

## **Background Information for Second Posting of Set One of Phase III & IV Standards:**

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### **Background Information for Second Posting of Phase III & IV Standards:**

The Phase III & IV drafting team divided its Standards into two sets, and is posting Set One now, and will post Set Two later.

#### **The Standards Included in Set One Are:**

##### **Undervoltage Load Shedding:**

- PRC-020-1 Undervoltage Load Shedding Program Database
- PRC-021-1 Undervoltage Load Shedding Program Data
- PRC-022-1 Undervoltage Load Shedding Program Performance

##### **Disturbance Monitoring Equipment and Disturbance Data:**

- PRC-002-1 Define and Document Regional Disturbance Monitoring and Reporting
- PRC-018-1 Disturbance Monitoring Equipment Installation and Data Reporting

##### **Generator Model and Data Verification:**

- MOD-024-1 Verification of Generator Gross and Net Real Power Capability
- MOD-025-1 Verification of Generator Gross and Net Reactive Power Capability

##### **Generator Protection, Coordination of Protection and Generator Performance:**

- PRC-003-1 Regional Requirements for Analysis of Protection System Misoperations
- PRC-004-1 Analysis and Mitigation of Protection System Misoperations
- PRC-005-1 Transmission and Generation Protection System Maintenance and Testing
- PRC-019-1 Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection
- PRC-024-1 (Re-numbered - previously VAR-004) Generator Performance during Frequency and Voltage Excursions

#### **The Standards Included in Set Two to be Posted Later Are:**

- EOP-005-1 System Restoration Plans
- MOD-016-1 Actual and Forecast Demands, Net Energy for Load, Controllable DSM
- MOD-026-1 Verification of Generator Excitation Systems and Voltage Control Model Data
- MOD-027-1 Verification and Status of Generating Unit Frequency Response
- VAR-001-1 Voltage and Reactive Control
- VAR-002-1 Generator Operation for Maintaining Network Voltage Schedules
- VAR-003-1 Assessment of Reactive Power Resources

#### **Standards Recommended for Deletion:**

- MOD-022-1 Use of Disturbance Data to Develop and Maintain Models
- MOD-028-1 Provision of Models and Data for Transmission Power Electronic Control Devices
- PRC-023-1 Redundancy of Transmission Protection Systems

## **Major Changes to Set One of the Phase III & IV Standards**

### ***Undervoltage Load Shedding:***

The ‘applicability’ section of PRC-021 – UVLS Program Data and PRC-022 - UVLS Program Data Performance were modified so that the requirements are only applicable to the entities that ‘own’ UVLS programs rather than to entities that either ‘own or operate’ UVLS programs. If the standard assigns applicability to both the owners and operators, then the same data will need to be provided by multiple entities. Responsibility should be applied to just one entity and that entity may delegate the task to another entity if so desired.

### ***Disturbance Monitoring Equipment and Disturbance Data:***

NERC’s Interconnected Dynamics Working Group submitted detailed comments that highlighted specific weaknesses in the 1<sup>st</sup> draft of the proposed standards and recommended changes based on its findings following a survey conducted as a result of the August 2003 Blackout. As a result of these and other comments, the drafting team added much more specificity in the requirements for Dynamic Disturbance Recorders.

### ***Generator Model and Data Verification:***

There were many suggestions for modifying the sequence of standards that include MOD-023 through MOD-027. MOD-023 required the RRO to develop procedures requiring Generator Owners to verify the following types of data used in modeling and for real-time analyses:

- Generator gross and net real power capability
- Generator gross and net reactive power capability
- Excitation system models and related data
- Speed/load governor control models and data

MOD-023 referenced four companion standards:

- MOD-024 requires the Generator Owner to verify its generator gross and net real power capability
- MOD-025 requires the Generator Owner to verify its generator gross and net reactive power capability
- MOD-026 requires the Generator Owner to verify its excitation system models and related data
- MOD-027 requires the Generator Owner to verify its speed/load governor control models and data

To prepare the second draft of this set of standards, the Drafting Team subdivided the Regional Reliability Organization’s requirements in MOD-023 and added the requirements into the associated standard (MOD-024 through MOD-027). Now each of the revised standards includes the Regional Reliability Organization’s requirement to develop a procedure and the Generator Owners requirement to follow that procedure. *(Note that MOD-026 and MOD-027 are included in Set Two of the Phase III & IV Standards.)*

One of the reasons the drafting team made this change was to make the balloting easier and to ensure that field testing of some measures won’t hold up the entire sequence of standards.

