measures

M1. The Regional Reliability Organization shall have available for inspection a procedure for the verification of generator models and data meeting the criteria listed in Requirement R1.

M2. The Regional Reliability Organization shall have evidence that its procedure for verification of generator models and data is available to affected Generator Owners, Generator Operators, and Transmission Planners and that any revisions were available within 30 calendar days of approval.

M3. The Regional Reliability Organization shall have evidence that it provided its procedure for verification of generator models and data to NERC within 30 calendar days of a request.

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 both the current and previous versions of the procedure.

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 for generation equipment model and data verification did not address one of the requirements MOD-023-1 R1.1, R1.3, R2, or R3.

2.2. Level 2: Procedures for generation equipment model and data verification did not address two or more of the requirements MOD-023-1 R1.1, R1.3, R2, or R3.

2.3. Level 3: Procedures for generation equipment model and data verification did not address the required elements of MOD-023-1 R1.2.

2.4. Level 4: Procedures for generation equipment model and data verification did not address all of the required elements of MOD-023-1 R1.4.

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 II.B.M2, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Verification of Generator Gross and Net Dependable Capability**

2. Number: MOD-024-1

3. Purpose: To ensure generator gross and net real power capability are available and consistent with models used to assess Bulk Electric System reliability.

4. Applicability

4.1. Generation Owner.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Generator Owner shall verify the sustainable gross and net real power capability of its units in accordance with Regional Reliability Organization requirements.

R2. The Generator Owner shall provide the Regional Reliability Organization and applicable Transmission Planner with the following information on request:

R2.1. Summer and winter gross and net real power capabilities of each unit based on the power factor level expected for each unit at the time of summer and winter peak demand, respectively.

R2.2. Real power requirements of auxiliary loads.

R2.3. Method of verification, including date and conditions as established in the Regional Reliability Organization procedures.

C. Measures

M1. The Generator Owner shall document verification of sustainable gross and net real power capability of generators, including verification methods as established by Regional Reliability Organization procedures, and shall make such documentation available to the Regional Reliability Organization.

M2. The Generator Owner shall have evidence it provided the Regional Reliability Organization and appropriate Transmission Planner with verification of generator sustainable gross and net real power capability within 30 calendar days.

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 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 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: Verified generator data was provided but was missing some of the information required in the method of verification required in MOD-024 R2.3.

2.2. Level 2: Not applicable.

2.3. Level 3: Verified generator data was provided but was missing the real power requirements of some auxiliary loads required in MOD-024 R2.2.

2.4. Level 4:

2.4.1 Verified generator data was not provided, or

2.4.2 Was provided but was missing any value of real power capability required in MOD-024 R2.1.

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 II.B.M3, which was not included in the approval Version 0 reliability standards because it required further work.

Development Steps Completed:

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Verification of Reactive Power Capability**

2. Number: MOD-025-1

3. Purpose: To verify generator gross and net reactive power capability are available and consistent with models used to assess Bulk Electric System reliability.

4. Applicability

4.1. Generator Owner.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Generator Owner shall verify the gross and net reactive power capability of its units in accordance with Regional Reliability Organization requirements.

R2. The Generator Owner shall provide the Regional Reliability Organization and the applicable Transmission Planner(s) with the following information on request:

R2.1. Maximum sustainable reactive power capability (both lagging and leading) as a function of real power output, including generator terminal voltage limitations.

R2.2. Reasons for reactive power limitation(s).

R2.3. Reactive power requirements of auxiliary loads.

R3. Method of verification, including date and conditions as established in the Regional Reliability Organization procedures.

C. Measures

M1. The Generator Owner shall document the verification of the sustainable gross and net reactive power capability of its generating units, including verification methods as established by Regional Reliability Organization procedures, and shall make such documentation available to the Regional Reliability Organization.

M2. The Generator Owner shall have evidence it provided the Regional Reliability Organization and applicable Transmission Planner(s) with validation of generator sustainable gross and net reactive power capability 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

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 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: Verified generator data was provided but was missing some of the information in the method of verification required in MOD-025 R2.4.

2.2. Level 2: Verified generator data was provided but was missing the reasons for reactive power limitation(s) required in MOD-025 R2.2.

2.3. Level 3: Verified generator data was provided when requested but was missing the reactive power requirements of some auxiliary loads as required in MOD-025 R2.3.

2.4. Level 4:

2.4.1 Verified generator data was not provided, or

2.4.2 Was provided but was missing reactive power capability required in MOD-025 R2.1.

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 II.B.M4 and II.B.M6, 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.
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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Verification and Modeling of Generator Excitation Systems and Voltage Controls**

2. Number: MOD-026-1

3. Purpose: To verify generator excitation system functions (including voltage regulator controls, limiters, compensators, and power system stabilizers, if applicable) are available and consistent with models used to assess Bulk Electric System reliability.

4. Applicability

4.1. Generator Owner.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Generator Owner shall, within 30 calendar days of a request, provide to the Regional Reliability Organization and applicable Transmission Planner(s) data associated with the generator excitation system functions (including voltage regulator controls, limiters, compensators, and power system stabilizers, if applicable), in accordance with Regional Reliability Organization requirements.

R2. The Generator Owner shall verify the data used in dynamic models for excitation systems (including power system stabilizers and other devices, if applicable) in accordance with Regional Reliability Organization requirements.

R3. The Generator Owner shall, within 30 calendar days of a request, provide to the Regional Reliability Organization and applicable Transmission Planner(s) the results of excitation system model and data verification, including but not limited to the following information:

R3.1. Type of excitation / voltage regulator control system (static, brushless, rotating, manufacturer, etc.).

R3.2. Voltage regulator controls.

R3.3. under and over excitation limiters.

R3.4. Line drop compensators.

R3.5. Gains and time constants.

R3.6. Power system stabilizers, if applicable.

R3.7. Method of verification, including the date, the voltage regulator mode of operation, and the voltage regulator control settings during the verification.

R4. The Generator Owner shall provide design data for new or refurbished excitation systems prior to the in-service date as required by the Regional Reliability Organization procedure and provide updated data once the unit is in service. Open circuit test response chart recordings shall be provided showing generator field voltage and generator terminal voltage.

R5. The Generator Owner shall provide open circuit test response chart recordings showing generator field voltage and generator terminal voltage (exciter field voltage and current data for brushless units) in accordance with Regional Reliability Organization requirements.

C. Measures

M1. The Generator Owner shall document verification of the excitation system functions (including voltage regulator controls, limiters, compensators, and power system stabilizers, if applicable) and shall make such documentation available to the Regional Reliability Organization.

