

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard.

Credible Island - a geographical or electrical contiguous area that has the possibility and probability of having a balance of generations and load, and is separated electrically from other areas.

Forecasted Peak Native Load – the projected value of an entity's end-use customers' coincident system peak load for the upcoming calendar year.

Title: SPP Automatic Underfrequency Load Shedding Program

A. Introduction

1. **Title:** Southwest Power Pool (SPP) Automatic Underfrequency Load Shedding Program

2. **Number:** PRC-006-SPP-01

3. **Purpose:** To develop, coordinate and document requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency and assist recovery of frequency following underfrequency events

4. **Applicability:**

4.1 Transmission Owners with end-use Load connected to their Facilities where such end-use Load is not part of a Distribution Provider's Load

4.2 Distribution Providers and any other entity with end-use Load not registered as a Distribution Provider determined by the Regional Entity to have material impact on the Bulk Electric System

4.3 Generator Owners and any owners of generation not registered as a Generator Owner determined by the Regional Entity to have material impact on the Bulk Electric System

4.4 Planning Coordinator as authorized by SPP Regional Entity

5. **Effective Date:** 24 months following applicable regulatory approvals

B. Requirements



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R1. The end-use Load entities identified in Applicability shall develop and implement an automatic UFLS program or shall participate with one or more Distribution Providers, and/or Transmission Owners to collectively implement a single automatic UFLS program. Entities that participate as a collective group shall designate a single entity that shall report to the Planning Coordinator.

The automatic UFLS program shall include the following requirements:

R1.1. Automatic UFLS program for frequencies of 58.7Hz and above shall be initiated in three separate steps as indicated in the table below.

(1) UFLS Step	(2) Frequency (hertz)	(3) Minimum Accumulated Load Relief as Percentage of Forecasted Peak Native Load (%)	(4) Maximum Accumulated Load Relief as Percentage of Forecasted Peak Native Load (%)
1	59.3	10	25
2	59.0	20	35
3	58.7	30	45

R1.2. The end-use Load entities identified in Applicability shall report by April 1st of each year to the Planning Coordinator the amount of Load as a percentage of Forecasted Peak Native Load it expects to automatically shed for each step identified in R1.1 for the current calendar year.

R1.3. The intentional relay time delay for UFLS shall not be greater than 30 cycles.

R1.4. Undervoltage inhibit shall be set as low as practical, but shall not be greater than 85 percent of nominal voltage.

R1.5. Applicable entities electing to use islanding schemes shall only operate after all 3 steps of UFLS have been exhausted and the frequency continues to fall below 58.5Hz.

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- R2.** Each Generator Owner or generator identified in Applicability shall verify by review of relay settings, generator control system settings, and generator operating guides that their generating unit(s) will not trip during low frequency conditions above 58.0Hz. Should this not be practical due to the operating characteristics of certain units, the Planning Coordinator shall study the resulting loss of generation to determine if there is any adverse impact on the system. If there is an adverse impact, the Generator Owner or generator identified in Applicability shall be required to arrange for Load shedding to be installed by mutual agreement with Distribution Providers, Load-Serving Entities, and/or Transmission Owners with end-use Load customer(s) connected to their Facilities, in addition to that required Load shedding as listed in R1.
- R2.1.** This additional Load shedding shall be equal to or greater than the amount of generation interrupted instituted at the same frequency and time as the generator would be expected to trip.
- R3.** Applicable entities shall maintain and submit the following UFLS data to Planning Coordinator at least every 5 years or within (30) calendar days upon request from the Planning Coordinator:
- R3.1.** Number of UFLS relays installed.
- R3.2.** Facility location of installed UFLS relays.
- R3.3.** Breaker, circuit switcher, or device identification the UFLS relays are tripping.
- R3.4.** Trip frequency for each installed relay.
- R3.5.** Total time delay of each UFLS relay scheme, including the intentional relay delay, unintentional relay delay, and breaker operating time.
- R3.6.** Total amount of Forecasted Peak Native Load shed by each trip frequency and the total amount of Forecasted Peak Native Load the entity has.
- R3.7.** Under-frequency trip set points and time delays of generating units.
- R3.8.** Tie tripping schemes.
- R3.9.** Islanding schemes and the frequency at which they operate.
- R3.10.** Undervoltage inhibit settings for each installed relay.
- R3.11.** A map or chart which shows additional automatic actions that will be taken below a frequency of 58.7Hz shall be furnished to the Planning Coordinator.

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- R4.** The Planning Coordinator shall maintain a database with information of the UFLS program.
- R4.1.** The Planning Coordinator shall update and maintain the UFLS equipment database. This database shall include all information identified in R3 which applicable entities are required to submit to the Planning Coordinator every 5 years or as requested by the Planning Coordinator.
- a. The Planning Coordinator shall periodically conduct and document a technical assessment of the effectiveness of the design of the UFLS program according to the latest NERC PRC-006 Standard.
 - b. These assessments shall be completed at least every 5 years.
- R5** The Planning Coordinator shall determine appropriate islands to study as a design basis for UFLS. These islands shall be chosen from system studies, actual system operations, or other islands as deemed appropriate by the applicable entities. Identified islands will be assessed to determine if any additional UFLS capability should be installed and how it should be designed and implemented.
- R6** Applicable entities identified in areas of a Credible Island shall participate in an engineering assessment and mitigation that specifically address the Generation/Load imbalances in that Credible Island.

C. Measures

The following documentation will be used to determine compliance with the above requirements.

- M1.** Each end-use Load entity identified in Applicability or designated entity shall have evidence that its UFLS scheme meets the performance requirements in R1.
- M2.** Each Generator Owner or generator identified in Applicability shall have evidence that it complies with the characteristics of R2 or has made arrangements for additional Load shedding, if appropriate, as required in R2.
- M3.** Each applicable entity shall have evidence that the information as required in R3 was supplied to the Planning Coordinator.
- M4.** The Planning Coordinator shall have evidence it established and maintained an UFLS database and performed a technical assessment as required in R4.
- M5.** The Planning Coordinator shall have evidence that islands were studied as required by R5.

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- M6.** Each applicable entity identified in areas of Credible Island shall have evidence of an engineering assessment and mitigation plan as required by R6.

D. Compliance

1. Compliance Monitoring

- 1.1 Compliance Monitoring Responsibility
Compliance Monitor: Regional Entity

- 1.2 Compliance Monitoring Period and Reset
On request (within 30 calendar days)

1.3 Data Retention

Requirement R1 - The Planning Coordinator shall retain submitted data for two years.

Requirement R3 - The Planning Coordinator shall retain submitted data for ten years.

Requirement R4 - The Planning Coordinator shall retain all assessments for ten years.

All other applicable entities shall retain data for one year after their most current submittal to the Planning Coordinator.

- 1.4 Additional Compliance Information
None

2. Violation Severity Levels (TBD)

E. Implementation Plan

TBD

F. Revision History

TBD