### ***Generator Performance:***

VAR-004 (Renumbered as PRC-024) required the RRO to develop requirements addressing response to frequency and voltage excursions, but the requirement to respond to those requirements was not explicitly stated in the original Planning Measures. The drafting team

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added a requirement for the Generator Owner and Transmission Owner to comply with the regional requirements to remain connected to the electrical grid during certain voltage and frequency excursions. (VAR-004/PRC-024)

### **Standards Recommended for Deletion:**

MOD-022-1 Use of Disturbance Data to Develop and Maintain Models is recommended for deletion because stakeholders indicated the requirements are too subjective and cannot be standardized until practical methods are developed.

MOD-028-1 Provision of Models and Data for Transmission Power Electronic Control Devices is recommended for deletion because stakeholders indicated that the proposed MOD-028 is redundant with the already approved standards MOD-012 and MOD-013.

PRC-023-1 Redundancy of Transmission Protection Systems is recommended for deletion because stakeholders indicated that the purpose and requirements are addressing two different types of redundancies, and much more industry debate is needed before an associated standard can be written.

### **Definitions:**

#### ***New Definitions:***

The drafting team added definitions for Misoperation, Mitigation Plan and Protection System:

#### **Misoperation:**

- Any failure of a Protection System element to operate within the specified time when a fault or abnormal condition occurs within a zone of protection.
- Any protection system operation for a fault not within a zone of protection (other than operation as backup protection for a fault in an adjacent zone).
- Any operation when no fault or other abnormal condition has occurred.
- Any failure to successfully reclose following a Protection System trip operation.
- Any unintentional operation when no fault or other abnormal condition has occurred.

**Mitigation Plan:** A list of corrective actions and an associated timetable for implementation to remedy a specific problem.

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

**Gross and Net Real and Reactive Power:** The drafting team avoided developing definitions for gross and net real and reactive power and suggested that definitions for these terms should be developed by the associated Region because these definitions will most likely contain some 'duration' component that can vary between Regions and may contain other qualifying factors such as ambient temperature.

### *Revised Definition:*

The drafting team modified the definition of Disturbance Monitoring Equipment to align with the revisions made to the standards:

**Disturbance Monitoring Equipment (DME):** Device(s) capable of ~~detecting and~~ recording ~~S~~system ~~electrical~~ data ~~during~~ pertaining to a Disturbance. ~~Examples include sequence of event recorders, fault recorders, and dynamic disturbance recorders.~~ Such equipment includes the following categories of recorders:

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

### *Deleted Definition:*

**Power Electronic Control Device:** The drafting team removed the definition of Power Electronic Control Device because the associated standard was recommended for deletion.

### **Field Testing and Effective Dates:**

Most of the comments submitted on field testing indicated either a need to delay full implementation of the standards to give entities time to acquire and install equipment or to develop processes to meet compliance. Although these are not necessarily reasons to conduct field testing, the drafting team did agree that the processes needed to meet compliance may not be in place and some may not be completely agreed upon at this time.

In most cases, the drafting team used these comments to propose effective dates for the individual standards that reflect consideration of the time entities need to acquire and install equipment or to develop processes to meet compliance.

For MOD-026 (Verification of Generator Excitation Systems & Voltage Control Model Data,) and MOD-027 (Verification and Status of Generating Unit Frequency Response), the drafting team is recommending field testing to give entities an opportunity to identify and test processes that can be used to achieve compliance.

The drafting team is recommending a field test of MOD-026 involving at least one unit for each Generator Owner, to gain experience in conducting identified verifications.

The drafting team is recommending a limited field test of MOD-027 to give Regions time to develop a process and methods of verification of generating unit frequency response. The field test would involve some Regions for at least one year on a voluntary basis. Following the field test, the Region's procedures written to support this standard are likely to change.

### **Consider Changes When Making Comments**

The drafting team asks you to consider your acceptance of the changes made to Set One of the Phase III & IV Standards when you respond to the questions in the associated Comment Form.