M2. The Generator Owner shall have evidence it provided the Regional Reliability Organization and applicable Transmission Planner(s) with verification results for the excitation system functions (including voltage regulator controls, limiters, compensators, and power system stabilizers, if applicable).

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

Generator Owner shall retain assessments for two years.

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

1.4. Additional Compliance Information

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

2.1. Level 1: Generator voltage regulator controls and limit function information, were provided but were incomplete in one area as specified in MOD-026 R1, R2 and R5.

2.2. Level 2: Not applicable.

2.3. Level 3: Generator Owner provided design data for new or refurbished excitation systems prior to the in-service date but was incomplete as required by the Regional Reliability Organization procedure or provided incomplete updated data once the unit is in service as specified in MOD-026 R3 and R4.

2.4. Level 4: Generator Owner did not verify the data used in dynamic models for excitation systems (including power system stabilizers and other devices, if applicable) in accordance with Regional Reliability Organization requirements as specified in MOD-026 R2.

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 II.B.M5 and III.C.M9, 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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

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 and Status of Generator Frequency Response**

2. Number: MOD-027-1

3. Purpose: To provide verification and status of generator primary (other than Automatic Generation Control) frequency response for use in models for reliability studies.

4. Applicability

4.1. Generator Owner.

5. Proposed Effective Date: October 1, 2005.

B. Requirements

R1. The Generator Owner shall provide data to the Transmission Planner, Transmission Operator, and Regional Reliability Organization on how the unit speed and real power output are expected to change in response to frequency transients, in accordance with Regional Reliability Organization requirements.

R2. The Generator Owner shall provide the Regional Reliability Organization and applicable Transmission Planner(s) with the following information within 30 days of a request:

R2.1. Non-functioning or blocked speed/load governor controls, or controls that influence speed/load governor controls.

R2.2. Method of verification of the generator frequency response, including date and conditions of the verification.

C. Measures

M1. The Generator Owner shall have evidence it provided the Regional Reliability Organization, Transmission Planner, and Transmission Operator with the information required in R1 and R2 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

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 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: Method of verification of the generator frequency response was provided but was missing some of the information required in MOD-027 R2.2.

2.2. Level 2: Not applicable.

2.3. Level 3: Data on a how a unit is expected to change in response to frequency transients was provided but was missing some of the information required in MOD-027 R1.

2.4. Level 4:

2.4.1 Information on speed/load governor controls was provided but was missing some of the information required in MOD-027 R2.1, or

2.4.2 Method of the verification of the generator frequency response was not provided, or

2.4.3 Data on how a unit is expected to change in response to frequency transients was not provided, or

2.4.4 Information on non-functioning or blocked speed/load governor controls, or controls that influence speed/load governor controls was not provided.

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.B.M2 and III.B.M3, 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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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Power Electronic Control Device: A device using semiconductor technology to provide dynamic control of one or more electric power system quantities. Examples include high voltage direct current links, static Var compensators, thyristor-controlled series capacitors, and unified power flow controllers.

A. Introduction

1. **Title:** **Provision of Models and Data for Transmission Power Electronic Control Devices**

2. **Number:** MOD-028-1

3. **Purpose:** To ensure that accurate transmission Power Electronic Control Device models and data are provided to the Transmission Planner to enable assessments required to meet system performance defined in Reliability Standards TPL- 001, TPl-002, TPL-003, and TPL-004.

4. **Applicability**

   4.1. Transmission Owner.

   4.2. Transmission Operator.

5. **Proposed Effective Date:** October 1, 2005.

B. Requirements

R1. The Transmission Owner shall provide transmission Power Electronic Control Device models and data suitable for use in system modeling.

R1.1. The Transmission Owner shall provide preliminary models and data for transmission Power Electronic Control Devices to the Transmission Planner and Planning Authority to permit analysis of the potential impacts of these devices on system reliability prior to their installation or change.

R1.2. The Transmission Owner shall provide validated models and data to the Transmission Planner and Planning Authority, based on commissioning test results, within 30 calendar days after the in-service dates of the Power Electronic Control Devices, so that the impacts of these devices on system security may be fully assessed and incorporated into System Operating Limits and Interconnection Reliability Operating Limits.

R2. The Transmission Owner and Transmission Operator shall review the settings and operating strategies of each transmission Power Electronic Control Device every five years.

R3. The Transmission Owner or Transmission Operator shall provide the following documentation to the Regional Reliability Organization and NERC upon request:

R3.1. Validated models and data for each transmission Power Electronic Control Device.

R3.2. Present settings and operating strategies of each transmission Power Electronic Control Device.

C. Measures

M1. The Transmission Owner shall have evidence it provided transmission Power Electronic Control Device preliminary models and data, allowing enough time to perform of studies of potential impacts before the new or changed Power Electronic Control Device is put in service. Validated models must be provided within 30 calendar days after the in service date.

M2. The Transmission Owner and Transmission Operator shall have evidence that it reviewed transmission Power Electronic Control Device settings and operating strategies and shall provide such evidence within 30 calendar days of a request by the Regional Reliability Organization or NERC.

M3. The Transmission Owner and Transmission Operator shall have evidence it provided documentation of validated models and data and present settings and operating strategies for each transmission Power Electronic Control Device, within 30 calendar days of a request by the Regional Reliability Organization or NERC.

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 Transmission Operator shall retain current data plus previous update.

1.4. Additional Compliance Information

The Transmission Owner and Transmission Operator 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).

2. Levels of Non-Compliance

2.1. Level 1: Transmission Power Electronic Control Device models, data, and settings were not provided to the Regional Reliability Organization within 30 days of a request.

2.2. Level 2: Transmission Owner and Transmission Operator review of the settings and operating strategies of each transmission Power Electronic Control Device was older than five years.

2.3. Level 3: Preliminary models of the transmission Power Electronic Control Device models, data, and settings were not provided with sufficient time to allow testing before the device went into service.

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

2.4.1 Preliminary models of the transmission Power Electronic Control Device models, data, and settings were not provided before the device went into service, or

2.4.2 Validated transmission Power Electronic Control Device models, data, and settings were not provided to the Transmission Operator within 30 calendar days after the device went into service.

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 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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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Disturbance Monitoring Equipment: Device(s) capable of detecting and recording System electrical data during a Disturbance. Examples include sequence of event recorders, fault recorders, and dynamic disturbance recorders.

A. Introduction

1. Title: **Define Regional Disturbance Monitoring and Reporting Requirements**

2. Number: PRC-002-1

3. Purpose: To ensure there are clear requirements for installation of Disturbance Monitoring Equipment and reporting of Disturbance data. This Disturbance data is necessary to evaluate system performance; to determine the causes of Disturbances; and to develop, verify, and update system models.

