



NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Disturbance Monitoring Standard Drafting Team

August 7, 2007 — 1 p.m.–5 p.m.

August 8, 2007 — 8 a.m.–5 p.m.

August 9, 2007 — 8 a.m.–noon

Florida Power and Light Offices

700 Universe Blvd.

Juno Beach, Florida 33408

☎ (561) 694-4787

Meeting Notes

1) Administrative

a) Roll Call

David Taylor welcomed the members and guests of the Disturbance Monitoring Standards Drafting Team. The drafting team members in attendance were:

- Navin B. Bhatt — American Electric Power (Chair)
- Felix Amarth — Georgia Transmission Corporation
- Alan D. Baker — Florida Power & Light Company
- Bharat Bhargava — Southern California Edison Co.
- Larry Brusseau — Midwest Reliability Organization (Day 2 only)
- Charlie Childs — Ametek Power Instruments
- James R. Detweiler — FirstEnergy Corp.
- Barry G. Goodpaster — Exelon Business Services Company
- Willy Haffecke — Springfield Missouri City Utilities
- Daniel J. Hansen — Reliant Energy, Inc.
- Tracy M. Lynd — Consumers Energy Co.
- Susan L. McGill — PJM Interconnection, L.L.C.
- Robert (Bob) Millard — ReliabilityFirst Corporation
- Steven Myers — Electric Reliability Council of Texas, Inc.
- Jeffrey M. Pond — National Grid
- Larry E. Smith — Alabama Power Company
- Jack Soehren — ITC Holdings
- Maureen Long — North American Electric Reliability Corporation (Day 1 only)
- David Taylor — North American Electric Reliability Corporation

Drafting team members not in attendance:

- Richard Dernbach — Los Angeles Department of Water & Power

Guests in attendance:

- o Robert Bentert — Florida Power & Light Company

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, 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) Maureen Long provided a PowerPoint presentation identifying what the Standards Committee expects of the standard drafting team for Project 2007-11 Disturbance Monitoring.

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 teams work 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 2007-11 Disturbance Monitoring. The drafting team acknowledged the schedule and agreed to work towards posting the first draft of a disturbance monitoring continent-wide and regional pro forma (if applicable) by year-end 2007.
- c) Navin Bhatt reviewed the SAR for Project 2007-11 Disturbance Monitoring.
- d) Navin Bhatt reviewed the consideration of comments report for Project 2007-11 generated during the SAR development stage of the project.

3) Disturbance Monitoring Programs

Presentations summarizing the regional disturbance monitoring programs for each region were provided:

- a) ERCOT — Steve Myers
- b) FRCC — Alan D. Baker
- c) MRO — Larry Brusseau
- d) NPCC — Jeff Pond
- e) RFC — Barry Goodpaster and Bob Millard
- f) SERC — Felix Amarh
- g) SPP — Willy Haffecke

h) WECC — Bharat Bhargava

During the presentations, Navin noted issues which the drafting team should discuss and maybe incorporate into the revised Disturbance Monitoring standard:

- Voltage level for locations
- Current measurements — 3-phase and neutral or something else
- Locations — siteing methodology
- Resolution (samples/second)
- Data retention
- Time stamping
- Timing error and skew requirements
- Generator location — should generator bus voltages be monitored?
- Recording duration
- What is a “disturbance”?
- Data format
- How to address legacy equipment
- Remote triggering requirements
- Would continuous recording requirements abrogate the need for remote triggering?
- Team will need to establish BEST “common denominator”
- Testing and maintenance requirements?
- Sampling rate: What are the requirements for measurements points/cycle?
- Okay to skip installation at a location when next station has a DME installed?
- Recording duration requirements
 - Faults
 - Dynamic events
 - Other
- Triggering of recording based on frequency (f, df/dt, etc.)
- Data output requirements with respect to simulation studies
- Data requirements with respect to need to replay an event on a relay

4) Standards Revisions

Navin Bhatt led the group in revising standards that are within the scope of the SAR for Project 2007-11 Disturbance Monitoring:

- a) PRC-002 — Define and Document Disturbance Monitoring and Equipment Requirements
- b) PRC-018 — Disturbance Monitoring Equipment Installation and Data

Navin started with a brainstorming session:

Disturbances to monitor:

- Frequency
- System Oscillations
- Sympathetic Tripping of lines
- Faults (due to lightening, hurricanes, trees, etc.)
- Loss of generation

- Load interruption
- Transients
- Voltage collapse
- Unwanted protection and control actions

Types:

- Transient
- Dynamic (long-term)

Functionality to be covered:

- digital fault recorders (DFR)
- dynamic disturbance recorders (DDR)
- sequence-of-event recorders (SER)

Purpose (draft)

To establish requirements for disturbance monitoring and reporting of disturbance data to facilitate analysis of events and verifying system models.

Data requirements:

- Quantities/parameters
 - Voltage
 - Currents
 - MW
 - MVAR
 - Frequency
 - Phase angles
- Protective system performance
 - Breakers¹
 - Trip Bus²
 - Relay trip bus
 - Communications
- Circuit breaker status
- Time stamping
- Modal frequency and damping
- Loss of GPS signal

Felix suggested that the following items need collected during a wide-area disturbance:

- Fault location

¹ Needed to analyze operation and to establish sequence of operation.

² Can be required for “critical locations” only (i.e., not at all locations where fault recorder functionality is required).

- Fault type
- When?
- Fault duration
- Current and voltage magnitude
- Current contribution
- Flow direction (directionality)
- Relay operation correct?
- Relay operation times
- Other fault data or SCADA

More brainstorming:

Locations of disturbance monitoring (will be different for each functionality (DDR, DFR, and SE)):

- Location determined by the following “methodology”
 - Load pockets greater than xx MX
 - Tie lines
 - Generating stations of greater than xx MW

Barry Goodpaster volunteered to take the draft RFC standard and collect comments from the rest of the team for improving the standard.

Action Item:

Barry will issue the latest version of the draft RFC standard to the group by COB on Monday, August 13. The draft will be redlined to reflect the discussion during the last half-day of the meeting.

Action Item:

All were asked to send Barry suggested improvements to the standard by COB on Monday, August 20. Barry will incorporate the changes and issue a revised redlined draft standard by COB, Monday, August 27.

5) Action Items

Navin Bhatt will review the action items generated during the meeting and confirm assignments.

6) Next Steps

The group discussed the possibility of future meeting dates and locations.

Action Item:

David Taylor will issue a survey for availability for future standard drafting team meetings — three WebEx and conference calls, and two face-to-face meetings.

7) Adjourn