Outline

• Philosophy behind standards
• Reading standards
• Following standards
• Measuring performance
• Types of standards
• Additional resources
References

- NERC Reliability Standards for the Bulk Electric Systems of North America
Accessing Standards

Program Areas & Departments > Standards > United States Mandatory Standards Subject to Enforcement

United States Mandatory Standards Subject to Enforcement

Section 215 of the Federal Power Act requires the Electric Reliability Organization (ERO) to develop mandatory and enforceable reliability standards, which are subject to Commission review and approval. Commission-approved reliability standards become mandatory and enforceable in the U.S. on a date established in the Orders approving the standards.

The standards included on this page are currently enforceable in the United States. A table is appended to the last page of each standard showing the United States enforcement dates. Please also see our Enforcement Dates page to view the applicable dates of each standard by status.

Related information including, but not limited to, the development history, applicable compliance documents, and implementation plans can be found at the related information link to the right of each standard.

Please send any questions or comments to sarcomm@nerc.com.

To filter the list of standards, please select a status from the table below.

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### Mandatory Standards Subject to Enforcement

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NERC’s Philosophy Behind Standards

- **Reliability Principles** addressed
  - Planned and operated in a coordinated manner
  - Within frequency and voltage limits while balancing Real and Reactive Power
  - Information necessary for planning and operations made available
  - Plans for emergencies and restorations effective
  - Facilities properly maintained
  - Personnel trained, qualified, and have authority to operate
  - Reliability assessed, monitored, and maintained
  - Protection from physical and cyber attacks
NERC’s Philosophy Behind Standards

• Provide **Adequate Level of Reliability**

• Bulk Electric System:
  – Is within limits during normal conditions
  – Performs acceptably after contingencies
  – Limits impact and scope of instability and cascading outages
  – Facilities protected from damage
  – Integrity can be restored if lost
  – Has ability to supply power and energy to all electricity customers at all times, including likely unscheduled outages
Color Codes in this Video

- Definitions
- Shall
- Verbs
- Other key words
Key parts of standards

• **Purpose**: Standard’s goal
• **Applicability**: Which parties the standard applies to
• **Requirements**: What the parties are responsible for
• **Measures**: How to assess if the requirements have been met
• **Compliance**: Additional notes on method (audit, self-certification) and data requirements
  – NERC’s annual [Actively Monitored List](#) takes precedence
• **Appendices**: Additional important information
NERC Defined Terms

• Capitalized terms and acronyms are in the Reliability Standards Glossary
  – NERC.com -> Program Areas & Departments -> Standards -> Glossary of Terms Used in Reliability Standards (on left)

• System Operating Limit (SOL) (Numerous)

• Capacity Benefit Margin (MOD-004)

• Capacity Emergency (EOP-001, EOP-002)

• Emergency (EOP, TOP)

• Protection System (PRC-005)
Purpose

- Describes why the standard is written
- **FAC-008-3 Purpose:** To ensure that Facility Ratings used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on technically sound principles. A Facility Rating is essential for the determination of System Operating Limits
- **TOP-002-2a Purpose:** Current operations plans and procedures are essential to being prepared for reliable operations, including response for unplanned events.
Requirements

• Specify who is responsible for what activities
• Pay attention to all parts!
• BAL-006-1 R1. Each Balancing Authority shall calculate and record hourly Inadvertent Interchange.
• EOP-001-1 R2. Each TOP and BA shall... R2.2. Develop, maintain, and implement a set of plans to mitigate operating emergencies on the transmission system.
• FAC-001-0 R1. The TO shall document, maintain, and publish facility connection requirements
Requirements

• **IRO-004 R4.** Each TOP, BA, TO, GO, GOP, and LSE in the RC Area **shall provide** information required for system studies, such as critical facility status, **Load**, generation, operating reserve projections, and known **Interchange Transactions**. This information **shall be available** by 1200 Central Standard Time for the Eastern Interconnection and 1200 Pacific Standard Time for the Western Interconnection.
Requirements

- **PRC-004-1, R1.** The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization’s procedures developed for Reliability Standard PRC-003 Requirement 1.
Requirements

• FAC-008-3 R7. Each GO shall provide Facility Ratings (for its solely and jointly owned Facilities that are existing Facilities, new Facilities, modifications to existing Facilities and re-ratings of existing Facilities) to its associated RC, PA, TP, and TOP as scheduled by such requesting entities.
Measures

• Provides guidance on how to demonstrate compliance.

• PRC-004-1 M1. The TO, and any DP that owns a transmission Protection System shall each have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Reliability Organization procedures developed for PRC-003 R1.
Measures

• **PRC-001-1 M1.** Each Generator Operator and Transmission Operator **shall have and provide upon request** evidence **that could include but is not limited to,** revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or changes as noted in Requirements 3, 3.1, and 3.2.
Measures

- **EOP-002-2.1. M2.** If an RC or BA implements its Capacity and Energy Emergency plan, that entity shall have and provide upon request evidence that could include but is not limited to, operator logs, voice recordings or transcripts of voice recordings, electronic communications, computer printouts or other equivalent evidence that will be used to determine if the actions it took to relieve emergency conditions were in conformance with its Capacity and Energy Emergency Plan.
Measures

- **TOP-002-2a M1.** Each Balancing Authority and Transmission Operator shall have and provide upon request evidence that could include, but is not limited to, documented planning procedures, copies of current day plans, copies of seasonal operations plans, or other equivalent evidence that will be used to confirm that it maintained a set of current plans. (Requirement 1 Part 1).
Reliability Standard Requirement Types

1. Performance – direct, observable effect
   - Continuous
   - Event-driven

2. Risk-based
   - Actions that reduce a risk to reliability

3. Capability-based
   - Tools or abilities needed to perform a function

• Standards may have more than one type of requirement
Performance Requirements

• Related to entities’ actions providing for or impacting reliability. Examples:
  – BAL-001-1 (Control Performance Standard)
  – BAL-002-0 (Disturbance Control Performance)
  – COM-002 (directives, staffing)
  – VAR-002-1 (Generator Operation for Voltage)

• Measures results of these actions
• Measures quality of performance of these actions
• “implement”, “coordinate”, “provide”, “submit”, “operate”
Performance Requirements

• Unless otherwise noted, no failures are allowed

• **COM-002, R2.** Each RC, TOP, and BA **shall issue directives** in a clear, concise, and definitive manner; **shall ensure** the recipient of the directive repeats the information back correctly; and **shall acknowledge** the response as correct or repeat the original statement to resolve any misunderstandings.