4. Applicability

4.1. Regional Reliability Organization.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Regional Reliability Organization shall develop comprehensive requirements for the installation of Disturbance Monitoring Equipment to ensure data is available to determine system performance and the causes of System Disturbances. The comprehensive requirements shall include all of the following:

R1.1. Type of data recording capability (e.g., sequence-of-event, Fault recording, dynamic Disturbance recording).

R1.2. Equipment characteristics including but not limited to:

R1.2.1. Recording duration requirements.

R1.2.2. Time synchronization requirements.

R1.2.3. Data format requirements.

R1.2.4. Event triggering requirements

R1.3. Monitoring, recording, and reporting capabilities of the equipment.

R1.3.1. Voltage.

R1.3.2. Current.

R1.3.3. Frequency.

R1.3.4. MW and/or MVAR, as appropriate.

R1.4. Data retention capabilities (e.g., length of time data is to be available for retrieval).

R1.5. Regional coverage requirements (e.g., by voltage, geographic area, electric area or subarea).

R1.6. Installation requirements:

R1.6.1. Substations.

R1.6.2. Transmission lines.

R1.6.3. Generators.

R1.7. Responsibility for maintenance and testing.

R1.8. Requirements for periodic (at least every five years) updating, review, and approval of the regional requirements.

R2. The Regional Reliability Organization shall provide its requirements for the installation of Disturbance Monitoring Equipment to the affected Transmission Owners and Generator Owners within 30 calendar days of the approval of a revision, and to other Regional Reliability Organizations and NERC on request within 30 calendar days.

R3. Each Regional Reliability Organization shall establish requirements for entities to provide Disturbance data necessary to evaluate system performance and analyze the causes of system disturbances. The data reporting requirements shall include:

R3.1. Criteria for reviewing Disturbance data

R3.2. List of entities that must be provided with Disturbance data

R3.3. Data format.

R3.4. Data content requirements and guidelines.

R3.5. Timetable for response to data request.

R3.6. Requirements for the storage and retention of the Disturbance data.

R3.7. The process for the periodic review and approval of the Regional Reliability Organization's Disturbance monitoring data reporting requirements.

R4. Each Regional Reliability Organization shall provide its Disturbance data reporting requirements to the affected Transmission Owners and Generator Owners within 30 calendar days of the approval of a revision, and to other Regional Reliability Organizations and NERC within 30 calendar days of a request.

C. Measures

M1. The Regional Reliability Organization's requirements for the installation of Disturbance Monitoring Equipment shall address all elements listed in Reliability Standard PRC-002_R1.

M2. The Regional Reliability Organization shall have evidence it provided its requirements for the installation of Disturbance Monitoring Equipment to the affected Transmission Owners and Generator Owners within 30 calendar days of the approval of a revision, and to other Regional Reliability Organizations and NERC within 30 calendar days of a request.

M3. The Regional Reliability Organization's documented Disturbance monitoring data reporting requirements include all elements identified in PRC-002 R3.

M4. The Regional Reliability Organization has evidence it provided its Disturbance monitoring data reporting requirements to the affected Transmission Owners and Generator Owners within 30 calendar days of the approval of a revision, and to other Regional Reliability Organizations and NERC on request.

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 RRO shall retain its current and prior version of the requirements for the installation of monitoring equipment and for reporting disturbance data.

The Compliance Monitor will retain its 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: There shall be a level one non-compliance if any of the following conditions exist:

2.1.1 The Regional Reliability Organization's Disturbance monitoring requirements do not address one of the eight requirements contained in PRC-002-01_R1.

2.1.2 (IFM3) The Regional requirements for providing Disturbance monitoring data do not address one of the areas identified in PRC-002-01_R3.

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

2.2.1 The Regional Reliability Organization's Disturbance monitoring requirements do not address two of the eight requirements contained in PRC-002-01 R1.

2.2.2 (IFM3) The Regional requirements for providing Disturbance monitoring data do not address two of the areas identified in PRC-002 R3.

2.3. Level 3: The Regional Reliability Organization's Disturbance monitoring requirements do not address three of the eight requirements contained in PRC-002 R1.

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

2.4.1 The Regional Reliability Organization's Disturbance monitoring requirements were not provided or

2.4.2 The Regional Reliability Organization's Disturbance monitoring requirements do not address four or more of the eight requirements contained in PRC-002 R1.

2.4.3 (IFM3) Regional requirements for providing Disturbance monitoring data were not provided

2.4.4 Regional requirements for providing Disturbance monitoring data do not address three or more of the areas identified in PRC-002 R3.

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.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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

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: **Regional Procedure for Transmission and Generation Protection System Misoperations.**

2. Number: PRC-003-1

3. Purpose: To ensure all transmission and generation protection system misoperations are analyzed for cause and corrective action and maintenance and testing programs are developed and implemented.

4. Applicability

4.1. Regional Reliability Organization.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. Each Regional Reliability Organization shall have a procedure for the monitoring, review, analysis, and correction of all transmission and generation protection system misoperations on categories of devices identified for monitoring. Each Regional Reliability Organization's procedure shall include, at a minimum, the following elements:

R1.1. The procedure shall identify the categories of protection systems to be reported as needed for bulk electric system reliability.

R1.2. Requirements for monitoring and analysis of all transmission and generation protective device misoperations.

R1.3. Description of the data reporting requirements (periodicity and format) for those misoperations that adversely affects the reliability of the Bulk Electric Systems as specified by the Regional Reliability Organization.

R1.4. Process for review, review cycle, follow up, and documentation of mitigation plans for misoperations.

R1.5. Identification of the Regional Reliability Organization group responsible for the procedure and the process for Regional Reliability Organization approval of the procedure.

R1.6. Regional Reliability Organization definition of misoperations.

R2. Each Regional Reliability Organization shall maintain documentation of its procedure and provide it to the affected Transmission Owners and Generator Owners within 30 calendar days of the approval of a revision, and to NERC on request (within 30 calendar days).

C. Measures

M1. The Regional Reliability Organization shall have a procedure for the monitoring, review, analysis, and correction of transmission and generation protection system misoperations as defined in PRC-003 R1.

M2. The Regional Reliability Organization shall have evidence it provided documentation of its procedure as defined in PRC-003 R2.

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 previous requirement revision.

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: The Regional Procedure has not been reviewed and updated within the review cycle period as required by the Regional Procedure.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: The Regional Reliability Organization's procedure was not provided or did not address one or more of the requirements as defined in PRC-003 R1.

