

**Violation Risk Factors — Version 1 Standards Pre-ballot Matrix**

The following table lists the Violation Risk Factors (VRFs) for the requirements in the following Version 1 Protection and Control standards:

- PRC-002-1 — Define and Document Disturbance Monitoring Equipment Requirements
- PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting
- PRC-021-1 — Under-Voltage Load Shedding Program Data
- PRC-022-1 — Under-Voltage Load Shedding Program Performance

These VRFs are the weighted average of the stakeholder VRF selections from the second posting of the Version 1 VRF survey.

<b>PRC-002-1 — Define and Document Disturbance Monitoring Equipment Requirements</b>			
PRC-002-1	R1	The Regional Reliability Organization shall establish the following installation requirements for sequence of event recording:	LOWER
PRC-002-1	R1.1	Location, monitoring and recording requirements, including the following:	LOWER
PRC-002-1	R1.1.1.	Criteria for equipment location (e.g., by voltage, geographic area, station size, etc.).	LOWER
PRC-002-1	R1.1.2.	Devices to be monitored.	LOWER
PRC-002-1	R2	The Regional Reliability Organization shall establish the following installation requirements for fault recording:	LOWER
PRC-002-1	R2.1	Location, monitoring and recording requirements, including the following:	LOWER
PRC-002-1	R2.1.1	Criteria for equipment location (e.g., by voltage, geographic area, station size, etc.).	LOWER
PRC-002-1	R2.1.2	Elements to be monitored at each location.	LOWER
PRC-002-1	R2.1.3	Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:	LOWER
PRC-002-1	R2.1.3.1	Three phase to neutral voltages.	LOWER
PRC-002-1	R2.1.3.2	Three phase currents and neutral currents.	LOWER
PRC-002-1	R2.1.3.3	Polarizing currents and voltages, if used.	LOWER
PRC-002-1	R2.1.3.4	Frequency.	LOWER
PRC-002-1	R2.1.3.5	Megawatts and megavars.	LOWER
PRC-002-1	R2.2	Technical requirements, including the following:	LOWER
PRC-002-1	R2.2.1	Recording duration requirements.	LOWER
PRC-002-1	R2.2.2	Minimum sampling rate of 16 samples per cycle.	LOWER
PRC-002-1	R2.2.3	Event triggering requirements.	LOWER
PRC-002-1	R3	The Regional Reliability Organization shall establish the following installation requirements for dynamic Disturbance recording:	LOWER
PRC-002-1	R3.1.	Location, monitoring and recording requirements including the following:	LOWER
PRC-002-1	R3.1.1	Criteria for equipment location giving consideration to the following:	LOWER

PRC-002-1 — Define and Document Disturbance Monitoring Equipment Requirements			
		<ul style="list-style-type: none"> <li>- Site(s) in or near major load centers</li> <li>- Site(s) in or near major generation clusters</li> <li>- Site(s) in or near major voltage sensitive areas</li> <li>- Site(s) on both sides of major transmission interfaces</li> <li>- A major transmission junction</li> <li>- Elements associated with Interconnection Reliability Operating Limits</li> <li>- Major EHV interconnections between control areas</li> <li>- Coordination with neighboring regions within the interconnection</li> </ul>	
PRC-002-1	R3.1.2	Elements and number of phases to be monitored at each location.	LOWER
PRC-002-1	R3.1.3	Electrical quantities to be recorded for each monitored element shall be sufficient to determine the following:	LOWER
PRC-002-1	R3.1.3.1	Voltage, current and frequency.	LOWER
PRC-002-1	R3.1.3.2	Megawatts and megavars.	LOWER
PRC-002-1	R3.2.	Technical requirements, including the following:	LOWER
PRC-002-1	R3.2.1	Capability for continuous recording for devices installed after January 1, 2009.	LOWER
PRC-002-1	R3.2.2	Each device shall sample data at a rate of at least 960 samples per second and shall record the RMS value of electrical quantities at a rate of at least 6 records per second.	LOWER
PRC-002-1	R4	The Regional Reliability Organization shall establish requirements for facility owners to report Disturbance data recorded by their DME installations. The Disturbance data reporting requirements shall include the following:	LOWER
PRC-002-1	R4.1.	Criteria for events that require the collection of data from DMEs.	LOWER
PRC-002-1	R4.2.	List of entities that must be provided with recorded Disturbance data.	LOWER
PRC-002-1	R4.3.	Timetable for response to data request.	LOWER
PRC-002-1	R4.4	Provision for reporting Disturbance data in a format which is capable of being viewed, read and analyzed with a generic COMTRADE[1] analysis tool,	LOWER
PRC-002-1	R4.5	Naming of data files in conformance with the IEEE C37.232 Recommended Practice for Naming Time Sequence Data Files[2].	LOWER
PRC-002-1	R4.6	Data content requirements and guidelines.	LOWER
PRC-002-1	R5	The Regional Reliability Organization shall provide its requirements (and any revisions to those requirements) including those for DME installation and Disturbance data reporting to the affected Transmission Owners and Generator Owners within 30 calendar days of approval of those requirements.	LOWER
PRC-002-1	R6	The Regional Reliability Organization shall periodically (at least every five years) review, update and approve its Regional requirements for Disturbance monitoring and reporting.	LOWER

