![NERC — North American Electric Reliability Corporation]

Underfrequency Load Shedding Standard Drafting Team Meeting

June 20, 2007 — 1 to 5 p.m.
June 21, 2007 — 8 a.m. to 5 p.m.
June 22, 2007 — 8 a.m. to noon

Offices of the Florida Reliability Coordinating Council
The Towers at Westshore
1408 N. Westshore Boulevard, Suite 1002
Tampa, FL 33607
☎ 813-289-5644

Meeting Notes

1) Administrative

a) Attendance

David Taylor welcomed the standard drafting team members and guests for Project 2007-01 Underfrequency Load Shedding.

Drafting team members in attendance:

- Dana Cabbell – Southern California Edison Co. – Chair of SDT
- Brian Bartos – Banders Electric Cooperative
- Larry E. Brusseau – Midwest Reliability Organization
- Jonathan Glidewell – Southern Company Transmission Company
- Robert W. Millard – Reliability*First* Corporation
- Steven Myers Electric Reliability Council of Texas, Inc.
- Mak Nagle – Southwest Power Pool
- Robert J. O'Keefe – American Electric Power
- Arthur Vierling – National Grid
- Robert Williams – Florida Municipal Power Agency
- Richard Young – American Transmission Company, LLC
- Mohsen Zamzam – Consolidated Edison Co. of New York
- David Taylor – North American Electric Reliability Corporation

Guests/Observers:

- Jason Speer – Southwest Power Pool

Drafting team members in not in attendance:

- Paul Attaway – Georgia Transmission Corporation
- Geral Keenan – Bonneville Power Administration
- Donal Kidney – Northeast Power Coordinating Council, Inc.

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.

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, and 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) Standard Drafting Team Objectives

a) David Taylor reviewed a PowerPoint presentation with the group that identified what the Standards Committee expects of the standard drafting team for Project 2007-01 UFLS.

Drafting teams develop high-quality, enforceable, and technically correct reliability standards based on the reliability objective defined in the purpose section of an approved SAR. The team's work is to ensure that standards reflect stakeholder comments and consensus within the scope of the defined purpose of the standard.

b) David Taylor reviewed the schedule for Project 2007-01 UFLS as was provided in the agenda package. He stressed the importance to continue to make progress in developing the standards associated with the project.

c) Dana Cabbell reviewed the SAR for Project 2007-01 UFLS with the group.

d) Dana Cabbell reviewed the comment report for Project 2007-01 UFLS generated during the SAR development stage of the project with the group.

3) UFLS Programs

Presentations outlining the regional UFLS programs were provided by representatives of each of the NERC regions.

a) ERCOT – Steve Myers

b) FRCC – Bob Williams

c) MRO – Larry Brusseau

d) NPCC – Mohsen Zamzam

e) RFC – Bob Millard

f) SERC – Jonathan Glidewell

g) SPP – Mak Nagle

h) WECC – Dana Cabbell

Mohsen Zamzam suggested it would be beneficial to understand the technical analysis behind the development of each of the regional programs. It was agreed that a presentation of the technical analysis behind each of the regional programs would be presented at the meeting scheduled for August 15–17.

Action Item: Mohsen Zamzam is to provide an outline of what the technical reports to be provided at the August meeting should contain. This information will be provided on or before the conference call scheduled for July 16.

Action Item: Each person that presented the regional UFLS program at the June 20–22 meeting of the SDT needs to find a person to present the technical UFLS report at the August 15–17 SDT meeting in Austin and provide an electronic copy of the technical report to the team (the technical reports are not to be posted on the NERC website and will not be distributed outside the UFLSDT distribution list).

4) Standards Revisions

Dana Cabbell reviewed the standards associated with this project with the group and began discussions on the best way to proceed:

- PRC-006 — Development and Documentation of Regional Reliability Organizations' Underfrequency Load Shedding Programs
- PRC-007 — Assuring Consistency with Regional UFLS Programs
- PRC-009 — UFLS Performance Following an Underfrequency Event

The group crafted an issues list that a UFLS standard/program should contain (see **Attachment 1**).

Action Item: Rob O'Keefe is to develop a strawman for PRC-0xx-1 based on the issues list and draft PRC-0xx-1 developed at the June 20-22 meeting of the drafting team

The group agreed that Project 2007-01 should cover only automatic underfrequency load shedding, Project 2007-09 should cover automatic off-nominal frequency generator tripping, and Project 2007-08 should cover manual load shedding.

Action Item: David Taylor to communicate breakdown of responsibility between Projects 2007-01, 08, and 09 to NERC staff.

The group agreed that a single continent-wide standard for Automatic Underfrequency Load Shedding should be developed with a corresponding pro forma checklist identifying what each regional standard should contain. The group began to craft the continent-wide standard (see **Attachment 2**).

Action Item: Bob Williams and Bob Millard are to develop a draft pro forma regional standard.

Action Item: David Taylor is to schedule a meeting with FERC staff to discuss Project 2007-01 Underfrequency Load Shedding.

5) Action Items

Dana Cabbell will review the action items generated during the meeting and confirm assignments.