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.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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Analysis and Mitigation of Transmission and Generation Protection System Misoperations**

2. Number: PRC-004-1

3. Purpose: To ensure all transmission and generation protection system misoperations are analyzed for cause and corrective action, and to ensure maintenance and testing programs are developed and implemented to mitigate the possibility of future misoperations.

4. Applicability

4.1. Transmission Owner

4.2. Generator Owner

4.3. Distribution Provider that owns a transmission protection system

5. Proposed Effective Date: November 1**,** 2005

B. Requirements

R1. The Transmission Owner, Generator Owner, and Distribution Provider that owns a transmission or generation protection system shall analyze all protection system misoperations and shall develop and implement a mitigation plan to avoid future misoperations.

R2. The Transmission Owner, Generator Owner, and Distribution Provider that owns a transmission or generation protection system shall provide to its Regional Reliability Organization and NERC on request (within 30 calendar days) documentation of the misoperations analyses and mitigation plan according to the Regional Reliability Organization's procedures referenced by PRC-003 R1.

C. Measures

M1. The Transmission Owner, Generator Owner, and Distribution Provider that owns a transmission or generation protection system shall have evidence it analyzed its protection system misoperation(s) and developed and implemented its mitigation plan to avoid future misoperations.

M2. Each Transmission Owner, Generator Owner, and Distribution Provider that owns a transmission or generation protection system shall have evidence it provided documentation of its protection system misoperations, analyses and mitigation plan(s) according to the Regional Reliability Organization procedures referenced by PRC-003 R1.

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, Generator Owner, and Distribution Provider that owns a transmission or generation protection system shall retain data on protection system misoperations and accompanying mitigation plans for a period of 12 months.

The Compliance Monitor shall retain any audit data for three years

1.4. Additional Compliance Information

The Transmission Owner, Generator 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: Documentation of protection system misoperations is complete according to PRC-003 R1 but documentation of mitigation plans is incomplete.

2.2. Level 2: Not applicable.

2.3. Level 3: Documentation of protection system misoperations is incomplete according to PRC-003 R1.

2.4. Level 4: Documentation of protection system misoperations is incomplete according to PRC-003 R1 and documentation of mitigation plans is incomplete.

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.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.

Description of Current Draft:

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Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 5, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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No new definitions are proposed for this standard.

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 Bulk Electric System are maintained and tested.

4. **Applicability**

   4.1. Transmission Owner.

   4.2. Generator Owner.

   4.3. Distribution Provider that owns transmission protection systems.

5. **Proposed Effective Date:** November 1, 2005.

B. Requirements

R1. Each Transmission Owner, Generator Owner and Distribution Provider that owns a transmission or generation protection system shall have a protection system maintenance and testing program in place. The program shall include, as a minimum:

R1.1. Protection system devices shall include but are not limited to:

R1.1.1. Relays.

R1.1.2. Instrument transformers.

R1.1.3. Communications systems, where appropriate.

R1.1.4. Batteries.

R1.2. Documentation of maintenance and testing intervals and their basis.

R1.3. Summary of testing procedure.

R1.4. Schedule for system testing.

R1.5. Schedule for system maintenance.

R1.6. Date last tested/maintained.

R2. Each Transmission Owner, Generator Owner and Distribution Provider that owns a transmission or generation protection system shall provide documentation of its protection system program and its implementation to the appropriate Regional Reliability Organization on request (within 30 calendar days).

C. Measures

M1. Each Transmission Owner, Generator Owner and Distribution Provider that owns a transmission or generation protection system shall have a protection system maintenance and testing program as defined in PRC-005 R1.

M2. Each Transmission Owner, Generator Owner and Distribution Provider that owns a transmission or generation protection system shall have evidence it provided documentation of its protection system maintenance and testing program and the implementation of its program as defined in PRC-003 R2.

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, Generator Owner and Distribution Provider shall retain any changes to its maintenance and testing program for three years and evidence of its implementation for one year. The Compliance Monitor shall retain any audit data for three years.

1.4. Additional Compliance Information

The Transmission Owner, Generator 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: Documentation of the maintenance and testing program provided was complete as required in PRC-005 R1, but records indicate that implementation was not on schedule as required in PRC-005 R2.

2.2. Level 2: Documentation of the maintenance and testing program provided was incomplete as required in PRC-005 R1, but records indicate implementation of the documented portions of the maintenance and testing program was on schedule as required in PRC-005 R2.

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 was not on schedule.

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

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.
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4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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Disturbance Monitoring Equipment: Device(s) capable of detecting and recording System electrical data during a Disturbance. Examples include sequence of event recorders, fault recorders, and dynamic disturbance recorders.

A. Introduction

1. Title: **Disturbance Monitoring Equipment Installation and Data Reporting**

2. Number: PRC-018-1

3. Purpose: To ensure that system events are recorded for the facilitation of model development and event analysis, Regional Reliability Organizations set requirements for the installation and reporting of data from Disturbance Monitoring Equipment (see PRC-002). PRC-018 ensures that the necessary Disturbance Monitoring Equipment is installed and the status of the equipment is reported for the purposes of verification and coordination. It also ensures Disturbance data is reported in accordance with regional criteria.

4. Applicability

4.1. Transmission Owner.

4.2. Generator Owner.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Transmission Owner and Generator Owner shall install Disturbance Monitoring Equipment to meet the Regional Reliability Organization requirements specified in accordance with PRC-002.

R2. The Transmission Owner and Generator Owner shall maintain, and report to the Regional Reliability Organization on request, the following data on its installed Disturbance Monitoring Equipment:

R2.1. Type of equipment.

R2.2. Make and model of equipment.

R2.3. Installation location.

R2.4. Operational status, including time synchronization status.

R2.5. Monitored facilities (lines, buses, etc.) and monitored quantities (MW, Mvar, etc.)

R2.6. Date last tested.

R3. The Transmission Owner and Generator Owner shall provide Disturbance data in accordance with the Regional Reliability Organization procedure established in PRC-002.

C. Measures

M1. The Transmission Owner and Generator Owner shall each have evidence that its Disturbance Monitoring Equipment is installed in accordance with its associated Regional Reliability Organization's requirements.

M2. The Transmission Owner and Generator Owner shall each have the data listed in PRC-002 R2.1 through R2.6 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 provided its Disturbance data to its Regional Reliability Organization as required by PRC-002 R3.

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 Disturbance Monitoring Equipment installations and any disturbance data provided to the Regional Reliability Organization for 12 months. 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: Disturbance Monitoring Equipment is installed at all required locations as required in PRC-018 R1, however the installation data provided was incomplete and did not meet one of the six requirements R2.1 through R2.6 of PRC-018, or (IFM4) Disturbance data was provided as required in PRC-018 R3, however, the data was incomplete and did not meet all of the requirements of the Regional Reliability Organization.