• **BAL-002-0, R4.** A BA or RSG **shall meet the Disturbance Recovery Criterion** within the Disturbance Recovery Period for **100% of Reportable Disturbances.**
Risk-based Requirements (Preparedness)

- Entities’ preparedness for unlikely, but critical conditions reduces risk of non-performance. Examples:
  - EOP-001 (Emergency Operations Planning)
  - EOP-005 (System Restoration)
  - EOP-008 (Plans for Loss of Control Center Functionality)
  - TOP-002 (Normal Operations Planning)
- “plan, “train”, “mitigate”
Risk-based Requirements (Engineering)

- Proper design, maintenance, and technical calculations reduce risk of cascading problems. Examples:
  - COM-001 (Telecommunications)
  - FAC-001 (Interconnection requirements)
  - PRC-005 (Protection System maintenance)
  - FAC-008 (Ratings methodology and ratings)

- Failure to follow would affect planning and real-time operations/jeopardize normal system responses, increasing risk

- “test”, “establish”, “design”, “maintenance”, “analysis”
Risk-based Standards

• EOP-005-2, R1. The restoration plan shall include:
  – R1.5. Identification of Cranking Paths and initial switching requirements, between each Blackstart Resource generating unit and the unit(s) to be started.

• EOP-001-2.1b, R2. Each TOP and BA shall:
  – R2.1. Develop, maintain, and implement a set of plans to mitigate operating emergencies for insufficient generating capacity.
Risk-based Standards

• **COM-001-1.1, R2.** Each RC, TOP, and BA **shall** manage, alarm, test and/or actively monitor vital telecommunications facilities. Special attention **shall** be given to emergency telecommunications facilities and equipment not used for routine communications.

• **FAC-008-3, R6.** Each TO and GO **shall** have **Facility Ratings** for its solely and jointly owned Facilities that are consistent with the associated **Facility Ratings methodology or documentation** for determining its **Facility Ratings.**
Capability Requirements

• Define essential capabilities to perform reliability functions. Examples:
  – BAL-005 (Automatic Generation Control)
  – PER-003 (Operating Personnel)
  – IRO-002 (RC – Facilities)
  – TOP-005 (Operational Reliability Information)
  – COM-001 (Telecommunications)

• Used to ensure organizations have the required capabilities
Capability Requirements

• **COM-001-1.1, R1.** Each RC, TOP and BA shall provide adequate and reliable telecommunications facilities for the exchange of **Interconnection** and operating information:
  – R1.1. Internally.
  – R1.2. Between the RC and its TOPs and BAs.

• **PER-001-0.1, R1.** Each TOP and BA **shall provide** operating personnel with the **responsibility and authority** to implement real-time actions to ensure the stable and reliable operation of the **Bulk Electric System.**
More resources

1. Reliability Standard Audit Worksheets (RSAWs)
2. FERC Orders
3. Compliance Application Notices (CANs)—being retired
4. Interpretations
5. Compliance Assessment Reports (CARs)
Reliability Standard Audit Worksheets

• Designed to add clarity and consistency in compliance assessment
• Data source for audit review
• Can be helpful for your internal review
• Are located in the RSAW section of the NERC website
FERC Orders

• FERC is organization with original jurisdiction
• Comments and directives in FERC orders provide direction to NERC and industry, set expectations
• Applicable sections are included in RSAWs
Interpretations

• Attempt to clarify a standard
• Team will draft, balloting occurs as with a standard
• If approved, filed with regulatory authority
• Carries same weight as the standard!
• Will be incorporated in next revision
• In RSAWs
• If a Standard has an Interpretation, it is listed after the Standard in the Complete Set of Reliability Standards
Compliance Analysis Reports (CARs)

- NERC.com -> Compliance & Enforcement -> Resources
  -> Compliance Reports -> Compliance Analysis Reports (on left)

- Identify common pitfalls for most violated standards

- May provide suggestions for ways to improve your program
Summary

• Understanding how to read standards helps you develop internal procedures and controls and ensure you are meeting all parts of standards

• You must follow performance-based standards regardless of having a procedure

• Many standards include performance measures that will be used to analyze compliance

• Performance, risk-based, and capability standards have different compliance methods
SPP RE Training Videos:

vimeopro.com/sppre/basics

- Audits: Top 10 Ways to Prepare
- CIP Audit: What to Expect
- CIP-005: Electronic Security Perimeter
- CIP-005-3 R3
- CIP-006: Physical Security
- CIP-007 Compliance
- CIP-007: R1 System Configuration
- CIP-007 R3 and R4
- Compliance Education at My Company
- Internal Compliance Programs Q&A
- Event Analysis-Entity Perspective
- Evidence Submission
- Firewalls: 13 Ways to Break Through
- Hashing: How To
- Human Performance - Entity Perspective
- Human Performance - NERC
- Mitigation Plans: Milestones, Completion, and Evidence
- Mock 693 Audit
- Self-Reporting: When and How
- TFE Expectations and Issues
- Training Employees on Compliance
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