Action Items	Status:	Assigned To:
Develop a strawman for PRC-0xx-1 based on the issues list and draft PRC-0xx-1 developed at the June 20-22 meeting of the drafting team	**NEW**	Rob O'Keefe
Develop a draft pro forma regional standard	**NEW**	Bob Millard and Bob Williams
Establish additional conference call and face-to-face meetings for the SDT for Project 2007-01 UFLS	**NEW**	Dave Taylor
Provide an outline of what the technical reports to be provided at the August meeting should contain	**NEW**	Mohsen Zamzam
Each person that presented the regional UFLS program at the June 20–22 meeting of the SDT needs to find a person to present the technical UFLS report at the August 15–17 SDT meeting in Austin and provide and electronic copy of the technical report to the team (the technical reports are not	**NEW**	Steve Myers, Bob Williams, Larry Brusseau, Mohsen Zamzam, Bob Millard, Jonathan Glidewell,

Action Items	Status:	Assigned To:
to be posted on the NERC website and not be distributed outside the UFLSDT distribution list)		Mak Nagle and Dana Cabbell
Schedule a meeting with FERC (Dana to participate via conference call) to discuss plans of SDT to develop continent-wide standard and pro-forma regional standard	**NEW**	Dave Taylor
Communicate breakdown of responsibility between Projects 2007-01, 08, and 09 to NERC staff	**NEW**	Dave Taylor

6) Next Steps

The group will discuss and identify the next steps and establish future meeting dates and locations.

Next meetings:

- July 16, 2007
  2–5 p.m. Eastern Time
  Web Ex and conference call

- August 15–17 – ERCOT Offices, Austin, TX
  1– 5 p.m. Central Time on August 15
  8 a.m.– 5 p.m. Central Time on August 16
  8 a.m.– noon Central Time on August 17

7) Adjourn

The meeting adjourned at 10:30a.m. on Friday, June 22, 2007.

Define Program
- What is the minimum # blocks of load shedding (variance)
- What is aggregate % minimum amount of load to trip
- Frequency set point to begin UFLS and blocks
  - Events and simulations dictate

Implement Program
- Develop a continent-wide minimum UFLS Standard and supported by 8- RRO regional std
  - May be broken down by interconnect: WECC, ERCOT, Eastern Interconnect
- Who implements (APPLICABILITY) the standard: TO/DP owner of scheme or LSE who contracts with TO/DP to have UFLS implemented
  - aggregating

Program Details
- Where to include generator requirement – PRC 24 or PRC 006 (UFLS)
  - Tripping requirements
  - If trip too soon, trip equal amount of load
- Shunt Cap tripping – prevent over voltage
- Overfrequency – overshoot
- Generator governor
- Type of loads – definition of load (peak, load at all times, etc.)
- Manual load shedding
- Restoration – manual vs. automatic or both
- EOP standards

Equipment Specifics
- Type of relays
  - Total tripping time (large motor issue)

Studies – Test Effectiveness
- Database – who keeps the data
- Technical Studies to support standards
- Islanding (who determines characteristic i.e. PC)
  - Special requirements

A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**

2. **Number:** PRC-0xx-1

3. **Purpose:** Provide system preservation measures by implementing coordinated automatic Underfrequency Load Shedding (UFLS) programs to arrest declining Bulk Electric System frequency.

4. **Applicability:**

4.1. Reliability Coordinator

4.2. Transmission Operator

4.3. Transmission Owner

4.4. Distribution Provider

5. **Effective Date:** TBD

B. Requirements

R1. Reliability Coordinator/Planning Coordinator shall analyze and document the UFLS equipment performance and program effectiveness following system events resulting in system frequency excursions below the initializing set points of the UFLS program. The analysis shall include,: *[Violation Risk Factor: Medium]*

R1.1. A description and sequence of the event including initiating conditions. *[Violation Risk Factor: Medium]*

R1.2. A review of the UFLS set points and tripping times. *[Violation Risk Factor: Medium] Such review shall include:*

R1.2.1. Verification that actual settings agreed with UFLS program requirements

R1.2.2. Verification of correct relay operation

R1.3. A simulation of the event for model verification. *[Violation Risk Factor: Medium]*

R1.4. A summary of the findings including an assessment of the effectiveness of UFLS program. *[Violation Risk Factor: Medium]*

R2. Reliability Coordinator/Planning Coordinator shall provide documentation of the analysis of the UFLS program to its Regional Entity and NERC as scheduled after the system event. *[Violation Risk Factor: Lower]*

C. Measures

M1. Each Transmission Owner's, Transmission Operator's, Load-Serving Entity's and Distribution Provider's documentation of the UFLS program performance following an underfrequency event includes all elements identified in Reliability Standard PRC-009-0_R1.

M2. Each Transmission Owner, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operate a UFLS program, shall have evidence it

provided documentation of the analysis of the UFLS program performance following an underfrequency event as specified in Reliability Standard PRC-009-0_R1.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

1.2. Compliance Monitoring Period and Reset Time Frame

On request 90 calendar days after the system event.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: Analysis of UFLS program performance following an actual underfrequency event below the UFLS set point(s) was incomplete in one or more elements in Reliability Standard PRC-009-0_R1.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Analysis of UFLS program performance following an actual underfrequency event below the UFLS set point(s) was not provided.

E. Regional Differences

None identified.

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	April 4, 2007	Regulatory Approval — Effective Date	New