2.2. Level 2: Disturbance Monitoring Equipment is installed at all required locations as required in PRC-018 R1, however the installation data provided was incomplete and did not meet two of the six requirements R2.1 through R2.6 of PRC-018.

2.3. Level 3: Disturbance Monitoring Equipment is installed at all required locations as required in PRC-018 R1, however the installation data provided was incomplete and did not meet three or more of the six requirements R2.1 through R2.6 of PRC-018.

2.4. Level 4: Disturbance Monitoring Equipment is not installed at all required locations as required in PRC-018 R1, or the installation data was not provided; (IFM4), or the Disturbance data required in PRC-018 R3 was not provided.

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.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.
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Description of Current Draft:

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Future Development Plan:

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1. Close Draft 1 comment period.	June 6, 2005
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4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

Definitions of Terms Used in Standard

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection**

2. Number: PRC-019-1

3. Purpose: To ensure generator voltage levels, reactive flows, and reactive resources are controlled and maintained within limits in real time to protect equipment and the reliable operation of the Interconnection.

4. Applicability

4.1. Generator Owner.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. Unless exempted by the Regional Reliability Organization, the Generator Owner shall provide the Regional Reliability Organization, NERC, and the Transmission Operator information documenting that the generator voltage regulator controls and limit functions coordinate with the generator's capabilities and protective relays. Unless exempted, the Generator Operator shall provide information to show the following:

R1.1. The generator manufacturer's reactive capability curve is consistent with the generator current capability. The capability curve includes specification of nominal voltage, ambient air or cooling temperature, or hydrogen pressure as appropriate. Per Regional Reliability Organization requirements, in order to document coordination, the following characteristics shall be plotted, or in a form that could be plotted on the capability curve:

R1.1.1. Steady state maximum and minimum excitation limiter control characteristics, as appropriate.

R1.1.2. The MW limit of the prime mover.

R1.1.3. The steady state stability limit.

R1.1.4. Any other limit that could restrict the MW or Mvar capability (GSU MVA rating, generator rotor shorted turn, etc.).

R1.1.5. Loss of excitation / field protective relay characteristics.

R1.1.6. Out of step.

R1.1.7. Generator back-up distance relay (if applicable).

R1.2. The Automatic Voltage Regulator coordinates with:

R1.2.1. Minimum excitation limit.

R1.2.2. Loss of excitation / field protective relay characteristic.

R1.3. The Volts / Hertz settings:

R1.3.1. Protect the generator and GSU from damage.

R1.3.2. Coordinate with AVR control.

R1.3.3. To the extent possible per R1.3.1, allow the unit to operate at the upper limit of expected normal operation.

R1.4. There are secure settings for the generator protective relays which could trip the generator for system conditions other than faults in the generator or transformer:

R1.4.1. Generator backup voltage restrained overcurrent.

R1.4.2. Negative sequence.

R1.4.3. Underfrequency.

R1.4.4. Overfrequency.

C. Measures

M1. The Generator Owner shall have evidence it provided the Transmission Operator, Regional Reliability Organization, and NERC with information that shows its generator voltage regulator controls and limit functions coordinate with the generator's capabilities and protective relays 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

Initial five calendar year phase in period, then 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 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: Not applicable.

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 PRC-019 R1.

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 PRC-019 R1.

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.
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Future Development Plan:

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1. Close Draft 1 comment period.	June 6, 2005
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4. Conduct ballot.	September 1, 2005
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Definitions of Terms Used in Standard

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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: Mitigate the risk of system voltage collapse or voltage instability by implementing an Under-Voltage Load Shedding (UVLS) program in areas of the system most susceptible to voltage collapse.

4. Applicability

4.1. Regional Reliability Organization.

5. Proposed Effective Date: October 1, 2005.

B. Requirements

R1. The Regional Reliability Organization shall maintain and annually update a UVLS program database. This database shall include sufficient information to model the UVLS program in dynamic simulations of the interconnected transmission systems, including the following items:

R1.1. Size and location of customer load, or percent of connected load, to be interrupted.

R1.2. Corresponding voltage set points.

R1.3. Time delay from initiation to trip signal.

R1.4. Breaker operating times.

R1.5. Related generation protection.

R1.6. Islanding schemes.

R1.7. Automatic load restoration schemes.

R1.8. Any other schemes that are part of or impact the UVLS programs.

R2. The Regional Reliability Organization shall update the UVLS database annually, and shall provide the current UVLS database to NERC within 30 calendar days of a request.

C. Measures

M1. The Regional Reliability Organization shall have evidence that it updated its UVLS database and provided database information upon request as required in PRC-020-1 R1 and R2 respectively.

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: The Regional Reliability Organization provided a UVLS program database that was incomplete.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: The Regional Reliability Organization did not provide a 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.

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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.
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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: Mitigate the risk of system voltage collapse or voltage instability by implementing an Under-Voltage Load Shedding (UVLS) program in areas most susceptible to voltage collapse.

4. Applicability

4.1. Transmission Owner that owns a UVLS program.

4.2. Transmission Operator that operates a UVLS program.

4.3. Distribution Provider that owns or operates a UVLS program.

4.4. Load-Serving Entity that owns or operates a UVLS program.

5. Proposed Effective Date: November 1, 2005

B. Requirements

R1. Each Transmission Owner, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operates a UVLS program shall provide, and annually update, its UVLS data as necessary for its Regional Reliability Organization to maintain and update a 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.

R1.3. Time delay from initiation to trip signal.

R1.4. Breaker operating times.

R1.5. Related generation protection.

R1.6. Islanding schemes.

R1.7. Automatic load restoration schemes.

R1.8. Any other schemes that are part of or impact the UVLS programs.

R2. Each Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates UVLS programs shall provide documentation of the UVLS system to the Regional Reliability Organization within 30 calendar days of a request.

C. Measures

M1. Each Transmission Owner, Transmission Operator, Load-serving Entity, and Distribution Provider that owns or operates an UVLS program shall have documentation of its UVLS program that includes all items specified in PRC-021 R1.

M2. Each Transmission Owner, Transmission Operator, Load-serving Entity, and Distribution Provider that owns or operates an UVLS program shall have evidence it provided the Regional Reliability Organization and NERC with documentation of its UVLS program 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, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operates a UVLS program shall retain data for two years.

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

1.4. Additional Compliance Information

Transmission Owner, 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: It has been more than a year since the UVLS data, used to update the Regional Reliability Organization UVLS program database, was updated.

2.3. Level 3: Not applicable.

2.4. Level 4: The data used to update the Regional Reliability Organization UVLS program database was not provided or did not address one or more of the items defined in PRC-021 R1.