PRC-018-1 — Disturbance Monitoring Equipment Installation and Data Reporting			
PRC-018-1	R1	Each Transmission Owner and Generator Owner required to install DMEs by its Regional Reliability Organization (reliability standard PRC-002 Requirements 1-3) shall have DMEs installed that meet the following requirements:	LOWER
PRC-018-1	R1.1	Internal Clocks in DME devices shall be synchronized to within 2 milliseconds or less of Universal Coordinated Time scale (UTC)	LOWER
PRC-018-1	R1.2	Recorded data from each Disturbance shall be retrievable for ten calendar days..	LOWER
PRC-018-1	R2	The Transmission Owner and Generator Owner shall each install DMEs in accordance with its Regional Reliability Organization's installation requirements (reliability standard PRC-002 Requirements 1 through 3).	LOWER
PRC-018-1	R3	The Transmission Owner and Generator Owner shall each maintain, and report to its Regional Reliability Organization on request, the following data on the DMEs installed to meet that region's installation requirements (reliability standard PRC-002 Requirements 1.1, 2.1 and 3.1):	LOWER
PRC-018-1	R3.1	Type of DME (sequence of event recorder, fault recorder, or dynamic disturbance recorder).	LOWER
PRC-018-1	R3.2	Make and model of equipment.	LOWER
PRC-018-1	R3.3	Installation location.	LOWER
PRC-018-1	R3.4	Operational status.	LOWER
PRC-018-1	R3.5	Date last tested.	LOWER
PRC-018-1	R3.6	Monitored elements, such as transmission circuit, bus section, etc.	LOWER
PRC-018-1	R3.7	Monitored devices, such as circuit breaker, disconnect status, alarms, etc.	LOWER
PRC-018-1	R3.8	Monitored electrical quantities, such as voltage, current, etc.	LOWER
PRC-018-1	R4	The Transmission Owner and Generator Owner shall each provide Disturbance data (recorded by DMEs) in accordance with its Regional Reliability Organization's requirements (reliability standard PRC-002 Requirement 4).	LOWER
PRC-018-1	R5	The Transmission Owner and Generator Owner shall each archive all data recorded by DMEs for Regional Reliability Organization-identified events for at least three years.	LOWER
PRC-018-1	R6	Each Transmission Owner and Generator Owner that is required by its Regional Reliability Organization to have DMEs shall have a maintenance and testing program for those DMEs that includes:	LOWER
PRC-018-1	R6.1	Maintenance and testing intervals and their basis.	LOWER
PRC-018-1	R6.2	Summary of maintenance and testing procedures.	LOWER

<b>PRC-021-1 — Under-Voltage Load Shedding Program Data</b>			
PRC-021-1	R1.	Each Transmission Owner and Distribution Provider that owns a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall annually update its UVLS data to support the Regional UVLS program database. The following data shall be provided to the Regional Reliability Organization for each installed UVLS system:	LOWER
PRC-021-1	R1.1.	Size and location of customer load, or percent of connected load, to be interrupted.	LOWER
PRC-021-1	R1.2.	Corresponding voltage set points and overall scheme clearing times.	LOWER
PRC-021-1	R1.3.	Time delay from initiation to trip signal.	LOWER
PRC-021-1	R1.4.	Breaker operating times.	LOWER
PRC-021-1	R1.5.	Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems.	LOWER
PRC-021-1	R2.	Each Transmission Owner and Distribution Provider that owns a UVLS program shall provide its UVLS program data to the Regional Reliability Organization within 30 calendar days of a request.	LOWER

<b>PRC-022-1 — Under-Voltage Load Shedding Program Performance</b>			
PRC-022-1	R1.	Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall analyze and document all UVLS operations and Misoperations. The analysis shall include:	LOWER
PRC-022-1	R1.1.	A description of the event including initiating conditions.	LOWER
PRC-022-1	R1.2.	A review of the UVLS set points and tripping times.	LOWER
PRC-022-1	R1.3.	A simulation of the event, if deemed appropriate by the Regional Reliability Organization. For most events, analysis of sequence of events may be sufficient and dynamic simulations may not be needed.	LOWER
PRC-022-1	R1.4.	A summary of the findings.	LOWER
PRC-022-1	R1.5.	For any Misoperation, a Corrective Action Plan to avoid future Misoperations of a similar nature.	MEDIUM
PRC-022-1	R2.	Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall provide documentation of its analysis of UVLS program performance to its Regional Reliability Organization within 90 calendar days of a request.	LOWER