NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

# Implementation Plan for Underfrequency Load Shedding Regional Reliability Standard Characteristics

## Prerequisite Approvals

There are no other reliability standards or Standard Authorization Requests (SARs), in progress or approved, that must be implemented before these Underfrequency Load Shedding (UFLS) Regional Reliability Standard characteristics and associated regional reliability standards can be implemented.

## Compliance with Standards

Once a UFLS regional reliability standard becomes effective, the responsible entities identified in the applicability section of the specific standard must comply with the requirements.

## Proposed Effective Date

Compliance with the individual UFLS regional reliability standards shall be effective according to the approved effective date of the specific regional reliability standard.

## Retired Standards

PRC-006-0 — Development and Documentation of Regional UFLS Programs will be completely retired once all eight UFLS regional reliability standards become effective. PRC-006-0 will remain in effect for any region without an effective UFLS regional reliability standard.

PRC-007-0 — Assuring Consistency with Regional UFLS Program Requirements will be completely retired once all eight UFLS regional reliability standards become effective. PRC-007-0 will remain in effect for any region without an effective UFLS regional reliability standard.

PRC-009-0 — UFLS Performance Following an Underfrequency Event will be completely retired once all eight UFLS regional reliability standards become effective. PRC-009-0 will remain in effect for any region without an effective UFLS regional reliability standard.

The following tables provide a mapping of the existing requirements to be retired relative to the resolution of the requirement going forward with the implementation of regional standards in accordance with the Underfrequency Load Shedding Regional Reliability Standard Characteristics.

| Standard | Requirement | Location | Needed for Reliability |
|---|---|---|---|
| **PRC-006-0** | **R1:** Each Regional Reliability Organization shall develop, coordinate, and document an UFLS program, which shall include the following: | UFLS Regional Reliability Standard Characteristics 1, 2, and 3. | Yes |
| | **R1.1**: Requirements for coordination of UFLS programs within the subregions, Regional Reliability Organization and, where appropriate, among Regional Reliability Organizations. | UFLS Regional Reliability Standard Characteristic 3. | Yes |
| | **R1.2**: Design details shall include, but are not limited to:<br>**R.1.2.1**: Frequency set points.<br>**R.1.2.2**: Size of corresponding load shedding blocks (% of connected loads.)<br>**R.1.2.3**: Intentional and total tripping time delays.<br>**R.1.2.4**: Generation protection.<br>**R.1.2.5**: Tie tripping schemes.<br>**R.1.2.6**: Islanding schemes.<br>**R.1.2.7**: Automatic load restoration schemes.<br>**R.1.2.8**: Any other schemes that are part of or impact the UFLS programs. | These design details will be included in the Regional Standards, and will be established within each region to meet the common system performance standard defined by UFLS Regional Reliability Standard Characteristics 4 and 5. | Yes |
| | **R1.3**: A Regional Reliability Organization UFLS program database. This database shall be updated as specified in the Regional Reliability Organization program (but at least every five years) and shall include sufficient information to model the UFLS program in dynamic simulations of the interconnected transmission systems. | UFLS Regional Reliability Standard Characteristics 7 and 8. | Yes |

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|---|---|---|---|
| | **R1.4**: Assessment and documentation of the effectiveness of the design and implementation of the Regional UFLS program. This assessment shall be conducted periodically and shall (at least every five years or as required by changes in system conditions) include, but not be limited to:<br><br>**R1.4.1**: A review of the frequency set points and timing, and<br><br>**R1.4.2**: Dynamic simulation of possible Disturbance that cause the Region or portions of the Region to experience the largest imbalance between Demand (Load) and generation. | UFLS Regional Reliability Standard Characteristic 10. | Yes |
| | **R2**: The Regional Reliability Organization shall provide documentation of its UFLS program and its database information to NERC on request (within 30 calendar days). | UFLS Regional Reliability Standard Characteristics 7 and 8. | Yes |
| | **R3:** The Regional Reliability Organization shall provide documentation of the assessment of its UFLS program to NERC on request (within 30 calendar days). | UFLS Regional Reliability Standard Characteristic 10. | Yes |

| Standard | Requirement | Location | Needed for Reliability |
|---|---|---|---|
| **PRC-007-0** | **R1**: The Transmission Owner and Distribution Provider, with a UFLS program (as required by its Regional Reliability Organization) shall ensure that its UFLS program is consistent with its Regional Reliability Organization's UFLS program requirements. | UFLS Regional Reliability Standard Characteristic 11. | Yes |
| | **R2**: The Transmission Owner, Transmission Operator, Distribution Provider, and Load-Serving Entity that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide, and annually update, its underfrequency data as necessary for its Regional Reliability Organization to maintain and update a UFLS program database. | UFLS Regional Reliability Standard Characteristics 7 and 8. | Yes |
| | **R3**: The Transmission Owner and Distribution Provider that owns a UFLS program (as required by its Regional Reliability Organization) shall provide its documentation of that UFLS program to its Regional Reliability Organization on request (30 calendar days). | UFLS Regional Reliability Standard Characteristic 10. | Yes |

| Standard | Requirement | Location | Needed for Reliability |
|---|---|---|---|
| **PRC-009-0** | **R1.** The Transmission Owner, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall analyze and document its UFLS program performance in accordance with its Regional Reliability Organization's UFLS program. The analysis shall address the performance of UFLS equipment and program effectiveness following system events resulting in system frequency excursions below the initializing set points of the UFLS program. The analysis shall include, but not be limited to:,: | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296:<br><br>A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | Yes |
| | **R1.1.** A description of the event including initiating conditions. | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296:<br><br>A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | Yes |
| | **R1.2.** A review of the UFLS set points and tripping times. | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296: | Yes |

| Standard | Requirement | Location | Needed for Reliability |
|---|---|---|---|
| | | A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | |
| | **R1.3.** A simulation of the event. | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296:<br><br>A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | Yes |
| | **R1.4.** A summary of the findings. | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296:<br><br>A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events | Yes |

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|---|---|---|---|
| | | leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | |
| | **R2.** The Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide documentation of the analysis of the UFLS program to its Regional Reliability Organization and NERC on request 90 calendar days after the system event. | These existing requirements are covered in the ERO Rules of Procedures, Appendix 8, page 296:<br><br>A NERC-level analysis will comprise (a) collecting pertinent event data; (b) constructing a detailed sequence of events leading to and triggering the disturbance; (c) assembling system models and data and conducting detailed system analysis to simulate pre- and post-event conditions; and (d) issuing findings, conclusions, and recommendations. | Yes |