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.
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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: Mitigate the risk of system voltage collapse or voltage instability by implementing an Under-Voltage Load Shedding (UVLS) program in areas most susceptible to voltage collapse.

4. Applicability

4.1. Load-Serving Entity that operates a UVLS.

4.2. Transmission Owner that owns or operates a UVLS.

4.3. Transmission Operator that operates a UVLS.

4.4. Distribution Provider that owns or operates a UVLS.

5. Proposed Effective Date: November 1, 2005

B. Requirements

R1. Each Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UVLS program shall analyze and document all UVLS operations, misoperations, and failures to operate. The analysis shall include, but not be limited to:

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.

R1.4. A summary of the findings.

R1.5. Corrective action taken to prevent any misoperation or failure to operate from reoccurring.

R2. Each Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UVLS program shall provide documentation of its analysis of UVLS operations, misoperations, and failures to operate, to the Regional Reliability Organization and NERC within 30 calendar days of a request.

C. Measures

M1. Each Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UVLS program shall have documentation to show its analysis of UVLS operations, misoperations and failures to operate, as specified in PRC-022 R1.

M2. Each Transmission Owner, Transmission Operator, Load-serving Entity, and Distribution Provider that owns or operates a UVLS program shall have evidence that it provided documentation of its analysis of UVLS operations, misoperations, and failures to operate within 30 calendar days of a request by the Regional Reliability Organization or NERC.

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, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UVLS program shall retain data for two years.

1.4. Additional Compliance Information

Transmission Owner, 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: An analysis of UVLS operations, misoperations, and failures to operate was provided but did not include one (1) of the five (5) requirements in PRC-002 R1.

2.3. Level 3: An analysis of UVLS operations, misoperations, and failures to operate was provided but did not include two (2) or more of the five (5) requirements in PRC-002 R1.

2.4. Level 4: An analysis of UVLS operations, misoperations, and failures to operate was not provided.

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.A.M2, which was not included in the approval Version 0 reliability standards because it required further work.

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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.
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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Redundancy of Transmission Protection Systems**

2. Number: PRC-023-1

3. Purpose: Transmission protection systems must ensure that no single protection system component failure would prevent the interconnected transmission systems from meeting system performance requirements.

4. Applicability

4.1. Transmission Owners.

4.2. Regional Reliability Organizations.

5. Proposed Effective Date: November 1, 2005

B. Requirements

R1. As necessary to meet the system performance requirements of standards TPL-001, TPL-002, TPL-003, and TPL-004 and associated Table I, each Transmission Owner shall provide protection system redundancy with each new or upgraded Bulk Electric System protection system installation, including as a minimum:

R1.1. Separate ac current inputs

R1.2. Separately fused dc control voltage

R1.3. Other redundant components

R1.4. Breaker failure protections need not be duplicated

R2. Each Regional Reliability Organization shall have a plan for reviewing the need for redundancy in its existing transmission protection systems and for implementing any required redundancy. Documentation of the protection system redundancy reviews shall be provided to NERC and those entities responsible for the reliability of the interconnected transmission systems within 30 calendar days of a request.

C. Measures

M1. The Transmission Owner shall provide documentation of the planned implementation of the redundancy requirements to NERC, the Regional Reliability Organization, and those entities responsible for the reliability of the interconnected transmission systems on request (within 30 calendar days).

M2. Each Regional Reliability Organization shall have a plan for reviewing transmission system protection redundancy and for implementing the required component redundancy. The Regional Reliability Organization shall have evidence it provided the regional plan to NERC and responsible entities within 30 calendar days of a request.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization for R1 and M1.

NERC for R2 and M2.

1.2. Compliance Monitoring Period and Reset Timeframe

On request (within 30 calendar days) for M1 and M2.

1.3. Data Retention

Transmission owners and Regional Reliability Organizations shall retain the current procedures and documentation.

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

1.4. Additional Compliance Information

Transmission owners and Regional Reliability Organizations 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 R1, M1

2.1. Level 1: Requirements to achieve the necessary component redundancy were incomplete in one area.

2.2. Level 2: Not applicable.

2.3. Level 3: Requirements to achieve the necessary component redundancy were incomplete in two or more areas.

2.4. Level 4: Requirements to achieve the necessary component redundancy were not provided.

3. Levels of Non-Compliance for R2, M2

3.1. Level 1: The Regional plan for reviewing the transmission or protection system owner's assessments and required component redundancy was incomplete in one area.

3.2. Level 2: Not applicable.

3.3. Level 3: The Regional plan for reviewing the transmission or protection system owner's assessments and required component redundancy was incomplete in two or more areas.

3.4. Level 4: The Regional plan for reviewing the transmission or protection system owner's assessments and required component redundancy was not provided.

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.C.M1, III.C.M3, and III.C.M5*, 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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

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: **Voltage and Reactive Control**

2. Number: VAR-001-1

3. Purpose: To ensure that voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in real time to protect equipment and the reliable operation of the Interconnection

4. Applicability

4.1. Transmission Operators.

4.2. Purchasing-Selling Entities.

5. Proposed Effective Date: November 1, 2005

B. Requirements

R1. Each Transmission Operator, individually and jointly with other Transmission Operators, shall ensure that formal policies and procedures are developed, maintained, and implemented for monitoring and controlling voltage levels and MVAR flows within their individual areas and with the areas of neighboring Transmission Operators.

R2. Each Transmission Operator shall acquire sufficient reactive resources within its area to ensure adequate voltage levels under normal and Contingency conditions. This includes the Transmission Operator's share of the reactive requirements of interconnecting transmission circuits.

R3. Each Transmission Operator shall specify a voltage or reactive schedule to be maintained by each synchronous generator, within the reactive capability of the unit, at a specified bus and shall provide this information to the Generator Operator.

R3.1. Each Transmission Operator shall maintain a list of synchronous generators that are required to follow a voltage or reactive schedule and shall provide each Generator Operator with its voltage or reactive schedule.

R4. Each Purchasing-Selling Entity shall arrange for (self-provide or purchase) reactive resources to satisfy its reactive requirements identified by its Transmission Service Provider.

R5. The Transmission Operator shall know the status of all transmission reactive power resources, including the status of voltage regulators and power system stabilizers.

R5.1. When notified of the loss of an automatic voltage regulator control, the Transmission Operator shall notify the Generator Operator of a voltage schedule or reactive output to maintain Interconnection and generator stability.

R6. The Transmission Operator shall be able to operate or direct the operation of devices necessary to regulate transmission voltage and reactive flow.

