



NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Project 2007-01 Underfrequency Load Shedding Standard Drafting Team

October 3, 2007 — 1–5 p.m.
October 4, 2007 — 8 a.m.–5 p.m.
October 5, 2007 — 8 a.m.–noon

Doubletree Hotel Tampa Westshore
4500 W. Cypress Street
Tampa, FL 33607

Meeting Notes

1) Administrative

a) Roll Call

David Taylor welcomed the members and guests of the Standards Drafting Team for Project 2007-01 Underfrequency Load Shedding.

- Dana Cabbell — Southern California Edison Co. (Chair)
- Paul Attaway — Georgia Transmission Corporation
- Brian Bartos — Banders Electric Cooperative
- Larry E. Brusseau — Midwest Reliability Organization
- Jonathan Glidewell — Southern Company Transmission Company
- Robert W. Millard — ReliabilityFirst Corporation
- Steven Myers — Electric Reliability Council of Texas, Inc.
- Mak Nagle — Southwest Power Pool
- Robert J. O'Keefe — American Electric Power
- Robert Williams — Florida Municipal Power Agency
- Richard Young — American Transmission Company, LLC
- David Taylor — North American Electric Reliability Corporation

Each team member was asked to verify the information on the UFLS roster and notify David Taylor via e-mail of any corrections that should be made.

Drafting team members not in attendance:

- GERAL Keenan — Bonneville Power Administration
- Donal Kidney — Northeast Power Coordinating Council, Inc.
- Arthur Vierling — National Grid
- Mohsen Zamzam — Consolidated Edison Co. of New York

b) NERC Antitrust Compliance Guidelines

David Taylor reviewed the NERC Antitrust Compliance Guidelines. It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains

competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition. It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

2) Action Items

The actions generated during the June 20–22 meeting of the standard drafting team for Project 2007-01 UFLS were reviewed:

Action Items	Status:	Assigned To:
Dave Taylor to provide an overview of the NERC data rule at the next standard drafting team meeting.	Remains Open Dave was not able to prepare a presentation on the data rule and will attempt to have the presentation ready for the next face-to-face meeting.	David Taylor
Dana to contact the WECC Control Work Group to inquire as to what data they have collected relative to generator trip settings during frequency excursions and report back to the UFLS SDT.	Remains Open	Dana Cabbell
The UFLS SDT to develop a recommendation on generator trip settings during frequency excursions and forward the recommendation to the standard drafting team for the Project 2007-09 Generator Verification.	Remains Open	UFLS SDT

3) Project Schedule

David Taylor reviewed the schedule for Project 2007-01 UFLS.

4) Standards Revisions

Dana Cabbell led the group in revising standards that are within the scope of the SAR for Project 2007-01 UFLS:

- a) Draft Pro Forma Regional Standard (also called Functional Requirements (See **Attachment 1**))
- b) Strawman for PRC-006-1 — Automatic Underfrequency Load Shedding (See **Attachment 2**)
- c) PRC-007 — Assuring Consistency with Regional UFLS Programs
- d) PRC-009 — UFLS Performance Following an Underfrequency Event

5) Next Steps

The group confirmed the next meeting of the UFLS SDT as follows.

- November 1 — Conference Call
2–5 p.m. Eastern Time

7) Adjourn

Regional Standard Functional Requirements

Each Regional Entity is directed to establish a Regional Standard for implementing an automatic Underfrequency Load Shedding (UFLS) program to arrest and recover declining Bulk Electric System frequency. Each Regional Standard shall specify UFLS program requirements to conform to the following:

- 1.** The Standard shall identify the Functional Model entity(s) that will be responsible to determine the system boundaries and conditions for which the following performance requirements shall apply for each region and any predetermined credible islands within or between regions. These Functional Model entity(s) shall specify all islands identified through system studies or actual system operations and may specify any additional islands deemed appropriate as a design basis for the UFLS program. The Standard shall specify the technical design parameters of the regional UFLS program that are required to meet the following performance requirements for underfrequency conditions resulting from an imbalance between load and generation of at least 25 percent within an interconnection, region, or predetermined credible island:
 - 1.1.** Frequency decline shall be arrested at no less than 58.0 Hz.
 - 1.2.** Frequency shall not remain below 58.5 Hz for greater than 10 seconds and shall not remain below 59.5 Hz for greater than [30] seconds.
 - 1.3.** Frequency overshoot resulting from operation of the UFLS program shall not exceed [61.0] Hz for any duration and shall not exceed 60.5 Hz for greater than [30] seconds.
 - 1.4.** The UFLS program design shall account for generator tripping during frequency variations.
 - 1.5.** Bulk Electric System voltage shall be maintained below [1.10] p.u. of nominal system voltage when frequency is below [59.5] Hz.
- 2.** The Standard shall identify the entity(s) responsible for maintaining an UFLS program database. The Standard shall require that the database be updated at least every five years and include sufficient information to model the UFLS program in dynamic simulations of the interconnected transmission systems. The Standard shall require the responsible entity(s) to provide the database to the Regional Entity or the ERO on request within 30 calendar days.
- 3.** The Standard shall identify the Functional Model entity(s) responsible for implementing the UFLS program. The Standard shall require the entity(s) to provide data to support maintenance of the database specified above in item 2. The Standard shall specify any documentation required to support this data.
- 4.** The Standard shall identify the entity(s) responsible for verifying through dynamic simulation that the technical design parameters of the regional UFLS program are adequate to meet the performance requirements specified above in item 1. Verification shall be conducted periodically: at least every five years or as required by changes in system conditions. The Standard shall require the responsible entity(s) to provide documentation of the verification to the Regional Entity or the ERO on request within 30 calendar days.

A. Introduction

1. **Title:** Underfrequency Load Shedding
2. **Number:** PRC-006-1
3. **Purpose:** Provide last resort system preservation measures by implementing an Under Frequency Load Shedding (UFLS) program.
4. **Applicability:**
 - 4.1. Transmission Owners that have UFLS equipment installed.
 - 4.2. Transmission Operators that operate UFLS equipment.
 - 4.3. Distribution Providers that have UFLS equipment installed or operate UFLS equipment.
 - 4.4. Load-Serving Entities that have UFLS equipment installed or operate UFLS equipment.
5. **Effective Date:** TBD

B. Requirements

5. The Transmission Owners, Distribution Providers, and Load Serving Entities that have UFLS equipment installed shall annually verify that the amount of load shed meets the technical design parameters of the regional UFLS program.
6. The Transmission Owners, Distribution Providers, and Load Serving Entities that have UFLS equipment installed, following system events occurring within their defined area resulting in system frequency excursions below the initializing set points of the UFLS program, shall provide documentation of which UFLS relays operated and the settings for each relay. The Transmission Owners, Distribution Providers, and Load Serving Entities shall provide this information to the [Reliability Coordinator/Planning Coordinator] within [10] days of the event.
7. The Load Serving Entities shall document the amount of load shed at each UFLS program step following system events occurring within their defined area resulting in system frequency excursions below the initializing set points of the UFLS program. The Load Serving Entities shall provide this information to the [Reliability Coordinator/Planning Coordinator] within [10] days of the event.
8. The [Reliability Coordinator/Planning Coordinator] shall analyze and document the UFLS program effectiveness following system events occurring within their defined area resulting in system frequency excursions below the initializing set points of the UFLS program. The analysis shall include,; *[Violation Risk Factor: Medium]*
 - 8.1. A description and sequence of the event including initiating conditions. *[Violation Risk Factor: Medium]*
 - 8.2. A review of the UFLS relay operation and amount of load shed. *[Violation Risk Factor: Medium]*
 - 8.3. A summary of the findings including an assessment of the effectiveness of UFLS program. *[Violation Risk Factor: Medium]*

9. [Reliability Coordinator/Planning Coordinator] shall provide documentation of the analysis of the UFLS program to its Regional Entity and NERC within 90 calendar days after the system event or as scheduled. [*Violation Risk Factor: Lower*]

C. Measures

- M1.** The Regional Reliability Organization shall have documentation of the UFLS program and current UFLS database.
- M2.** The Regional Reliability Organization shall have evidence it provided documentation of its UFLS program and its database information to NERC as specified in Reliability Standard PRC-006-0_R2.
- M3.** The Regional Reliability Organization shall have evidence it provided documentation of its assessment of its UFLS program to NERC as specified in Reliability Standard PRC-006-0_R3.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

On request (within 30 calendar days) for the program, database, and results of assessments.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: Documentation demonstrating the coordination of the Regional Reliability Organization's UFLS program was incomplete in one of the elements in Reliability Standard PRC-006-0_R1.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Documentation demonstrating the coordination of the Regional Reliability Organization's UFLS program was incomplete in two or more requirements or documentation demonstrating the coordination of the Regional Reliability Organization's UFLS program was not provided, or an assessment was not completed in the last five years.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

10.