Leveraging Mandatory and Enforceable Electric Reliability Standards for Non-Registered Rural Electric Utilities

IEEE

Rural Electric Power Conference

April 16, 2012

GDS Associates, Inc.
Engineers and Consultants

1

Objectives

1. Develop understanding of the:
   - ➢ History of the Electric Reliability Organization
   - ➢ Standards Development Process
   - ➢ Standard PRC-005-2
2. Recognize value of industry-developed Reliability Standards

August 2003 Blackout

- 50 million people and 61,800 megawatts (MW) of load

- Eight states and one Canadian Province

- The Eastern Interconnection grid conditions were within prescribed limits and in compliance with NERC's <u>voluntary</u> operating policies.

- None of the electrical conditions on the system before the blackout were determined to be a direct cause of the blackout.

(*See*, Report of U.S.-Canada Power System Outage Task Force, https://reports.energy.gov/B-F-Web-Part2.pdf.)

Electric Reliability Authority

Congress
- Energy Policy Act of 2005

FERC
- Establishes NERC as ERO

NERC
- Drafts Policy, Standards Development Process, Enforcement

SERC
- Drafts Regional Standards, Enforcement

Order 672

- Docket No. RM05-30-000 , issued February 3, 2006

- Certification of the Electric Reliability Organization and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards

- Procedures under which the ERO may propose new or modified Reliability Standards

- Regulations pertaining to the funding of the ERO

Order 693

- Docket No. RM06-16-000, Issued March 16, 2007.

- 83 new Mandatory Reliability Standards for the Bulk-Power System.

- Has now grown to 103 Mandatory & Enforceable Standards.

Order 706

- Docket No. RM06-22-000, Issued January 18, 2008.

- Mandatory Reliability Standards for Critical Infrastructure Protection ("CIP").

- Approves eight (8) Critical Infrastructure Protection Reliability Standards.

- Requires certain users, owners, and operators of the Bulk Power System to comply with specific requirements to safeguard critical cyber assets.

Standards Development Process

Standards Development

- Many further Orders issued since 693 and 706

- Total of 102 Mandatory and Enforceable Standards to date – more than 1500 individual Requirements

- Many more new Standards and revisions to existing Standards under development by industry participants in Standards Drafting Teams (voluntary participation)

Standards Drafting

Standards Authorization	→	Standards Drafting Team	→	Comment and Balloting

Characteristics of a Standard

Clear Purpose Statement and Language

Performance Requirements

Sound Technical Basis

Reliability Standards of Interest

PRC-005-2
Protection System Maintenance

- Draft Standard merges previous standards PRC-005-1a, PRC-008-0, PRC-011-0, and PRC-017-0

- Posted for formal comment and successive ballot through March 28, 2012

- Defines Protection Systems

- Defines a Protection System Maintenance Program ("PSMP")

- Defines Time-Based (TBM), Performance-Based (PBM), and Condition-Based (CBM) maintenance programs

PRC-005-2
Protection System Maintenance

- Defines Maximum Allowable Testing Intervals and Maintenance Activities

- Contains detailed tables containing maintenance intervals and activities for protective relays, voltage and current sensing devices, DC supply systems employing Vented Lead-Acid ("VLA"), Valve-Regulated Lead-Acid ("VRLA") and Nickel-Cadmium ("NiCad") Batteries, control circuitry as well as other components associated with protective relay functions

PRC-005-2
Protection System Maintenance

Elements of a protection system:

- Relays

- Instrument Transformers (CTs, PTs)

- Batteries and Chargers

- DC Control Circuitry and Trip Coils

- Associated Communications Systems (pilot wire, carrier, microwave)

PRC-005-2
Application Example

- Use of CBM to modify TBM maintenance interval

- Unmonitored Microprocessor Relay Maintenance NTE 6 years

  - Verify operation of relay inputs and outputs for proper function

  - Verify measurement of power system input values

PRC-005-2
Application Example

- Monitored Microprocessor Relay Maintenance NTE 12 years:
  - Internal self-diagnostics
  - Voltage and/or current waveform sampling three times per Hz
  - Power supply failure alarms

Questions

More Information

	Federal Energy Regulatory Commission Website **http://www.ferc.gov/**
	Energy Policy Act of 2005 http://www.ferc.gov/legal/fed-sta/ferc-and-epact-2005.pdf
	North American Energy Regulatory Commission Website http://www.nerc.com/
	GDS Associates, Inc. Website Seth W. Brown, Principal – Transmission Services http://www.gdsassociates.com/