R7. Each Transmission Operator shall operate or direct the operation of capacitive and inductive reactive resources within its area – including reactive generation scheduling; transmission line and reactive resource switching; and, if necessary, load shedding – to maintain system and Interconnection voltages within established limits.

R8. Each Transmission Operator shall maintain reactive resources to support its voltage under first Contingency conditions.

R8.1. Each Transmission Operator shall disperse and locate the reactive resources so that the resources can be applied effectively and quickly when Contingencies occur.

R9. Each Transmission Operator shall correct IROL or SOL violations resulting from reactive resource deficiencies (IROL violations must be corrected within 30 minutes) and complete the required IROL or SOL violation reporting.

R9.1. Each Generator Operator shall provide information to its Transmission Operator on the status of all generation reactive power resources, including the status of each voltage regulator and power system stabilizer.

R9.2. When a generator's voltage regulator is out of service, the Generator Operator shall maintain the generator field excitation at a level to maintain Interconnection and generator stability.

R10. Each Transmission Operator with synchronous generation connected to its system shall provide to the Generator Operator procedures that shall:

R10.1. Require the Generator Operator to provide summary reports showing the number of hours each synchronous generator did not operate in the automatic voltage control mode during a specified time period.

R10.2. Require the Generator Operator to provide logs containing the date, duration, and reason for each period when a synchronous generator was not operated in the automatic voltage control mode.

R10.3. Require the Generator Operator to retain the above information for 12 rolling months.

R10.4. Specify criteria by which generators are to be exempted from the above requirements.

R11. The Transmission Operator shall have, and shall provide to the Generator Operator, procedures instructing Generator Operators to provide tap settings, available tap ranges, and impedance data for generator step-up and auxiliary transformers.

R11.1. When mutually agreed to tap changes are necessary, the Transmission Operator shall provide documentation to the Generator Operator specifying the required tap changes and technical justification for these changes.

R11.2. The Transmission Operator procedures shall address generating unit exemption criteria (including any that may apply to nuclear units).

R12. The Transmission Operator shall direct corrective action, including load reduction, necessary to prevent voltage collapse when reactive resources are insufficient.

C. Measures

M1. For Reliability Standard VAR-001-1 R3., the Transmission Operator shall have documentation of the voltage or reactive schedule provided to the Generator Operator and shall provide the information to the Regional Reliability Organization and NERC within 30 calendar days of a request.

M2. The Transmission Operator shall have evidence that the written procedures for synchronous generators meet Requirement 10 and shall provide the information to the Regional Reliability Organization and NERC within 30 calendar days of a request.

M3. The Transmission Operator shall have procedures for reporting synchronous generator step-up and auxiliary transformer tap settings and available tap ranges as specified in Requirement 11 and shall provide the information to the Regional Reliability Organization and NERC 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

The Transmission Operator shall retain current and previous version documentation.

1.4. Additional Compliance Information

The Transmission Operator 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: Transmission Operator has procedures for Generator Operators to follow but they do not include all aspects of Requirements R10 or R11.

2.2. Level 2: Incomplete list of exempt synchronous generators was provided per requirements R3 or R10.

2.3. Level 3: Incomplete documentation of the requested voltage or reactive schedule was provided per requirements R3 or R10.

2.4. Level 4: Transmission Operator has no documentation or procedures addressing requirements R3, R10, or R11.

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.C.M2, III.C.M4, and III.C.M6, 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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

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: **Generator Operation for Maintaining Network Voltage Schedules**

2. Number: VAR-002-1

3. Purpose: To ensure generators provide reactive and voltage control necessary to ensure voltage levels, reactive flows, and reactive resources are maintained within limits in real time to protect equipment and the reliable operation of the Interconnection.

4. Applicability

4.1. Generator Operator.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Generation Operator shall operate each synchronous generating unit connected to the interconnected transmission system in the automatic voltage control mode (automatic voltage regulator in service and controlling voltage) unless otherwise approved by the Transmission Operator.

R1.1. Each Generator Operator shall inform its Transmission Operator within 30 minutes of a status change on any synchronous generator reactive power resource, including the status of each voltage regulator and power system stabilizer.

R1.2. When a generator's voltage regulator is out of service, the Generator Operator shall use an alternative method to control the generator voltage and reactive output to meet the voltage or reactive schedule directed by the Transmission Operator.

R1.3. Each Generator Operator shall report to its Transmission Operator the date, time, duration, and reason for each period when a synchronous generator was not operated in the automatic voltage control mode and shall maintain a written log of this information for 12 rolling months.

R2. Each Generator Operator shall maintain the synchronous generator voltage or reactive output as specified by the Transmission Operator, unless otherwise approved by the Transmission Operator.

R3. Each Generator Operator shall report within 30 minutes to its Transmission Operator the date, time, duration, and reason for each period when a voltage and reactive schedule for a generator is not maintained, and shall maintain a written log of this information, including concurrence of the Transmission Operator, for 12 rolling months.

R4. When mutually agreed with the Transmission Operator, the Generator Operator shall change tap positions according to the documentation provided by the Transmission Operator within a mutually agreed upon time frame.

R5. The Generator Operator shall provide the tap settings and the available tap ranges and impedance data for generator step-up and auxiliary transformers to the Transmission Operator, Regional Reliability Organization, and NERC, within five business days of a request.

C. Measures

M1. The Generator Operator shall provide to the Transmission Operator, the Regional Reliability Organization, and NERC, within 30 calendar days of a request, information on the operation of the synchronous generator's excitation system according to the Transmission Operator's procedures for synchronous generators.

M2. The Generator Operator has available on request a log that specifies the date, duration, and reason for not maintaining the established voltage or reactive power schedule, along with approvals for such operation received from the Transmission Operator.

M3. The Generator Operator has documentation of tap settings and changes, available tap ranges, and impedances for generator step-up and auxiliary transformers.

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 Generator Operator shall maintain a written log of this information for 12 rolling months**.**

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

1.4. Additional Compliance Information

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

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

2.1.1 Logs indicate incidents, subsequent to the 30-minute notification period, of synchronous generator operation off the voltage or reactive schedule or operation without automatic voltage control, for an accumulated time of less than 8 unit-hours for an individual generator without Transmission Operator concurrence.

2.1.2 Documentation of tap settings and changes, available tap ranges, and impedances for generator step-up and auxiliary transformers is not complete.

2.2. Level 2: Logs indicate incidents, subsequent to the 30-minute notification period, of synchronous generator operation off the voltage or reactive schedule, or operation without automatic voltage control, for an accumulated time of less than 16 unit-hours for an individual generator without Transmission Operator concurrence.

