

System Personnel Training Standard Drafting Team Meeting

August 1, 2007 — 1–4 p.m. Eastern Daylight Time

Web Conference Agenda

Consortium conference server: 1(732)694-2061

Conference code: 12080080107

Web Ex Meeting Number: 712 753 756

Meeting password: training

- 1) Administrative
 - a) Introduction of Participants
 - b) Review Antitrust Guidelines (Attachment 1)
 - c) Review Meeting Objectives:
 - i) Review Performance Requirements Reference
 - ii) Review Draft 2 of Standard
 - iii) Revise Comments Form
- 2) Review Performance Requirements Reference (Attachment 2)
- 3) Review Standard Version 2 (Attachment 3)
- 4) Revise Comments Form (Attachment 4)
- 5) Discuss Next Steps



NERC Antitrust Compliance Guidelines

I. General

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.

Antitrust laws are complex and subject to court interpretation that can vary over time and from one court to another. The purpose of these guidelines is to alert NERC participants and employees to potential antitrust problems and to set forth policies to be followed with respect to activities that may involve antitrust considerations. In some instances, the NERC policy contained in these guidelines is stricter than the applicable antitrust laws. Any NERC participant or employee who is uncertain about the legal ramifications of a particular course of conduct or who has doubts or concerns about whether NERC's antitrust compliance policy is implicated in any situation should consult NERC's General Counsel immediately.

II. Prohibited Activities

Participants in NERC activities (including those of its committees and subgroups) should refrain from the following when acting in their capacity as participants in NERC activities (e.g., at NERC meetings, conference calls and in informal discussions):

- Discussions involving pricing information, especially margin (profit) and internal cost information and participants' expectations as to their future prices or internal costs.
- Discussions of a participant's marketing strategies.
- Discussions regarding how customers and geographical areas are to be divided among competitors.
- Discussions concerning the exclusion of competitors from markets.
- Discussions concerning boycotting or group refusals to deal with competitors, vendors or suppliers.

III. Activities That Are Permitted

From time to time decisions or actions of NERC (including those of its committees and subgroups) may have a negative impact on particular entities and thus in that sense adversely impact competition. Decisions and actions by NERC (including its committees and subgroups) should only be undertaken for the purpose of promoting and maintaining the reliability and

A Guide for Determining Task Performance Requirements

Reference for NERC Standard PER-005. [Add webpage](#)

Purpose

The purpose of this reference is to provide guidance in writing a performance standard that describes the desired outcome of a task. A standard for acceptable performance should be in either measurable or observable terms.

Clear standards of performance are necessary for an individual to know when he or she has completed the task and to ensure agreement between employees and their supervisors on the objective of a task. Performance standards answer the following questions:

How timely must the task be performed?

Or

How accurately must the task be performed?

Or

With what quality must it be performed?

Or

What response from the customer must be accomplished?

When a performance standard is quantifiable, successful performance is more easily demonstrated. For example, in the following task statement, the criteria for successful performance is to return system loading to within normal operating limits, which is a number that can be easily verified. .

Given a System Operating Limit violation on the transmission system, implement the correct procedure for the circumstances to mitigate loading to within normal operating limits.

Even when the outcome of a task cannot be measured as a number, it may still be observable. The next example contains performance criteria that is qualitative in nature, that is, it can be verified as either correct or not, but does not involve a numerical result

Given a tag submitted for scheduling, ensure that all transmission rights are assigned to the tag per the company Tariff and in compliance with NERC and NAESB standards.

adequacy of the bulk power system. If you do not have a legitimate purpose consistent with this objective for discussing a matter, please refrain from discussing the matter during NERC meetings and in other NERC-related communications.

You should also ensure that NERC procedures, including those set forth in NERC's Certificate of Incorporation, Bylaws, and Rules of Procedure are followed in conducting NERC business.

In addition, all discussions in NERC meetings and other NERC-related communications should be within the scope of the mandate for or assignment to the particular NERC committee or subgroup, as well as within the scope of the published agenda for the meeting.

No decisions should be made nor any actions taken in NERC activities for the purpose of giving an industry participant or group of participants a competitive advantage over other participants. In particular, decisions with respect to setting, revising, or assessing compliance with NERC reliability standards should not be influenced by anti-competitive motivations.

Subject to the foregoing restrictions, participants in NERC activities may discuss:

- Reliability matters relating to the bulk power system, including operation and planning matters such as establishing or revising reliability standards, special operating procedures, operating transfer capabilities, and plans for new facilities.
- Matters relating to the impact of reliability standards for the bulk power system on electricity markets, and the impact of electricity market operations on the reliability of the bulk power system.
- Proposed filings or other communications with state or federal regulatory authorities or other governmental entities.
- Matters relating to the internal governance, management and operation of NERC, such as nominations for vacant committee positions, budgeting and assessments, and employment matters; and procedural matters such as planning and scheduling meetings.

Any other matters that do not clearly fall within these guidelines should be reviewed with NERC's General Counsel before being discussed.

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development Steps Completed:

1. Standard drafting team appointed by the Standards Authorization Committee on June 21, 2006.
2. Standards Drafting Team posted draft standard for comment on September 27, 2006.
3. Standards Drafting Team responded to comments and posted the revised standard on ~~July-August~~ 15, 2007.

Proposed Action Plan and Description of Current Draft:

This is the second posting of the proposed standard and its associated implementation plan for a 30-day comment period, from ~~July-August~~ 15, 2007 to September 15, 2007.

Future Development Plan:

| Anticipated Actions | Anticipated Date |
|---|--|
| 1. Respond to comments and post a revised standard and implementation plan for a second comment period for 45-days. | July 15—September 1, 2007 August 15 – October 1, 2007 |
| 2. Respond to comments on the second draft of the proposed standard. | October 1 November 1, 2007 |
| 3. Obtain the Standards Committee's approval to move the standard forward to balloting. | October 15 November 15, 2007 |
| 4. Post the standard and implementation plan for a 30-day pre-ballot review. | December 1 – January 1, 2008 |
| 5. Conduct an initial ballot for ten days. | January 24 – January 11, 2008 7 |
| 6. Respond to comments submitted with the initial ballot. | January 15 February 15, 2008 |
| 7. Conduct a recirculation ballot for ten days. | January 15 February 15 – January 25 February 25, 2008 |
| 8. Post for a 30-day preview for board. | February 1 – March 3 March 1-March 31, 2008 |
| 9. BOT adoption. | March April 15, 2008 |

A. Introduction

1. **Title:** System Operator Training
2. **Number:** PER-005-1
3. **Purpose:** To ensure that System Operators performing real-time, reliability-related tasks on the North American Bulk Electric System are competent to perform those reliability related tasks. The competency of System Operators is critical to the reliability of the North American Bulk Electric System.
4. **Applicability:**
 - 4.1. **Functional Entities:**
 - 4.1.1 Reliability Coordinator.
 - 4.1.2 Balancing Authority.
 - 4.1.3 Transmission Operator.
 - 4.2. This standard applies to ~~all~~ System Operator positions of the entities listed in 4.1 and their delegates who can directly, or through communications, impact reliability by producing a real-time response from the Bulk Electric System.
 - ~~4.2. that have the authority and responsibility either directly or through communications with others, to perform independent actions that impact reliability by producing a response from the Bulk Electric System that is real-time and concurrent with the causative action. This includes contract System Operators or System Operators performing such reliability-related tasks under delegation agreements.~~
5. **Proposed Effective Date for Regulatory Approvals:** The first day of the first quarter after applicable regulatory approvals is received (or the Reliability Standard otherwise becomes effective in those jurisdictions if regulatory approval is not required.) March 15, 2008

B. Requirements

- R1. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall complete the five phases of a systematic approach to training (SAT); ~~(which includes analysis, design, development, implementation, and evaluation);~~ to establish a new or modify an existing a training program(s) that addresses all Bulk Electric System company-specific reliability-related tasks. [Risk Factor: Medium] [Time Horizon: Long-term Planning]
 - R1.1. To create a company-specific list of reliability related tasks, each Reliability Coordinator, Balancing Authority and Transmission Owner shall select all tasks that the company performs from the Generic Task List (~~provided in Attachment A~~); and add all other reliability-related tasks that the company performs.
 - R1.2. The Reliability Coordinator, Balancing Authority and Transmission Owner shall implement a System Operator training program that addresses all company specific reliability-related tasks.~~other entity specific tasks that impact reliability.~~
- R2. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall assess at least annually the training needs of each System Operator position to determine the mis-match between acceptable and actual performance.[DLF1]. [Risk Factor: Medium] [Time Horizon: Long-term Planning]
 - R2.1. This assessment shall include identification of any gaps in current performance that needs to be addressed through training. [DLF2]

R2.2. This assessment shall include identification of training required to perform any new or revised tasks from the company-specific reliability related tasks.

- R3. Each Reliability Coordinator, Balancing Authority and Transmission Operator entity shall ~~annually~~ provide each applicable System Operator with at least 32 hours ~~of annually of~~ emergency operations ~~and~~ ~~or~~ system restoration training, which ~~may shall~~ include training in principles and procedures needed for effectively recognizing and responding to emergencies and drills, exercises, or simulations of system conditions, operating procedures, and communication processes in one or more of the subject areas listed in Attachment B, Emergency Operations Topics. [Risk Factor: Medium] [Time Horizon: Long-term Planning]
- R4. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall assess ~~and~~ ~~verify~~ the capabilities of each real-time System Operator to perform each assigned task that is on its list of company-specific reliability-related tasks. [Risk Factor: Medium] [Time Horizon: Long-term Planning]

C. Measures

- M1. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall have available for inspection evidence of a SAT-developed training program for each of the positions identified as meeting the applicability of this standard with evidence of the following SAT-related outcomes:
- M1.1. Analysis that results in a list of company-specific reliability-related tasks and measurable or observable criteria for desired performance for each task
 - M1.2. Design and develop training that results in learning objectives and content that is derived from results of training analysis and training needs assessment
 - M1.3. Implementation of the training program, as identified in a training needs assessment
 - M1.4. Evaluations and assessments of training delivered to determine if learning objectives are met
- M2. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall have available for inspection the results of its latest assessment for each position, as specified in R2.
- M3. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall provide evidence that each System Operator has obtained 32 hours of emergency operations or system restoration training, as specified in R3.
- M4. Each Reliability Coordinator, Balancing Authority and Transmission Operator shall have available for inspection assessment results for each real-time System Operator, as specified in R4.

D. Compliance (under development)

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Entity and NERC or NERC-designated Compliance Enforcement Authority

1.2. Compliance Monitoring Period and Reset

Each applicable entity shall self certify compliance annually. For Reliability Coordinator, Balancing Authority and Transmission Operator, an on-site compliance audit shall be conducted at least once every three years for which the monitoring period extends to the previous on-site compliance audit or three years whichever is greater.

~~The performance reset period for all requirements is one month.~~

~~The performance monitoring period for all requirements is one calendar year. The performance reset period for all requirements is one month.~~

1.3. Data Retention

~~For all requirements, each Reliability Coordinator, Balancing Authority and Transmission Operator shall retain evidence of compliance for four years or since its most recent compliance audit, whichever is greater. Each applicable entity shall retain all data used to show evidence it is following or followed any mitigation plan associated with this standard.~~

~~The Compliance Monitor shall retain data including self certifications since its last on-site audit and all documentation from other compliance monitoring methods used since the last full compliance audit. The Compliance Monitor shall retain any data used in mitigation plans associated with this standard.~~

~~For Measure 1, each Reliability Coordinator, Balancing Authority and Transmission Operator shall have its current SAT-developed training program available for review at all times.~~

~~For Measure 2, each Reliability Coordinator, Balancing Authority and Transmission Operator shall have its latest assessment for each position available for review at all times.~~

~~For Measure 3, each Reliability Coordinator, Balancing Authority and Transmission Operator shall retain records of training, as specified in R3, for three years.~~

~~For Measure 4, each Reliability Coordinator, Balancing Authority and Transmission Operator shall have its latest assessment for each operator available for review at all times.~~

~~The Compliance Monitor shall retain data from its last audit and any data used in any associated mitigation plans.~~

1.4. Additional Compliance Information

~~Each Reliability Coordinator, Transmission Operator and Balancing Authority shall demonstrate compliance through self-certification submitted to its Compliance Monitor annually and reporting by exception. The Compliance Monitor may also use scheduled on-site reviews of a minimum, every three years, as well as spot checks and investigations upon complaint, to assess performance.~~

~~None.~~

2. Violation Severity Levels

2.1. Lower: There shall be a lower violation severity level if any of the following conditions exist:

~~2.1.1.12.1.1 The entity has an SAT-developed training program that includes 75% through 99% of the company-specific reliability-related tasks.~~

~~2.1.2.12.1.2 The entity conducted a training needs assessment for 75% through 99% of the applicable positions.~~

~~2.1.3.12.1.3 Up to 10% of System Operators in identified positions did not receive sufficient training hours.~~

2.1.4.12.1.4 The entity has assessed the capability of at least 75% of the entities real-time System Operators and each assessment included at least 75% of each System Operator's assigned reliability-related tasks.

2.2. Medium: There shall be a medium violation severity level if any of the following conditions exist:

2.2.1.12.2.1 The entity has a SAT-developed training program that includes 50% through 74% of the company-specific reliability-related tasks.

2.2.2.12.2.2 The entity conducted a training needs assessment for 50% to 74% of the applicable positions.

2.2.3.12.2.3 At least 20% of System Operators in identified positions did not receive sufficient training hours.

2.2.4.12.2.4 The entity has assessed the capability of at least 50% (but less than 75%) of the entities real-time System Operators and assessment included at least 50% each System Operator's assigned reliability-related tasks.

2.3. High: There shall be a high violation severity level if any of the following conditions exist:

2.3.1 SAT-Developed Training Programs

2.3.1.12.3.2 The entity has a SAT-developed training program that includes 25% through 49% of the company-specific reliability-related tasks.

2.3.2.12.3.3 The entity conducted a training needs assessment for 25% to 49% of the applicable positions.

2.3.3.12.3.4 At least 30% of System Operators in identified positions did not receive sufficient training hours.

2.3.4.12.3.5 The entity has assessed the capability of at least 25% (but less than 50%) of the entities real-time System Operators and each assessment included at least 25% each System Operator's assigned reliability-related tasks.

2.4. Severe: There shall be a severe violation severity level if any of the following conditions exist:

2.4.1 The entity has a SAT-developed training program that includes the reliability-related tasks for less than 25% of the company-specific reliability-related tasks or there is no SAT-developed training program.

2.4.2 The entity conducted a training needs assessment for less than 25% of the applicable positions.

2.4.3 40% or more of system operators in identified positions did not receive sufficient training hours.

2.4.4 The entity has assessed the capability of less than 25% of real-time System Operators and each assessment included less than 25% of each System Operator's assigned reliability-related ~~tasks~~tasks ~~tasks~~

E. Regional Variances

None.

Version History

| Version | Date | Action | Change Tracking |
|---------|------|--------|-----------------|
| | | | |
| | | | |

DRAFT

Attachment A: Generic Task List

This is a generic list of tasks, intended to be used as a resource to assist with the creation of a company specific list of reliability related tasks. While this list is a good starting point, organizations may need to add or subtract from the list to accurately reflect all reliability related tasks applicable to their organization.

General Control Center Operations Tasks:

| ITEM# | TYPE OF ACTIVITY | GENERAL CONTROL CENTER OPS TASKS |
|-------|------------------|---|
| 1 | Communication | Provides real-time system information to the Reliability Coordinator. |
| 2 | Communication | Coordinates reliability processes and actions with and among other Reliability Coordinators. |
| 3 | Communication | Issues reliability alerts to Generator Operators, Load-Serving Entities, Transmission Operators, Transmission Service Providers, Balancing Authorities, Regional Councils, and NERC |
| 4 | Communication | Produce and publish system status information (e.g., OASIS, IRN, and RCIS) |
| 5 | Communication | Prepare and provide data to reliability authority for later inclusion in NERC reports |
| 6 | Communication | Ensure all balancing authorities or transmission operators are aware of solar magnetic disturbances (SMD) forecast information |
| 7 | Communication | Communicate the status of system conditions with appropriate reliability coordination offices |
| 8 | Communication | Communicate the status of system conditions with appropriate balancing authorities and/or transmission operators |
| 9 | Communication | Report disturbances to NERC following the guidelines within the U.S. Department of Energy's most recent Power System Emergency Reporting Procedures |
| 10 | Communication | Communicate with interconnected systems during normal and emergency conditions using established procedures |
| 11 | Communication | Coordinate operations between the host balancing authority or transmission operator and any transmission operating entities that exist within the host balancing authority and/or transmission operator's boundaries to ensure transmission reliability |
| 12 | Communication | Report to the regional council staff within 24 hours after a disturbance affecting your system has occurred |
| 13 | Communication | Report any disturbances or unusual occurrences, suspected or determined to be caused by sabotage to the appropriate systems, governmental agencies, and regulatory bodies |
| 14 | Communication | Coordinate reliability processes and actions with and among other reliability coordinators |

| ITEM# | TYPE OF ACTIVITY | GENERAL CONTROL CENTER OPS TASKS |
|-------|------------------|---|
| 15 | Communication | Utilize the voice and data telecommunication systems as required while adhering to Interconnection and regional operating procedures |
| 16 | <u>Monitor</u> | Monitor real-time operational information from Balancing Authorities and Transmission Operators. |
| 17 | <u>Monitor</u> | Interpret SCADA-generated alarms and information, and then take appropriate actions to maintain system reliability |
| 18 | <u>Monitor</u> | Check data and verify accuracy of each metering point used by Supervisory Control and Data Acquisition (SCADA) |
| 19 | <u>Monitor</u> | Monitor performance of power system equipment and call out system personnel when appropriate |
| 20 | <u>Monitor</u> | Monitor system load and generation |
| 21 | <u>Monitor</u> | Ensure all special protection systems and special design features are in service as needed |
| 22 | <u>Monitor</u> | Monitor real-time market prices for accuracy |
| 23 | <u>Monitor</u> | Monitor and respond to alarms from status of special protective schemes |
| 24 | <u>Monitor</u> | Verify data used in operation |
| 25 | <u>Monitor</u> | Monitor the RCIS and respond to any information provided |
| 26 | <u>Monitor</u> | Monitor all reliability-related system parameters, such as MW, MVAR, voltage, and amps to determine system conditions |
| 27 | <u>Monitor</u> | Monitor and control access to the control center to prevent sabotage |
| 28 | <u>Monitor</u> | Monitor all reliability-related data within a reliability authority area |
| 29 | <u>Monitor</u> | Monitor and periodically test normal and emergency telecommunication systems that link with interconnected systems to ensure communications are adequate and continuous |
| 30 | <u>Monitor</u> | Monitor and respond to telecommunication alarms or failures and notify the appropriate personnel |
| 31 | <u>Monitor</u> | Monitor and maintain defined voltage profiles to ensure system reliability |
| 32 | <u>Monitor</u> | Monitor and validate telemetry data for accuracy |
| 33 | <u>Monitor</u> | Monitor control center systems and support equipment and call out appropriate assistance as needed |
| 34 | <u>Operating</u> | Analyze operations log, and oral information from system operator leaving shift |
| 35 | <u>Operating</u> | Maintain records of special protection system, special design feature, and transmission protection system mis-operations |
| 36 | <u>Operating</u> | Evaluate impact of current weather conditions on system operations |

| ITEM# | TYPE OF ACTIVITY | GENERAL CONTROL CENTER OPS TASKS |
|-------|-----------------------|--|
| 37 | <u>Operating</u> g | Evaluate system conditions and apply operating guides when applicable |
| 38 | <u>Operating</u> g | Evaluate the extent of an outage or disturbance and develop a plan of restoration |
| 39 | <u>Operating</u> g | Identify operating problems and deficiencies, and recommend corrective measures |
| 40 | <u>Operating</u> g | Respond to performance survey requests |
| 41 | <u>Operating</u> g | Provide input to ensure that the operations computer database is up to date |
| 42 | <u>Operating</u> g | Prepare daily reports and logs generated to meet company and regulatory requirements |
| 43 | <u>Operating</u> g | Adjust control systems to compensate for any equipment errors or failures |
| 44 | <u>Operating</u> g | Perform same-day reliability analysis of the electric system |
| 45 | <u>Operating</u> g | Perform next-day reliability analysis of the electric system |
| 46 | <u>Operating</u> g | Analyze and authorize requests for equipment outages |
| 47 | <u>Operating</u> g | Enforce operational reliability requirements |
| 48 | <u>Operating</u> g | Compile regional system data reports |
| 49 | <u>Operating</u> g | Operate primary and backup telecommunications systems as required |
| 50 | <u>Operating</u> g | Schedule system telecommunications, telemetering, protection, and control equipment outages to ensure system reliability |
| 51 | <u>Operating</u> g | Maintain current knowledge of power system modifications and additions |
| 52 | <u>Operating</u> g | Ensure that every effort is made to remain connected to the Interconnection |
| 53 | <u>Operating</u> g | Take action as necessary to protect the system if it becomes endangered by remaining interconnected |
| 54 | <u>Operating</u> g | Apply guidelines, including lists of utility contact personnel, for reporting disturbances due to sabotage events |
| 55 | <u>Operating</u> g | Direct to the appropriate entities those options necessary to relieve reliability threats and violations in a reliability authority area |
| 56 | <u>Operating</u> g | Ensure the accuracy of current system status by updating necessary operating procedures, diagrams, and map board |

| ITEM# | TYPE OF ACTIVITY | GENERAL CONTROL CENTER OPS TASKS |
|-------|----------------------|---|
| 57 | Operating | Provide input to system planners to help maintain accuracy in system models used for reliability assessments |
| 58 | Operating | Evaluate, test, and/or confirm the accuracy of reliability assessment tools |
| 59 | Operating | Utilize interconnected operation services as needed to maintain system reliability |
| 60 | Operating | Utilize reactive resources from transmission and generator owners to maintain acceptable voltage profiles |
| 61 | Operating | Enforce compliance of operating reliability limits |
| 62 | Operating | Arm or verify that special protection systems are armed to meet system conditions (contingencies) as needed |
| 63 | Operating | Test, evaluate, and operate backup control center facilities/systems as needed |
| 64 | Operating | Implement procedures for the recognition of sabotage events on your facilities and multi-site sabotage affecting larger portions of the Interconnection |
| 65 | Operating | Implement specified procedural actions in the event of a FERC Standards of Conduct violation |
| 66 | Procedure | Complies with reliability requirements specified by Reliability Coordinator. |
| 67 | Procedure | Evaluate current operating practices and make recommendations for improvement to meet NERC reliability standards' requirements |
| 68 | Procedure | Implement system restoration procedures |
| 69 | Procedure | Maintain a working knowledge of regional, NERC, FERC, and company specific guides, policies, and standards |

Transmission Tasks:

| ITEM# | TYPE OF ACTIVITY | TRANSMISSION TASKS |
|-------|--------------------------------------|--|
| 1 | <u>L</u> imits | Monitor and operate or direct the operations of the transmission system within equipment and facility ratings. |
| 2 | <u>O</u> perating | Notify Generator Operators of transmission system problems in compliance with FERC requirements. |
| 3 | <u>O</u> utage | Adjust transmission configuration to implement proposed transmission system outage plan |
| 4 | <u>O</u> utage outag e | Build contingency case for scheduled outages for next day |
| 5 | <u>O</u> utage outag e | Coordinate planned and unplanned transmission outages with all impacted systems to ensure transmission system reliability |
| 6 | <u>O</u> utage outag e | Direct transmission operators to revise maintenance plans as required, and as permitted by agreements |
| 7 | <u>O</u> utage outag e | Implement transmission outages to ensure system reliability |
| 8 | <u>O</u> utage outag e | Initiate the cancellation of scheduled transmission work when system conditions require |
| 9 | <u>O</u> utage outag e | Interpret relay targets, oscillograph readings, breaker operations, and field observations to determine proper restoration methods during forced outages |
| 10 | <u>O</u> utage outag e | Notify others of any planned transmission changes that may impact the operation of their facilities |
| 11 | <u>O</u> utage outag e | Perform reliability analysis to determine impact of both scheduled and forced transmission outages |
| 12 | <u>O</u> utage outag e | Receive and review transmission maintenance plans from transmission operators for reliability assessment |
| 13 | <u>O</u> utage outag e | Report transmission outages to the reliability coordinators and other affected utilities |
| 14 | <u>L</u> imits | Coordinate with impacted systems, and monitor actual and/or expected operating reliability limit violations and respond as required |
| 15 | <u>L</u> imits limits | Develop or calculate system operating reliability limits |
| 16 | <u>L</u> imits limits | Direct transmission operators to take actions to mitigate interconnection reliability operating limits |
| 17 | <u>L</u> imits limits | Ensure all tie-line limits are not exceeded |
| 18 | <u>L</u> imits limits | Ensure that transmission contract paths are not exceeded |
| 19 | <u>L</u> imits limits | Identify, communicate, and direct actions to relieve reliability threats and limit violations in the reliability authority area |
| 20 | <u>L</u> imits limits | Initiate control actions resulting from thermal limit violations, considering the responsiveness of the system |
| 21 | <u>L</u> imits limits | Monitor and respond to transmission system equipment rating violations |
| 22 | <u>L</u> imits limits | Monitor bulk transmission elements to determine constraints and operating limit |

| ITEM# | TYPE OF ACTIVITY | TRANSMISSION TASKS |
|-------|--|---|
| | | violations |
| 23 | Limits limits | Monitor major transmission lines, flow gates, and scheduling paths |
| 24 | Limits limits | Coordinate with Transmission Operators and Transmission Service Providers on real-time transmission system limitations. |
| 25 | Limits limits | Monitor Interconnection Reliability Operating Limits. |
| 26 | Limits limits | Recalculate interconnection reliability operating limits based on current or future conditions, and according to transmission and generator owners' specified equipment ratings |
| 27 | Limits limits | Develop interconnected operating reliability limits |
| 28 | O operating | Analyze/research any bulk system disturbances affecting your system |
| 29 | Operating operating rating | Respond to disturbance conditions |
| 30 | Operating operating rating | Monitor and operate transmission system within its designed capabilities |
| 31 | Operating operating rating | Monitor radio system for calls requiring response |
| 32 | Operating operating rating | Monitor system frequency and initiate a hotline conference call when frequency error exceeds specified limits |
| 33 | Operating operating rating | Monitor the condition of the transmission system and respond as required (including shedding firm load) to avoid voltage collapse and/or Interconnection separation |
| 34 | Operating operating rating | Monitor the voltages, and coordinate the reactive dispatch of transmission facilities, and the interconnections with neighboring systems |
| 35 | Operating operating rating | Develop special operating procedures to allow continued operation of the transmission system based on the results of a reliability analysis |
| 36 | Operating operating rating | Direct and/or control all energization and/or modification of new or existing facilities |
| 37 | Operating operating rating | Direct and/or control phase shifting transformer taps |
| 38 | Operating operating rating | Direct and/or control transmission switching |
| 39 | Operating operating rating | Direct and/or regulate the operation of the transmission system |
| 40 | Operating operating rating | Ensure adequate transmission facilities are available to meet external and internal requirements (real-time or hourly) |
| 41 | Operating operating rating | Implement corrective actions from transmission problems resulting from an underlying sub-transmission or distribution event (local reliability issues) |
| 42 | Operating operating rating | Maintain constant awareness of neighboring transmission system conditions |
| 43 | Operating operating rating | Maintain safe operating conditions for all persons and property within the transmission system |

| ITEM# | TYPE OF ACTIVITY | TRANSMISSION TASKS |
|-------|-----------------------------------|--|
| 44 | <u>Operating</u> <u>rating</u> | Operate control equipment to continuously and accurately meet its system and Interconnection control obligation and measure its performance |
| 45 | <u>Operating</u> <u>rating</u> | Perform reliability analysis (actual and contingency) for the reliability authority area |
| 46 | <u>Operating</u> <u>rating</u> | Provide oversight of transmission operational plans, direct revisions as required, and as permitted by agreements |
| 47 | <u>Operating</u> <u>rating</u> | Respond to solar magnetic disturbance (SMD) warnings as required by system operating procedures |
| 48 | <u>Operating</u> <u>rating</u> | Specify interconnected operation services requirements for transmission reliability (e.g., reactive requirements, location of operating reserves) |
| 49 | <u>Operating</u> <u>rating</u> | Supervise and coordinate all activity at switching stations, generating stations, and transmission switchyards |
| 50 | <u>Operating</u> <u>rating</u> | Utilize load flow modeling tools to determine power flow changes and optimum system configurations during normal and emergency conditions |
| 51 | <u>V</u> <u>voltage</u> | Deploy reactive resources to maintain acceptable voltage profiles. |
| 52 | <u>Voltage</u> <u>e</u> | Coordinate voltage reduction as requested by the Balancing Authority or as directed by the Reliability Coordinator. |
| 53 | <u>Voltage</u> <u>e</u> | Direct voltage reduction |
| 54 | <u>Voltage</u> <u>e</u> | Approve system voltage regulating equipment outages to ensure adequate system voltage and system reliability is maintained |
| 55 | <u>Voltage</u> <u>e</u> | Coordinate operation of voltage control equipment with interconnected utilities |
| 56 | <u>Voltage</u> <u>e</u> | Direct Transmission Operators to reduce voltage or shed load if needed to ensure balance in real-time |
| 57 | <u>Voltage</u> <u>e</u> | Identify and respond to conditions likely to lead to voltage collapse |
| 58 | <u>Voltage</u> <u>e</u> | Implement voltage reductions as directed by a transmission operator |
| 59 | <u>Voltage</u> <u>e</u> | Minimize system voltage decay and prevent cascading outages |
| 60 | <u>Voltage</u> <u>e</u> | Schedule system voltage regulating equipment outages to ensure adequate system voltage and system reliability is maintained |
| 61 | <u>Voltage</u> <u>e</u> | Utilize HVDC systems' reactive power control capabilities as a voltage control tool when appropriate |
| 62 | <u>Voltage</u> <u>e</u> | Utilize transmission line removal as a voltage control tool only if system studies indicate that system reliability will not be degraded below acceptable levels |
| 63 | <u>L</u> <u>imits</u> | Request Reliability Coordinator to mitigate equipment overloads. |
| 64 | <u>C</u> <u>ongestion</u> | Identify special operating procedures that may be necessary to maintain acceptable transmission loading |
| 65 | <u>Congestion</u> | Initiate line loading relief procedures upon request of members of the |

| ITEM# | TYPE OF ACTIVITY | TRANSMISSION TASKS |
|-------|--|---|
| | Congestion | Interconnection using appropriate priority levels |
| 66 | Congestion Congestion | Initiate transmission loading relief procedures to relieve potential or actual loading on a constrained facility |
| 67 | Congestion Congestion | Manage transmission loading by directing the redispatch of generators or reconfiguring the transmission system to mitigate impact, including the load curtailment process |
| 68 | Congestion Congestion | Notify all affected areas that line loading relief has been requested, and that corrective actions are required |
| 69 | Congestion Congestion | Request the reliability authority to mitigate equipment overloads |
| 70 | Congestion Congestion | Run day-ahead congestion management market |
| 71 | Congestion Congestion | Run hour-ahead congestion management market to allocate available transmission capacities |
| 72 | Congestion Congestion | Use the results from an available transfer capability (ATC) calculator to determine the impact of an interchange transaction on the transmission system |
| 73 | Congestion Congestion | Utilize the Interchange Distribution Calculator to determine transaction curtailments for transmission load relief |
| 74 | Congestion Congestion | Calculate and post changes in available transmission capacity |
| 75 | Congestion Congestion | Implement terms of interruption for transmission services according to contractual provisions |
| 76 | | Direct load shedding |
| 77 | Load | Coordinate load shedding as requested by the Balancing Authority or as directed by the Reliability Coordinator. |
| 78 | Load Load | Issue corrective actions (e.g., curtailments or load shedding) to Transmission Operators, Transmission Service Providers |
| 79 | Load Load | Adjust both short-term and future forecasts using actual load data and correction factors |
| 80 | Load Load | Call for interruptible loads to be shed when required |
| 81 | Load Load | Collect individual load profiles and forecasts of end-users energy requirements, and develop overall load profiles |
| 82 | Load Load | Compile load forecasts from load-serving entities within a balancing area |
| 83 | Load Load | Coordinate load shedding, and load restoration with, or as directed by the reliability authority |
| 84 | Load Load | Coordinate or direct use of controllable loads that have been bid as interconnected operations services |
| 85 | Load Load | Develop both short-term and future forecasts using actual load data and correction factors |
| 86 | Load Load | Monitor an area's estimated and actual loads |

| ITEM# | TYPE OF ACTIVITY | TRANSMISSION TASKS |
|-------|------------------|----------------------------------|
| 87 | Load | Respond to light load conditions |

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Generation Tasks:

| ITEM# | TYPE OF ACTIVITY | GENERATION TASKS |
|-------|--------------------|--|
| 1 | Bbalancing | Direct resources (Generator Operators and Load-Serving Entities) to take action to ensure balance in real time |
| 2 | Balancingbalancing | Ensure adequate generation capacity is available to meet external and internal requirements (real-time, or hourly) |
| 3 | Balancingbalancing | Respond to manual time error correction requests by regional time error monitor |
| 4 | Balancingbalancing | Allocate generation resources to meet system requirements |
| 5 | Balancingbalancing | Allocate load resources to meet system requirements |
| 6 | Balancingbalancing | Monitor AGC to ensure compliance with NERC CPS1 and CPS2 standards |
| 7 | Balancingbalancing | Perform system configuration evaluation for dispatching of imbalance energy based on real-time conditions |
| 8 | Balancingbalancing | Minimize inadvertent flows, losses, and CPS1 and CPS2 criteria violations |
| 9 | Balancingbalancing | Monitor AGC performance to diagnose and identify telemetry problems |
| 10 | Balancingbalancing | Compare actual generator output with anticipated schedules, and take action to account for the difference |
| 11 | Balancingbalancing | Dispatch generation resources economically while maintaining system reliability |
| 12 | Balancingbalancing | Monitor time error and initiate corrections |
| 13 | Balancingbalancing | Manually calculate ACE as necessary |
| 14 | Balancingbalancing | Publish next-day market results |
| 15 | Balancingbalancing | Monitor ramping capability for requested interchange schedules |
| 16 | Balancingbalancing | Ensure that the balancing authority is satisfying its Interconnection frequency regulation obligation |
| 17 | Balancingbalancing | Ensure that the balancing authority's frequency bias value is continually set at the proper value |
| 18 | Balancingbalancing | Monitor ACE to determine if the calculation is correct |
| 19 | Balancingbalancing | Inform the appropriate balancing authority of the status of its overlap regulation service |
| 20 | Balancingbalancing | Verify that the regulating capacity is distributed equitably over as many units as possible |
| 21 | Balancingbalancing | Manage generation biasing to avoid reliability limit violations |
| 22 | Balancingbalancing | Monitor response of units to the AGC signals |
| 23 | Balancingbalancing | Operate the AGC system in tie-line bias control mode unless such operation is adverse to system or Interconnection reliability |
| 24 | Balancingbalancing | Obtain replacement energy upon a loss of any major generating or interchange resource |

| ITEM# | TYPE OF ACTIVITY | GENERATION TASKS |
|-------|----------------------------------|--|
| 25 | Balancing balancing | Respond to generation losses, recognizing reliability restrictions to effectively maintain tie-line flows |
| 26 | Balancing balancing | Apply the principles of economic dispatch to generating units |
| 27 | Balancing balancing | Respond to generation losses, recognizing economic and reliability restrictions |
| 28 | Balancing balancing | Publish hour-ahead market results |
| 29 | Balancing balancing | Publish day-ahead market results |
| 30 | Balancing balancing | Declare an Energy Emergency Alert (EEA) when generation resources and reserves are inadequate to meet demand |
| 31 | Balancing balancing | Consult with other impacted balancing authorities, adjust the AGC algorithm for the proper time periods (on-peak and off-peak) to account for known tie-line metering errors |
| 32 | Balancing balancing | Review generation commitments, dispatch, and load forecasts |
| 33 | Balancing balancing | Receive and review generation operations plans and commitments from balancing authorities for reliability assessment |
| 34 | Balancing balancing | Control or direct generation biasing to provide overlap regulation service to other balancing authorities in accordance with contractual obligations |
| 35 | Balancing balancing | Ensure adequate energy resources are available to meet external and internal requirements (real-time or hourly) |
| 36 | C ongestion | Direct the reduction or shedding of load if needed to ensure balance within its Balancing Authority Area. |
| 37 | Congestion congestion | Direct Generator Operators to implement redispatch for congestion management. |
| 38 | Congestion congestion | Issue corrective actions (e.g., curtailments or load shedding) to Balancing Authorities. |
| 39 | Congestion congestion | Procure alternate sources of energy when reliability coordinator curtails transactions or calls for generation re-dispatch |
| 40 | Congestion congestion | Issue generation dispatch adjustments to mitigate transmission congestion |
| 41 | Congestion congestion | Direct balancing authorities to take actions to mitigate interconnection reliability operating limits |
| 42 | Congestion congestion | Control, direct, or manage generation dispatch to avoid transmission reliability limit violations |
| 43 | e Operating | Monitor output of units ensuring that MW output is within operating limits |
| 44 | Operating operating | Monitor output of units ensuring that MVA _r output is within operating limits |
| 45 | Operating operating | Operate generation to minimize inadvertent power flow |
| 46 | Operating operating | Operate the SCADA and analog systems to control generation and monitor telemetered information |
| 47 | Operating operating | Select proper mode of automatic generation control for system conditions |

| ITEM# | TYPE OF ACTIVITY | GENERATION TASKS |
|-------|--------------------------------|--|
| 48 | Operating operating | Suspend automatic generation control as required |
| 49 | Operating operating | Monitor system fuel reserves |
| 50 | Operating operating | Communicate with generating station regarding work for anticipated increases or decreases that may cause limit changes |
| 51 | Operating operating | Monitor generation production data for correctness and ensure that records are developed and maintained as required |
| 52 | Operating operating | Monitor output of units ensuring that MW output is operating according to schedules |
| 53 | Operating operating | Monitor output of units ensuring that MVar output is operating according to schedules |
| 54 | Operating operating | Supervise and coordinate all activity at generating stations |
| 55 | Operating operating | Monitor hydro generation and pond levels |
| 56 | Operating operating | Monitor generating unit governors to verify their operational status |
| 57 | Operating operating | Initiate manual control of generation, and maintain scheduled interchange following an AGC system component failure |
| 58 | Operating operating | Operate power facilities in compliance with environmental standards (e.g., air quality, wildlife) |
| 59 | Operating operating | Ensure that the AGC and other vital control performance equipment are functioning properly when using the backup power supply following the loss of the primary power supply |
| 60 | Operating operating | Verify the accuracy of the AGC tie-line metering by comparing hourly MWh meter totals to the totals derived from tie-line meter registers |
| 61 | Operating operating | Monitor the status and availability of generator voltage regulators and/or power system stabilizers, and respond as required to deficiencies that may impact system reliability |
| 62 | Operating operating | Test/verify the reactive capability of generating units |
| 63 | Operating operating | Administer generator start-up and shutdown schedules |
| 64 | Operating operating | Report the status of generator automatic voltage regulators and/or power system stabilizers to transmission operators |
| 65 | Operating operating | Provide oversight of generation operational plans, direct revisions as required, and as permitted by agreements |
| 66 | Operating operating | Validate adequacy of resource plans (in near real time) |
| 67 | Operating operating | Procure interconnected operations services from generator owners to ensure voltage support from generating resources is adequate |
| 68 | Operating operating | Notify generator operators of voltage limitations, or equipment overloads that may impact, or are impacting generator operations |
| 69 | Outage outage | Inform the Reliability Coordinator and impacted Balancing Authorities of Interchange Schedule interruptions due to generation or load interruptions within its Balancing Authority Area. |
| 70 | Outage outage | Plan next-day generation required to implement a proposed outage |

| ITEM# | TYPE OF ACTIVITY | GENERATION TASKS |
|-------|--------------------------|--|
| 71 | <u>Outage</u> outage | Implement terms of interruption for generation services according to contractual provisions |
| 72 | <u>Outage</u> outage | Implement or delay generation outages to ensure system reliability |
| 73 | <u>Outage</u> outage | Coordinate ramp down of unit going on planned outage |
| 74 | <u>Outage</u> outage | Adjust generation levels to implement proposed transmission system outage plan |
| 75 | <u>Outage</u> outage | Perform reliability analysis to determine impact of both scheduled and forced generation outages |
| 76 | <u>Outage</u> outage | Separate or shut down generators that are unsafe to operate during or after an area disturbance |
| 77 | <u>Outage</u> outage | Direct generation operators to revise maintenance plans as required, and as permitted by agreements |
| 78 | <u>R</u> eserves | Apply operating reserves when needed |
| 79 | <u>Reserves</u> reserves | Respond to Reserve Sharing Group requests for emergencies |
| 80 | <u>Reserves</u> reserves | Perform day-ahead ancillary services auction |
| 81 | <u>Reserves</u> reserves | Produce list of resources to meet additional energy requirements (from ancillary service market) to purchase in real time |
| 82 | <u>Reserves</u> reserves | Monitor and analyze regional reactive reserve availability |
| 83 | <u>Reserves</u> reserves | Perform instantaneous reserve checks |
| 84 | <u>Reserves</u> reserves | Dispatch operating reserves to alleviate system emergency conditions |
| 85 | <u>Reserves</u> reserves | Perform hour-ahead ancillary services auction |
| 86 | <u>Reserves</u> reserves | Monitor and analyze regional operating reserves availability |
| 87 | <u>Reserves</u> reserves | Reestablish required operating reserve levels as soon as possible following a contingency that results in operating reserve usage |
| 88 | <u>Reserves</u> reserves | Administer performance tests for generating resources providing ancillary services (e.g., spinning, regulation, unit ramp rates) |
| 89 | <u>Reserves</u> reserves | Determine required quantities of ancillary services |
| 90 | <u>Reserves</u> reserves | Determine reserves needed for the next hour |
| 91 | <u>Reserves</u> reserves | Determine reserves needed for the next day |
| 92 | <u>Reserves</u> reserves | Determine reserves needed for future days (long term) |
| 93 | <u>Reserves</u> reserves | Monitor reactive reserve levels to ensure adequate reactive reserves exist and are properly located to provide for adequate voltage levels under normal and emergency conditions |
| 94 | <u>Reserves</u> reserves | Restore reactive reserves to acceptable levels as soon as possible after use |
| 95 | <u>Reserves</u> reserves | Ensure adequate spinning and operating reserves are on line |
| 96 | <u>Reserves</u> reserves | Ensure adequate spinning and/or operating reserves are dispersed throughout the system |

| ITEM# | TYPE OF ACTIVITY | GENERATION TASKS |
|-------|--------------------------|--|
| 97 | <u>Reserves</u> reserves | Monitor available operating reserves and take corrective actions to correct deficiencies |

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Interchange Tasks:

| ITEM# | TYPE OF ACTIVITY | INTERCHANGE TASKS |
|-------|---|--|
| 1 | <u>e</u> Communication | Communicate with real-time scheduler regarding the purchase of resources |
| 2 | <u>Communication</u> communication | Notify source balancing authority and transmission service providers, or transmission operators when an interchange transaction must be modified or terminated |
| 3 | <u>Communication</u> communication | Notify intermediate balancing authorities when an interchange transaction must be modified or terminated |
| 4 | <u>Communication</u> communication | Notify participants of transaction curtailments or adjustments observing NERC communication protocols |
| 5 | <u>Communication</u> communication | Notify sink balancing authority or transmission service provider when an interchange transaction needs to be modified or terminated |
| 6 | <u>Communication</u> communication | Notify the interchange authority when interchange transactions are cancelled or terminated |
| 7 | <u>C</u> ongestion | Curtail, terminate, or modify interchange transaction requests that aggravate operating reliability limits |
| 8 | <u>Congestion</u> congestion | Curtail transactions as directed across interfaces |
| 9 | <u>Congestion</u> congestion | Ensure that the maximum net scheduled interchange with other balancing authorities does not exceed the available transfer capability |
| 10 | <u>Congestion</u> congestion | Ensure that all curtailments are properly applied per reliability coordinators instructions |
| 11 | <u>Congestion</u> congestion | Analyze the impact of proposed requests for transmission service and interchange schedules on the bulk power system |
| 12 | <u>Congestion</u> congestion | Reestablish curtailed interchange transactions with affected balancing authorities or transmission operators |
| 13 | <u>Congestion</u> congestion | Coordinate reallocation and reloading of interchange transactions during transmission loading relief procedures |
| 14 | <u>M</u> onitor | Monitor status of NERC interchange transaction tags to ensure timely approval and implementation |
| 15 | <u>O</u> perating | Arrange transactions for energy to serve projected demand |
| 16 | <u>Operating</u> operating | Determine proper use of dynamic schedules of remote generating units as to their contribution to operating reserves |
| 17 | <u>Operating</u> operating | Manually calculate net interchange when needed |
| 18 | <u>Operating</u> operating | Determine energy excess after meeting load, reserves, and contract obligations |
| 19 | <u>Operating</u> operating | Verify the accuracy of time error monitoring equipment |
| 20 | <u>Operating</u> operating | Maintain the confidentiality of interchange transactions |
| 21 | <u>Operating</u> operating | Protect the confidentiality of all interchange transaction information |

| ITEM# | TYPE OF ACTIVITY | INTERCHANGE TASKS |
|-------|----------------------------|--|
| 22 | <u>Operating</u> operating | Check inadvertent interchange accounts with other balancing authorities at the end of each day |
| 23 | <u>Operating</u> operating | Ensure that all appropriate transmission rights are assigned to all energy schedules (e.g., OASIS reservations) prior to their implementation |
| 24 | <u>Operating</u> operating | Agree upon daily schedule totals and energy imbalance totals with balancing authorities or transmission operators and other schedulers as needed |
| 25 | <u>Operating</u> operating | Assess, approve, or deny interchange transaction requests based on reliability analysis from the ATC calculator |
| 26 | <u>Operating</u> operating | Create NERC interchange transaction tag with all required information |
| 27 | <u>Operating</u> operating | Implement or terminate interchange transactions when needed |
| 28 | <u>Operating</u> operating | Adjust interchange transactions |
| 29 | <u>Operating</u> operating | Monitor the electronic (interchange) tagging system for accuracy of information (e-tagging) |
| 30 | <u>Operating</u> operating | Ensure all import and export schedule totals are checked for accuracy and correctness with each utility at the end of the day |
| 31 | <u>Operating</u> operating | Ensure interchange transactions are conducted in accordance with regional and NERC standards |
| 32 | <u>Operating</u> operating | Implement inadvertent interchange payback schedules with other entities |
| 33 | <u>Operating</u> operating | Submit a request to obtain the necessary transmission reservations to implement transactions |
| 34 | <u>Operating</u> operating | Manually calculate ACE as necessary |
| 35 | <u>Operating</u> operating | Adjust transfers across interfaces to maintain system reliability |
| 36 | <u>Operating</u> operating | Submit NERC interchange transaction tag to transmission providers and balancing authority or transmission operators on the scheduling path within proper timeframe |
| 37 | <u>Operating</u> operating | Secure appropriate transmission rights in response to system emergencies |
| 38 | <u>Operating</u> operating | Enter interchange transactions into the control area's scheduled interchange |
| 39 | <u>Operating</u> operating | Coordinate with any controlled interface operators (e.g., DC ties) that are part of an interchange transaction-scheduling path |
| 40 | <u>Operating</u> operating | Participate in system planning studies to determine transfer capabilities and operating limits |
| 41 | <u>Operating</u> operating | Check and validate hourly tie-line data |
| 42 | <u>Operating</u> operating | Monitor inadvertent accumulations in both the on-peak and off-peak accounts |
| 43 | <u>Operating</u> operating | Maintain knowledge of existing and proposed Interconnection agreements and contracts |

| ITEM# | TYPE OF ACTIVITY | INTERCHANGE TASKS |
|-------|---------------------------|---|
| 44 | <u>Operatingoperating</u> | Maintain accurate settlement records for bulk power sales and purchases |
| 45 | <u>Operatingoperating</u> | Apply tariffs associated with rates and services uniformly to all parties |
| 46 | <u>Operatingoperating</u> | Evaluate and respond to customer requests for transmission and ancillary services via the OASIS |
| 47 | <u>Operatingoperating</u> | Ensure that the ramp rate, start and end times, energy profile, and losses are communicated to all parties in the transaction |
| 48 | <u>Operatingoperating</u> | Identify potential parallel flow impacts on pending interchange |
| 49 | <u>Operatingoperating</u> | Approve interchange transactions based upon a reliability perspective |
| 50 | <u>Operatingoperating</u> | Monitor dynamic energy schedules for the appropriate use of transmission rights |
| 51 | <u>Operatingoperating</u> | Administer interchange scheduling and recordkeeping requirements with interconnected balancing authorities or transmission operators or other utilities |
| 52 | <u>Operatingoperating</u> | Implement interchange schedules |
| 53 | <u>Operatingoperating</u> | Approve or deny bilateral schedules from the reliability perspective |
| 54 | <u>Operatingoperating</u> | Confirm and approve interchange transactions from ramping ability perspective |
| 55 | <u>Operatingoperating</u> | Enter interchange transaction information into reliability assessment tools |
| 56 | <u>Operatingoperating</u> | Determine and post available transfer capability values |
| 57 | <u>Operatingoperating</u> | Secure energy and transmission services to serve end-use customers |
| 58 | <u>Operatingoperating</u> | Perform after-the-hour checkout of actual and scheduled interchange with adjacent balancing authorities |
| 59 | <u>Operatingoperating</u> | Approve or deny transmission service requests in accordance with any tariff requirements (OASIS) |
| 60 | <u>Operatingoperating</u> | Ensure transmission reliability margins, total transfer capabilities and available transfer capabilities are correctly posted |
| | | |

Emergency Operations Tasks:

| ITEM# | TYPE OF ACTIVITY | EMERGENCY OPERATIONS TASKS |
|-------|---------------------------------------|--|
| 1 | <u>C</u> apacity | Request emergency energy upon loss of a resource |
| 2 | <u>Capacity</u> capacity | Respond to capacity deficiency |
| 3 | <u>Capacity</u> capacity | Respond to loss of energy resources within allowable regional or pool timeframe |
| 4 | <u>Capacity</u> capacity | Prepare for a capacity emergency by bringing on all available generation |
| 5 | <u>Capacity</u> capacity | Prepare for a capacity emergency by postponing equipment maintenance |
| 6 | <u>Capacity</u> capacity | Prepare for a capacity emergency by scheduling emergency energy purchases |
| 7 | <u>Capacity</u> capacity | Prepare for a capacity emergency by reducing load |
| 8 | <u>Capacity</u> capacity | Prepare for a capacity emergency by initiating voltage reductions |
| 9 | <u>Capacity</u> capacity | Prepare for a capacity emergency by requesting emergency assistance from other systems |
| 10 | <u>Capacity</u> capacity | Schedule available emergency assistance with as much advance notice as possible given a capacity emergency |
| 11 | <u>Capacity</u> capacity | Utilize the assistance provided by the Interconnection's frequency bias (in a capacity emergency) only for the time period necessary to utilize operating reserves |
| 12 | <u>Capacity</u> capacity | Utilize the assistance provided by the Interconnection's frequency bias (in a capacity emergency) only for the time period necessary to analyze ability to recover using own resources |
| 13 | <u>Capacity</u> capacity | Utilize the assistance provided by the Interconnection's frequency bias (in a capacity emergency) only for the time period necessary to schedule emergency assistance from others |
| 14 | <u>F</u> req | Direct corrective actions to correct abnormal frequency |
| 15 | <u>L</u> oad s Shed | Manually shed load to alleviate system emergency conditions |
| 16 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, restore system load as appropriate for current system conditions and in coordination with adjacent systems |
| 17 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, shed additional load manually if there is insufficient generation to support the connected load |
| 18 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, monitor system voltage levels to ensure high voltage conditions do not develop |
| 19 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, monitor system frequency to ensure high frequency conditions do not develop |
| 20 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, monitor the performance of any automatic load restoration relays |
| 21 | <u>Load Shed</u> load-shed | Following the activation of automatic load shedding schemes, |

| ITEM# | TYPE OF ACTIVITY | EMERGENCY OPERATIONS TASKS |
|-------|---------------------------------------|---|
| | | resynchronize transmission at preplanned locations if possible |
| 22 | <u>Load Shed</u> load shed | Following the activation of automatic load shedding schemes, disable automatic underfrequency relays if system conditions warrant |
| 23 | <u>Load Shed</u> load shed | Direct distribution providers to shed load when required for system reliability |
| 24 | <u>Load Shed</u> load shed | Use manual load shedding to prevent imminent separation from the Interconnection due to transmission overloads or to prevent voltage collapse |
| 25 | <u>P</u> procedure | Implement emergency procedures. |
| 26 | <u>Procedure</u> procedure | Notify the Reliability Coordinator of the implementation of its own emergency procedures. |
| 27 | <u>Procedure</u> procedure | Comply with reliability coordinators' instructions during emergency conditions |
| 28 | <u>Procedure</u> procedure | Direct implementation of emergency procedures |
| 29 | <u>Procedure</u> procedure | Maintain knowledge of existing and proposed emergency assistance agreements and contracts |
| 30 | <u>Procedure</u> procedure | Mandate the sale or purchase of energy to optimize reliability |
| 31 | <u>Procedure</u> procedure | Respond to system emergencies and frequency deviations to meet local, regional, and NERC DCS requirements |
| 32 | <u>Procedure</u> procedure | Notify appropriate personnel or departments in event of an emergency |
| 33 | <u>Procedure</u> procedure | Perform or direct actions such as starting generation, canceling pre-scheduled maintenance, schedule interchange, or shed load to return the system to a secure state |
| 34 | <u>Procedure</u> procedure | Perform regular testing of emergency procedures to determine preparedness and alertness of shift personnel |
| 35 | <u>Procedure</u> procedure | Provide emergency services coordination for field personnel |
| 36 | <u>Procedure</u> procedure | Respond to generation losses, recognizing economic and reliability restrictions to effectively maintain tie-line flows |
| 37 | <u>Procedure</u> procedure | Respond to requests for emergency assistance from neighboring systems |
| 38 | <u>Procedure</u> procedure | Declare system emergencies |
| 39 | <u>Procedure</u> procedure | Develop and/or implement contingency plans when facilities/equipment are forced out of service |
| 40 | <u>Procedure</u> procedure | Formulate a plan to implement corrective actions when equipment ratings are exceeded or anticipated to be exceeded |
| 41 | <u>Procedure</u> procedure | Use sub-regional, regional, and NERC hotline to coordinate actions during emergency conditions |
| 42 | <u>Procedure</u> procedure | Schedule emergency energy when needed and create interchange transaction tags within one hour |
| 43 | <u>Procedure</u> procedure | Coordinate response to system emergencies |

| ITEM# | TYPE OF ACTIVITY | EMERGENCY OPERATIONS TASKS |
|-------|--------------------------------------|--|
| 44 | Procedure procedure | Request emergency assistance from neighboring systems |
| 45 | Procedure procedure | Assume sole control of designated telecommunication systems for use during an emergency |
| 46 | Procedure procedure | Implement emergency procedures related to generating resources within a balancing area as directed by the reliability authority |
| 47 | R restoration | Direct the restoration of the transmission system following a major system outage, load shedding, islanding, or blackout |
| 48 | Restoration restoration | Ensure adequate protective relaying exists during all phases of the system restoration sequence |
| 49 | Restoration restoration | Test or simulate system restoration procedures to validate restoration plans |
| 50 | Restoration restoration | Following a partial or total system shutdown, implement the appropriate provisions and procedures of the system's restoration plan in a coordinated manner with adjacent systems |
| 51 | Restoration restoration | Following a partial or total system shutdown, arrange for start-up and/or emergency power for generation units as required |
| 52 | Restoration restoration | Following a partial or total system shutdown, arrange for and utilize emergency (backup) telecommunications facilities as required |
| 53 | Restoration restoration | Following a partial or total system shutdown, restore the integrity of the Interconnection as soon as possible |
| 54 | T ransmission | Formulate a plan to implement corrective actions when an operating reliability limit violation is anticipated |
| 55 | Transmission transmission | Determine the cause and extent of transmission system disturbances and interruptions and the impact on other facilities |
| 56 | Transmission transmission | Apply relief measures as necessary to permit re-synchronizing and reconnecting to the Interconnection when separated from the Interconnection |
| 57 | Transmission transmission | Use manual load shedding to prevent imminent separation from the Interconnection due to transmission overloads, or to prevent voltage collapse |
| 58 | Transmission transmission | Implement load shedding as directed by a transmission operator |
| 59 | Transmission transmission | Identify and take appropriate actions when partial or full system islanding occurs |
| 60 | V voltage | Implement voltage reductions to alleviate system emergency conditions |
| 61 | V voltage | Identify and take appropriate actions when a partial or full system voltage collapse occurs |

Attachment B: Emergency Operations Topics

These topics are identified as meeting the topic criteria for Emergency Operations training per Requirement 3 of this standard.

A. Recognition and Response to System Emergencies

1. Emergency drills and responses
2. Communication tools, protocols, coordination
3. Operating from backup control centers
4. System operations during unstudied situations
5. System Protection
6. Geomagnetic disturbances weather impacts on system operations
7. System Monitoring – voltage, equipment loading
8. Real-time contingency analysis
9. Offline system analysis tools
10. Monitoring backup plans
11. Sabotage, physical, and cyber threats and responses

B. Operating Policies Related to Emergency Operations

1. NERC standards that identify emergency operations practices (e.g. EOP Standards)
2. Regional reliability operating policies
3. Sub-regional policies and procedures
4. ISO/RTO policies and procedures

C. Power System Restoration Philosophy and Practices

1. Black start
2. Interconnection of islands – building islands
3. Load shedding – automatic (under-frequency and under-voltage) and manual
4. Load restoration philosophies

D. Interconnected Power System Operations

1. Operations coordination
2. Special protections systems
3. Special operating guides
4. Voltage and reactive control, including responding to eminent voltage collapse
5. Understanding the concepts of Interconnection Reliability Operating Limits versus System Operating Limits
6. DC tie operations and procedures during system emergencies
7. Thermal and dynamic limits
8. Unscheduled flow mitigation – congestion management
9. Local and regional line loading procedures
10. Radial load and generation operations and procedures
11. Tie line operations
12. E-tagging and Interchange Scheduling
13. Generating unit operating characteristics and limits, especially regarding reactive capabilities and the relationship between real and reactive output

E. Technologies and Tools

1. Forecasting tools
2. Power system study tools
3. Interchange Distribution Calculator (IDC)

F. Market Operations as They Relate to Emergency Operations

1. Market rules
2. **Locational Marginal Pricing (LMP)**
3. Transmission rights
4. OASIS
5. Tariffs
6. Fuel management
7. Real-time, hour-ahead and day-ahead tools

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Comment Form — Standard PER-005 – System Operator Training

Please use this form to submit comments on the second draft Standard PER-005 – System Operator Training. Comments must be submitted by **September 15, 2007**. You may submit the completed form by e-mail to sarcomm@nerc.net with the words "System Operator Training Standard" in the subject line. If you have questions please Linda Clarke at linclrke@msn.com or by telephone at 610-310-7210.

| Individual Commenter Information | | |
|---|--------------------------|--|
| (Complete this page for comments from one organization or individual.) | | |
| Name: | | |
| Organization: | | |
| Telephone: | | |
| E-mail: | | |
| NERC Region | <input type="checkbox"/> | Registered Ballot Body Segment |
| <input type="checkbox"/> ERCOT | <input type="checkbox"/> | 1 — Transmission Owners |
| <input type="checkbox"/> FRCC | <input type="checkbox"/> | 2 — RTOs and ISOs |
| <input type="checkbox"/> MRO | <input type="checkbox"/> | 3 — Load-serving Entities |
| <input type="checkbox"/> NPCC | <input type="checkbox"/> | 4 — Transmission-dependent Utilities |
| <input type="checkbox"/> RFC | <input type="checkbox"/> | 5 — Electric Generators |
| <input type="checkbox"/> SERC | <input type="checkbox"/> | 6 — Electricity Brokers, Aggregators, and Marketers |
| <input type="checkbox"/> SPP | <input type="checkbox"/> | 7 — Large Electricity End Users |
| <input type="checkbox"/> WECC | <input type="checkbox"/> | 8 — Small Electricity End Users |
| <input type="checkbox"/> NA – Not Applicable | <input type="checkbox"/> | 9 — Federal, State, Provincial Regulatory or other Government Entities |
| | <input type="checkbox"/> | 10 — Regional Reliability Organizations and Regional Entities |

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Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact E-mail:

| Additional Member Name | Additional Member Organization | Region* | Segment* |
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*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on prior page.

Background Information:

The System Operator Training standard is designed to help ensure that System Operators who work for Reliability Coordinators, Balancing Authorities, and Transmission Operators are provided with training to promote the reliability and adequacy of the North American interconnections and their bulk power systems.

The proposed standard allows each Reliability Coordinator, Balancing Authority, and Transmission Operator to use a valid approach in determining its system operator's training needs and then in developing and delivering training that meets those individual training needs to support reliable bulk power system operations.

The System Operator Training Drafting Team would like to receive industry comments on this group of standards. Accordingly, we request that you include your comments on this form and e-mail to sarcomm@nerc.net with the subject "System Operator Training" by **September 1, 2007**.

You do not have to answer all questions. Enter All Comments in Simple Text Format.

Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.

1. Do you agree that it is reasonable to at least annually, assess the training needs for each system operator position by determining any mis-match between acceptable and actual performance? [R2]? If not, please explain in the comment area.

Yes

No

Comments:

2. As stated in the approved SAR for this standard, do you agree that there should be a requirement to perform an assessment of the capabilities of each real-time System Operator to perform each assigned task that is on its list of company-specific reliability-related tasks? [R4] If not, please explain in the comment area.

Yes

No

Comments:

3. Do you agree with the Time Horizons as provided for each requirement in the revised standard? If not, please explain in the comment area.

Yes

No

Comments:

4. Do you agree with the Violation Risk Factor for each requirement in the revised standard? If not, please explain in the comment area^[lic1].

Yes

No

Comments: _____

5. Do you agree with the Measures identified for each requirement in the revised standard? If not, please explain in the comment area^[lic2].

Yes

No

Comments: _____

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4.6. Are you aware of any conflicts between the proposed standard and any regulatory function, rule/order, tariff, rate schedule, legislative requirement, or agreement? If not, please explain in the comment area.

Yes

No

Comments:

5.7. Please provide any other comments (that you have not already provided in response to the questions above) that you have on the draft standard PER-005.

Comments: