

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.

Development Steps Completed:

1. The Standards Committee approved the SAR for posting on November 21, 2006.
2. SAR posted for comments on November 29, 2006.
3. The Standards Committee appointed a SAR Drafting team on January 11, 2007.
4. SAR Drafting Team responds to comments, revises SAR and posts for comments on February 7, 2007.
5. SAR Drafting Team responds to comments on April 20, 2007.
6. Standards Committee approves development of Standard on April 10, 2007.
7. The Standards Committee appointed the Standard Drafting Team on April 10, 2007.
8. The Standards Drafting Team posted draft performance characteristics for comment on July 2, 2008.
9. Standards Drafting Team responds to comments, revises standard and posts for comments on April 15, 2009.

Proposed Action Plan and Description of Current Draft:

This is the second posting of the proposed standard (the first posting was proposed common continent-wide performance characteristics as a directive to the Regional Entities to develop regional standards) for a 30 day comment period, from April 21 – May 20, 2009.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Respond to comments on the second posting and post revised standard for a 30 day comment period.	July 7, 2009
2. Respond to comments on the draft of the proposed standard and implementation plan.	September 14, 2009
3. Obtain the Standards Committee's approval to move the standard forward to balloting.	September 16, 2009
4. Post the standard and implementation plan for a 30-day pre-ballot review.	October 1, 2009
5. Conduct an initial ballot for ten days.	November 15, 2009
6. Respond to comments submitted with the initial ballot.	November 30, 2009
7. Conduct a recirculation ballot for ten days.	December 15, 2009
8. BOT adoption.	

A. Introduction

1. **Title:** Automatic Underfrequency Load Shedding
2. **Number:** PRC-006-01
3. **Purpose:** To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency and assist recovery of frequency following underfrequency events.
4. **Applicability:**
 - 4.1. Planning Coordinators
 - 4.2. Distribution Providers
 - 4.3. Transmission Owners with end-use Load connected to their Facilities where such end use load is not part of a Distribution Provider's load
5. **(Proposed) Effective Date:** TBD

B. Requirements

- R1.** Each Planning Coordinator shall join a group consisting of all the Planning Coordinators within the region for each of the regions in which it performs the Planning Coordinator function.
- R2.** Each group of Planning Coordinators shall design an underfrequency load shedding program for consistent application across the region.
- R3.** Each group of Planning Coordinators shall develop criteria, considering historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands.
- R4.** Each group of Planning Coordinators shall develop a procedure for coordinating with groups of Planning Coordinators in neighboring regions within an interconnection to identify and reach agreement on islands between its region and neighboring regions within the interconnection. The procedure shall identify how the neighboring entities will assist in the UFLS assessments and document concurrence of assessment results.
- R5.** Each group of Planning Coordinators shall identify an island(s) as a basis for designing a UFLS program. The identified island(s) shall include:
 - Those islands selected by applying the criteria in Requirement R3, if any.
 - Any portions of the BES that are designed to be detached from the interconnection (planned islands) as a result of the operation of a relay scheme.
 - Interregional islands agreed on by the Planning Coordinators.
 - Any other islands necessary to ensure that all portions of the region's BES are included in at least one island.
- R6.** Each group of Planning Coordinators shall specify the technical design parameters of the underfrequency load shedding program required to meet the following performance characteristics in simulations of underfrequency conditions resulting from an

imbalance scenario where an imbalance = [(load - actual generation output) / (load)] of up to 25 percent within the identified island(s):

- R6.1.** Arrest frequency decline at no less than 58.0 Hz.
- R6.2.** Frequency shall not remain below 58.2 Hz for greater than four seconds cumulatively per simulated event, and shall not remain below 58.5 Hz for greater than ten seconds cumulatively per simulated event, and shall not remain below 59.3 Hz for greater than 30 seconds, cumulatively per simulated event.
- R6.3.** Frequency overshoot resulting from operation of UFLS relays shall not exceed 61.8 Hz for any duration and shall not exceed 60.7 Hz for greater than 30 seconds, cumulatively per simulated event.
- R6.4.** Control voltage during and following UFLS operations such that the per unit Volts per Hz (V/Hz) does not exceed 1.18 for longer than two seconds cumulatively per simulated event, and does not exceed 1.10 for longer than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with any:
 - R6.4.1.** Individual generating unit greater than 20 MVA (gross nameplate rating) and directly connected to the BES.
 - R6.4.2.** Generating plant/facility greater than 75 MVA (gross aggregate nameplate rating) and directly connected to the BES.
- R7.** Each group of Planning Coordinators shall conduct a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R6. The simulation shall include;
 - R7.1.** Modeling the trip settings of any generators that trip at or above 58.0 Hz.
 - R7.2.** Modeling the trip settings of any generators that trip at or below 61.8 Hz.
 - R7.3.** Modeling any automatic load restoration that is designed to assist in stabilizing frequency.
- R8.** Each group of Planning Coordinators shall create and annually maintain a UFLS database containing relay information provided by their Transmission Owners and Distribution Providers for use in UFLS assessments and event analyses.
- R9.** Each Transmission Owner and Distribution Provider shall provide data to its group of Planning Coordinators according to the schedule and format specified by the group of Planning Coordinators to support maintenance of the database.
- R10.** Each Transmission Owner and Distribution Provider shall provide load tripping in accordance with the UFLS program designed by the group of Planning Coordinators for each region in which it operates.