2.3. Level 3: Logs of synchronous generator operation off the voltage or reactive schedule, or reactive schedule were incomplete, or the logs indicate incidents, subsequent to the 30-minute notification period, of operating off the voltage or reactive schedule or operation without automatic voltage control, for an accumulated time of less than 24 unit-hours for an individual generator without Transmission Operator concurrence.

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

2.4.1 Logs of synchronous generator operation off the voltage or reactive schedule were not provided, or the logs indicate incidents, subsequent to the 30-minute notification period, of operating off the voltage or reactive schedule or operation

without automatic voltage control for an accumulated time of more than 24 unit-hours for an individual generator without Transmission Operator concurrence.

2.4.2 Generator operator did not change tap settings as requested by the Transmission Operator during the mutually agreed upon time frame.

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 I.D.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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	June 6, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	July 15, 2005
3. Post for 30-day pre-ballot period.	August 1, 2005
4. Conduct ballot.	September 1, 2005
5. Post for 30-day period prior to Board adoption.	October 1, 2005
6. Board adoption and effective date.	November 1, 2005

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: **Assessment of Reactive Power Resources**

2. Number: VAR-003-1

3. Purpose: To ensure that reactive power resources, with a balance between static and dynamic characteristics, are planned and distributed throughout the interconnected transmission systems.

4. Applicability

4.1. Transmission Planner.

4.2. Planning Authority.

5. Proposed Effective Date: November 1, 2005.

B. Requirements

R1. The Transmission Planner and Planning Authority shall each establish a method and criteria for assessing adequate static and dynamic reactive power requirements.

R2. The Transmission Planner and Planning Authority shall each conduct assessments to ensure static and dynamic reactive power resources are adequate to meet projected customer demands, firm (non-recallable) electric power transfers, and the system performance requirements as defined in TPL-001, TPL-002, and TPL-003.

R2.1. In its assessment of reactive power resources, the Transmission Planner and Planning Authority shall each address how known changes in system conditions may affect system reliability.

R2.2. The Transmission Planner and Planning Authority shall each perform this assessment at least once every five years or as required by changes in system conditions.

R3. The Transmission Planner and Planning Authority shall each document its assessments of reactive power resources and shall provide these assessments to the Regional Reliability Organization and NERC when requested.

C. Measures

M1. The Transmission Planner and Planning Authority shall each have evidence that it developed, and reviewed within the previous five years, a method and criteria for assessing the adequacy of reactive power resources in accordance with VAR-003 R1 and shall provide this evidence to its Regional Reliability Organization and NERC within 3 calendar days of a request.

M2. The Transmission Planner and Planning Authority shall each have evidence it conducted an assessment of its reactive power resources within the past five years or as required by system conditions, in accordance with VAR-003 R2.

M3. The Transmission Planner and Planning Authority shall each have evidence it provided documentation of the results of its most recent reactive power resource assessment to its Regional Reliability Organization 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

The Transmission Planner and Planning Authority shall retain the current assessment.

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

1.4. Additional Compliance Information

The Transmission Planner and Planning Authority 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: Assessments of reactive power resources were incomplete in one area.

2.3. Level 3: The Transmission Planner or Planning Authority have not reviewed the method and criteria for assessing adequate static and dynamic reactive power requirements within the last five years.

2.4. Level 4:

2.4.1 The Transmission Planner or Planning Authority did not provide evidence that it has a method and criteria for assessing adequate static and dynamic reactive power requirements, or

2.4.2 Assessments of reactive power resources were incomplete in more than one area.

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.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.

Description of Current Draft:

This is a first draft of the standard to be posted for industry comment.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Close Draft 1 comment period.	May 16, 2005
2. Review comments from industry posting and determine if the draft standard is ready for ballot.	June 15, 2005
3. Post for 30-day pre-ballot period.	July 1, 2005
4. Conduct ballot.	August 1, 2005
5. Post for 30-day period prior to Board adoption.	September 1, 2005
6. Board adoption and effective date.	October 1, 2005

Definitions of Terms Used in Standard

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No new definitions are proposed for this standard.

A. Introduction

1. Title: **Generator Performance During Temporary Frequency and Voltage Excursions**

2. Number: VAR-004-1

3. Purpose: To ensure that generators remain connected to the electrical grid during temporary voltage and frequency excursions and are not normally tripped manually or by preset protection schemes during temporary voltage and frequency excursions.

4. Applicability

4.1. Regional Reliability Organization

5. Proposed Effective Date: October 1, 2005

B. Requirements

R1. The Regional Reliability Organization shall establish and maintain requirements for generators to remain interconnected during temporary system excursions. These requirements shall include, but not be limited to:

R1.1. Requirements to stay connected during temporary excursions in:

R1.1.1. Voltage.

R1.1.2. Frequency.

R1.2. The definition of temporary excursions expressed as a function of:

R1.2.1. Time duration in seconds or cycles, as appropriate.

R1.2.2. Amplitude or magnitude of the excursion.

R1.2.3. Relationship between time and amplitude or magnitude.

R2. The Regional Reliability Organization shall establish and maintain criteria for exemptions to the requirements of requirement R1 based on:

R2.1. Generator size.

R2.2. Generator operating equipment constraints, i.e. unique auxiliary service voltage restrictions.

R2.3. Operating conditions that may potentially damage the generating unit, i.e. changes in real and reactive power output that may be caused by a fault.

R3. The Regional Reliability Organization shall establish and maintain a procedure for handling variances to requirement R1, including steps for requesting and approving such variances.

R4. The Regional Reliability Organization shall provide documentation of its temporary excursion requirements, exemptions and variance procedure to the Transmission Operators and Generator Operators within its Region within 30 calendar days of the approval of a revision.

R5. The Regional Reliability Organization shall review and update as necessary its requirements, exemption criteria and variance procedure for generators to withstand temporary excursions in voltage, frequency, and real and reactive power output of a generator at least once every five years.

C. Measures

M1. The Regional Reliability Organization shall provide NERC with its requirements, exemption criteria and variance procedure for generators to withstand temporary excursions in voltage and frequency within 30 calendar days of a request.

M2. The Regional Reliability Organization shall have evidence it provided the requirements, criteria and procedures to the Transmission Operators and Generator Operators 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 requirement R5

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 its current and previous criteria revision.

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

1.4. Additional Compliance Information

The Regional Reliability Organization 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).

2. Levels of Non-Compliance

2.1. Level 1: The Regional Reliability Organization did not provide evidence required in requirement R4 or R5.

2.2. Level 2: Documentation of Regional Reliability Organization exemption criteria or variance procedure did not address one or more of the items in requirement R2 or R3.

2.3. Level 3: Not applicable

2.4. Level 4: Documentation of Regional Reliability Organization requirements did not address one or more of the items in requirement R1.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking