

## 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. Standards Authorization Committee approves SAR for posting on December 1, 2004.
2. SAR Drafting Team posted SAR for comments on December 7, 2004.
3. SAR Drafting Team responds to comments, revises SAR, and posts revised SAR for comments on February 17, 2006.
4. SAR Drafting Team responds to comments and revises SAR on May 15, 2006.
5. Standards Committee approves development of Standard on May 15, 2006.
6. The Standards Authorization Committee appointed the Standard Drafting Team on June 21, 2006.
7. Standards drafting team posted draft standard for comment on September 27, 2006.
8. Standards drafting team responded to comments and posted the revised standard on August 15, 2007.

Standard Drafting Team responded to comments and posted the revised standard for comment on February 15, 2008.

### Proposed Action Plan and Description of Current Draft:

This is the third posting of the proposed standard and its associated implementation plan for a 45-day comment period, from February 25, 2008 to April 9, 2008.

### Future Development Plan:

Anticipated Actions	Anticipated Date
1. Respond to comments on the third draft of the proposed standard.	May 15, 2008
2. Obtain the Standards Committee's approval to move the standard forward to balloting.	June 15, 2008
3. Post the standard and implementation plan for a 30-day pre-ballot review.	July 1–July 31, 2008
4. Conduct an initial ballot for 10 days.	August 1–August 10, 2008
5. Respond to comments submitted with the initial ballot.	September 1, 2008
6. Conduct a recirculation ballot for 10 days.	September 1–September 10, 2008
7. Post for a 30-day preview for board.	October 1–October 31, 2008

8. Board adoption.	November 15, 2008
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## A. Introduction

1. **Title:** System Personnel 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 (BES) 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 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.~~
5. **Proposed Effective ~~Date for Regulatory Approvals:~~ Dates:**

Effective 36 months after the first day of the first calendar quarter following applicable regulatory approval, or in those jurisdictions where no regulatory approval is required, the Reliability Standard becomes effective 36 months after the first day of the first calendar quarter after Board of Trustee adoption.

~~5.1. Requirement 3 in the standard shall become effective on the first day of first quarter after applicable regulatory approval (or the Reliability Standard otherwise becomes effective on the first day of first quarter after Board of Trustee adoption in jurisdictions where regulatory approval is not required).~~

~~5.2. Requirement 2 in the standard shall become effective 18 months after the first day of the first quarter following regulatory approval (or the Reliability Standard otherwise becomes effective 18 months after the first day of the first quarter after Board of Trustee adoption in those jurisdictions where regulatory approval is not required).~~

~~5.3. Requirement 1 and Requirement 4 shall become effective 36 months after the first day of the first quarter following regulatory approval (or the Reliability Standard otherwise becomes effective 36 months after the first day of the first quarter after Board of Trustee adoption in those jurisdictions where regulatory approval is not required).~~

## B. Requirements

- R1. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall use 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 training program(s) for the BES company-specific reliability-related tasks performed by its that addresses Bulk Electric System Operators. [Risk Factor: Medium] [Time Horizon: Long-term Planning]
- ~~R2.~~R1.1. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall create a list of (BES) company-specific reliability-related tasks performed by its System Operators. [Risk Factor: Medium] [Time Horizon: Long-term Planning]

- ~~**R2.1.R1.1.1.** Each To create a company-specific list of BES reliability-related tasks, each Reliability Coordinator, Balancing Authority, and Transmission Owner shall select all tasks performed by its System Operator shall update its list of BES company-specific positions from the Generic Task List (provided in Attachment A) and add other BES reliability-related tasks performed by its System Operators at least annually to identify new or modified tasks for inclusion in training Operator positions.~~
- R1.2.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall design and develop learning objectives and training materials based on the task list created in R1.1.
- R1.3.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall deliver assess at least annually the training established in R1.2.
- R1.4.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall conduct an evaluation of position to determine the training program established in R1, to identify any needed changes to the training program.
- ~~**R3.R2.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall verify each or its System Operator’s capabilities to perform each assigned task identified in R1.1 at least one time, mis-match between acceptable and actual performance capability. [Risk Factor: HighMedium] [Time Horizon: Long-term Planning]~~
- ~~**R2.1.** Within six months of a modification The assessment shall include identification of mis-matches between acceptable and actual performance capability that need to be addressed through future training.~~
- ~~**R2.2.** The assessment shall include identification of training required to perform new or revised tasks from the BES company-specific reliability-related tasks, each-~~
- R2.1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall verify each of its System Operator’s capabilities to perform the new or modified tasks.
- R3.** At least every 12 months each Reliability Coordinator, Balancing Authority, and Transmission Operator shall provide each of its System Operators Operator with at least 32 hours annually of emergency operations training applicable to its organization that reflects emergency operations topics (which includes and system restoration) using training, drills, exercises, and hands on training using simulators. [Risk Factor: Medium] [Time Horizon: Long-term Planning]
- ~~**R3.1.** The emergency operations and system restoration training shall include the principles and procedures needed for recognizing and responding to emergencies, using drills, exercises or simulations of system conditions in subject areas from the Emergency Operations Topics (provided in Attachment B).~~
- ~~**R3.1.1.** Each Reliability Coordinator, Balancing Authority and Transmission Operator shall add or remove topics from the Emergency Operations Topics to reflect emergency operations and system restoration topics that apply to its organization.~~
- ~~**R4.** Each Reliability Coordinator, Balancing Authority and Transmission Operator shall verify the capabilities of each of its real-time System Operators to perform each assigned task on its list of company-specific BES 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 using a systematic approach to training to establish a new or modify an existing training program(s), as specified in R1.
- M1.1** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall have available for inspection its company-specific task list, with the date of the last revision, as specified in R1.1.
- M1.2** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall have available for inspection its learning objectives and training materials, as specified in R1.2.
- M1.3** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall have available for inspection SAT-developed BES System Operator training records showing the names of the people trained, the title of the training delivered and the dates of delivery to show that it delivered the training, as specified in R1.3.
- M1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall have available for inspection program with evidence (such as instructor observations, trainee feedback, supervisor feedback, course evaluations, learning assessments, or audit results) that it performed a training program evaluation, as specified in R1.4 of the following SAT-related outcomes:
- M1.1.** Analysis that results in a list of company specific BES reliability related tasks and measurable or observable criteria for desired performance for each task
- M1.2.** Design and development of training materials that result in learning objectives and content that is derived from results of training analysis
- M1.3.** Implementation of the training program, as identified in the training analysis
- 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 evidence to show that it verified that each of its System Operators is capable of performing each assigned task identified in R1.1 the results of its latest assessment for each position, as specified in R2. This evidence can be documents such as training records showing successful completion of tasks with the employee name and date; supervisor check sheets showing the employee name, date, and task completed; or the results of learning assessments.
- M3.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall have available for inspection training records that provide evidence that each System Operator has obtained 32 hours of emergency operations or system restoration training, as specified in R3.
- M3.** Each Reliability Coordinator, Balancing Authority and Transmission Operator shall have available for inspection verification of the capabilities for each real-time System Operator, as specified in R4.

## D. Compliance

### 1. Compliance Monitoring Process

#### **1.1. Compliance Monitoring Responsibility**

**Compliance Enforcement Authority (CEA)**

For Reliability Coordinators and other functional entities that work for the Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

**1.1. Compliance Monitoring Period and Reset**

Not Applicable.

**1.2. Compliance Monitoring and Enforcement Processes:**

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

The performance reset period for all requirements is one month.

**1.3. Data Retention**

Each~~For all requirements and measures, each~~ Reliability Coordinator, Balancing Authority, and Transmission Operator shall keep data or retain~~evidence to show of~~ compliance, as identified below, unless directed by~~for four years or since~~ its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

1.4.1 ~~most recent on-site compliance audit, whichever is greater.~~ Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall retain its current company-specific task list and all data used to show evidence it is following or followed any supporting learning objectives and course outlines, training records, and evaluation records since its last compliance audit for Requirement 1, Measure 1~~mitigation plan associated with this standard.~~

1.4.2 Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall retain training records for each of its System Operators since the last compliance audit for Requirement 2, Measure 2.

1.4.3 Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall retain training records for each of its System Operators since the last compliance audit for Requirement 3, Measure 3.

1.4.4 If a Reliability Coordinator, Balancing Authority, and Transmission Operator is found non-compliant, it shall keep information related to the non-compliance until found compliant.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

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 on-site compliance audit. ~~The Compliance Monitor shall retain any data used in mitigation plans associated with this standard.~~

**1.4. Additional Compliance Information**

~~None~~Each Reliability Coordinator, Transmission Operator and Balancing Authority shall demonstrate compliance through self-certification submitted to its Compliance Enforcement Authority annually.

~~The Compliance Enforcement Authority shall conduct a scheduled on-site review once every three years, and may conduct spot checks and investigations to assess performance.~~

**2. Violation Severity Levels**

<u>R#</u>	<u>Lower VSL</u>	<u>Medium VSL</u>	<u>High VSL</u>	<u>Severe VSL</u>
<u>R1</u>	<u>None</u>	<u>The responsible entity failed to provide evidence of evaluating its training program effectiveness to identify needed changes to its training program(s).</u>	<u>The responsible entity failed to design and develop learning objectives and training materials based on the BES company specific reliability related task list (when developing a new or modifying an existing training program).</u>	<u>When developing a new or modifying an existing training program, the responsible entity failed to prepare a company-specific reliability-related task list</u>  <u>OR</u> <u>When developing a new or modifying an existing training, the responsible entity failed to deliver training based on the BES company specific reliability related task list.</u>
<u>R2</u>	<u>None</u>	<u>The responsible entity verified at least 90% but less than 100% of its System Operators' capabilities to perform each assigned task from its list of BES company-specific reliability-related tasks.</u>	<u>The responsible entity verified at least 70% but less than 90% of its System Operators' capabilities to perform each assigned task from its list of BES company-specific reliability-related tasks</u>  <u>OR</u>	<u>The responsible entity verified less than 70% of its System Operators' capabilities to perform each assigned task from its list of BES company-specific reliability-related tasks.</u>

<u>R#</u>	<u>Lower VSL</u>	<u>Medium VSL</u>	<u>High VSL</u>	<u>Severe VSL</u>
			<u>The responsible entity failed to verify its system operators' capabilities to perform each new or modified task within six months of making a modification to its BES company-specific reliability related task list.</u>	
<u>R3</u>	<u>None</u>	<u>The responsible entity provided at least 32 hours of emergency operations training to at least 90% but less than 100% of its System Operators.</u>	<u>The responsible entity provided at least 32 hours of emergency operations training to at least 70% but less than 90% of its System Operators.</u>	<u>The responsible entity provided 32 hours of emergency operations training to less than 70% of its System Operators</u> <u>OR</u> <u>The responsible entity did not include in its emergency training, the use of drills, exercises, and hands on training using simulators.</u>

~~2.1.— Lower: There shall be a lower violation for each subsection in which one or more of the following conditions exist:~~

~~2.1.1— None~~

~~2.1.2— None~~

~~2.1.3— The responsible entity did not add or remove topics from the Emergency Operations Topics that apply to their organization.~~

~~2.1.4— None~~

~~2.2.— Moderate: There shall be a moderate violation for each subsection in which one or more of the following conditions exist:~~



~~2.2.1—The responsible entity has completed a list of company-specific reliability-related tasks from the Generic Task List (Provided in attachment A), and has started creating a list identifying all other reliability-related task that the company performs, but the list is not complete.~~

~~**NOTE: If the entity violates R1.1, the entity is also in violation of R1, (failure to perform the Analysis phase of the SAT process).**~~

~~2.2.2—The responsible entity has determined training required based on the mis-match between acceptable and actual performance capability but has not included the training identified in its current schedule.~~

~~2.2.3—The responsible entity provided at least 32 hours of training on emergency operations or system restoration, annually, but did not include training in subject areas listed in Attachment B.~~

~~2.2.4—None~~

~~**2.3. High: There shall be a high violation for each subsection in which one or more of the following conditions exist:** The responsible entity has only partially achieved the reliability objective of the requirement and is missing one or more significant elements.~~

~~2.3.1—The responsible entity has a system operator training program for all its system operator positions (identified in Section 4.2) but the entity did not use or provide evidence of use of one of the five phases of a SAT process listed below when establishing new system operator training: (R1)~~

- ~~• Analysis that results in a list of company-specific reliability-related tasks and measurable or observable criteria for desired performance for each task~~
- ~~• Design that results in learning objectives~~
- ~~• Develop training content that is derived from results of training analysis and learning objectives.~~
- ~~• Implementation of the training program, as identified in the training analysis~~
- ~~• Evaluations and assessments of training delivered to determine if learning objectives are met~~

~~**OR**~~

~~The responsible entity has a system operator training program for all its system operator positions (identified in Section 4.2) but the entity did not use or provide evidence of use of one of the five phases of a SAT process listed below when making modifications to an existing system operator training program:~~

- ~~• Analysis that results in a list of company-specific reliability-related tasks and measurable or observable criteria for desired performance for each task~~
- ~~• Design that results in learning objectives~~
- ~~• Develop training content that is derived from results of training analysis and learning objectives.~~
- ~~• Implementation of the training program, as identified in the training analysis~~
- ~~• Evaluations and assessments of training delivered to determine if learning objectives are met~~

**OR**

~~The responsible entity does not have a system operator training program based on the SAT process for one of its system operator positions (as identified in Section 4.2).~~

~~2.3.1.1 The responsible entity has started creating a list or has a partial list identifying its company specific list of reliability related tasks from the generic task list (in Attachment A), but the list is not complete~~

~~NOTE: If the entity violates R1.2, the entity is also in violation of R1, (failure to perform the implementation phase of the SAT process).~~

~~2.3.2 The responsible entity has not performed an assessment which includes identification of measurable or observable criteria for desired performance to each task for the determination of the training needs for one of its system operating position.~~

~~2.3.2.1 The responsible entity has not identified training required based on the mis-match between acceptable and actual performance capability.~~

~~2.3.3 The responsible entity provided to its system operators at least, 32 hours of emergency operations or system restoration training, annually, but not all its System Operators has completed or evidence shows will not have completed the required annual training.~~

~~2.3.3.1 The responsible entity provided at least 32 hours of training on emergency operations or system restoration, but the training did not include training in principles and procedures needed for effectively recognizing and responding to emergencies OR~~

~~The emergency operations or system restoration training delivery method did not include drills, exercises, or simulations of system conditions;~~

~~2.3.4 The responsible entity has performed an assessment of its System Operator's capabilities to perform each identified task that is on its company specific reliability related task, but not for each of its System Operators.~~

~~2.4. Severe: There shall be a severe violation for each subsection in which one or more of the following conditions exist. The responsible entity has failed to meet the reliability objective of the requirement.~~

~~2.4.1 The responsible entity has a system operator training program for all its system operator positions (identified in Section 4.2) but the entity did not use or provide evidence of use of two of the five phases of a SAT process listed below when establishing new system operator training:~~

- ~~• Analysis that results in a list of company specific reliability related tasks and measurable or observable criteria for desired performance for each task~~
- ~~• Design that results in learning objectives~~
- ~~• Develop training content that is derived from results of training analysis and learning objectives.~~
- ~~• Implementation of the training program, as identified in the training analysis~~
- ~~• Evaluations and assessments of training delivered to determine if learning objectives are met~~

**OR**

~~The responsible entity has a system operator training program for all its system operator positions (identified in Section 4.2) but the entity did not use or provide evidence of use of two of the five phases of a SAT processes listed below when making modifications to an existing system operator training program.:~~

- ~~• Analysis that results in a list of company specific reliability related tasks and measurable or observable criteria for desired performance for each task~~
- ~~• Design that results in learning objectives~~
- ~~• Develop training content that is derived from results of training analysis and learning objectives.~~
- ~~• Implementation of the training program, as identified in the training analysis~~
- ~~• Evaluations and assessments of training delivered to determine if learning objectives are met~~

**OR**

~~The responsible entity does not have a SAT program for its system operators.~~

~~**2.4.1.1** The responsible entity failed to create a company specific list of reliability related tasks from the generic task list. (in attachment A) **OR**~~

~~The responsible entity failed to create a list of all other reliability related task the company performs.~~

~~**2.4.2** The responsible entity has not performed an assessment which includes identification of measurable or observable criteria for desired performance to each task for the determination of the training needs for two of its system operating position **OR**~~

~~The responsible entity has not performed an annual assessment as required by R2.~~

~~**2.4.3** The responsible entity did not provide to its system operators at least 32 hours of emergency operations or system restoration training **OR**~~

~~The responsible entity has provided 32 hours of emergency operations and system restoration training but the training has not provided annually.~~

~~**2.4.4** The responsible entity has not performed an assessment on its System Operator’s capabilities to perform each identified task that is on its company specific reliability related task list~~

**E. Regional Variances**

None.

**Version History**

Version	Date	Action	Change Tracking

**Attachment A: Generic Task List**

Attachment A presents a generic list of tasks to assist with the creation of a company specific list of reliability related tasks. Entities shall add or remove from the list to create a list of reliability related tasks applicable to their organization.

**General Control Center Operations Tasks:**

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

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

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



ITEM#	TYPE OF ACTIVITY	TRANSMISSION TASKS
24	Limits	Coordinate with transmission operators and transmission service providers on real-time transmission system limitations.
25	Limits	Monitor interconnection reliability operating limits.
26	Limits	Recalculate interconnection reliability operating limits based on current or future conditions, and according to transmission and generator owners' specified equipment ratings
27	Limits	Develop interconnected operating reliability limits
28	Operating	Analyze/research any bulk system disturbances affecting your system
29	Operating	Respond to disturbance conditions
30	Operating	Monitor and operate transmission system within its designed capabilities
31	Operating	Monitor radio system for calls requiring response
32	Operating	Monitor system frequency and initiate a hotline conference call when frequency error exceeds specified limits
33	Operating	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	Monitor the voltages, and coordinate the reactive dispatch of transmission facilities, and the interconnections with neighboring systems
35	Operating	Develop special operating procedures to allow continued operation of the transmission system based on the results of a reliability analysis
36	Operating	Direct and/or control all energization and/or modification of new or existing facilities
37	Operating	Direct and/or control phase shifting transformer taps
38	Operating	Direct and/or control transmission switching
39	Operating	Direct and/or regulate the operation of the transmission system
40	Operating	Ensure adequate transmission facilities are available to meet external and internal requirements (real-time or hourly)
41	Operating	Implement corrective actions from transmission problems resulting from an underlying sub-transmission or distribution event (local reliability issues)
42	Operating	Maintain constant awareness of neighboring transmission system conditions
43	Operating	Maintain safe operating conditions for all persons and property within the transmission system
44	Operating	Operate control equipment to continuously and accurately meet its system and interconnection control obligation and measure its performance
45	Operating	Perform reliability analysis (actual and contingency) for the reliability coordinator area
46	Operating	Provide oversight of transmission operational plans, direct revisions as required, and as permitted by agreements
47	Operating	Respond to solar magnetic disturbance (SMD) warnings as required by system

ITEM#	TYPE OF ACTIVITY	TRANSMISSION TASKS
		operating procedures
48	Operating	Specify interconnected operation services requirements for transmission reliability (e.g., reactive requirements, location of operating reserves)
49	Operating	Supervise and coordinate all activity at switching stations, generating stations, and transmission switchyards
50	Operating	Utilize load flow modeling tools to determine power flow changes and optimum system configurations during normal and emergency conditions
51	Voltage	Deploy reactive resources to maintain acceptable voltage profiles.
52	Voltage	Coordinate voltage reduction as requested by the balancing authority or as directed by the reliability coordinator.
53	Voltage	Direct voltage reduction
54	Voltage	Approve system voltage regulating equipment outages to ensure adequate system voltage and system reliability is maintained
55	Voltage	Coordinate operation of voltage control equipment with interconnected utilities
56	Voltage	Direct transmission operators to reduce voltage or shed load if needed to ensure balance in real time
57	Voltage	Identify and respond to conditions likely to lead to voltage collapse
58	Voltage	Implement voltage reductions as directed by a transmission operator
59	Voltage	Minimize system voltage decay and prevent cascading outages
60	Voltage	Schedule system voltage regulating equipment outages to ensure adequate system voltage and system reliability is maintained
61	Voltage	Utilize HVDC systems' reactive power control capabilities as a voltage control tool when appropriate
62	Voltage	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	Limits	Request reliability coordinator to mitigate equipment overloads.
64	Congestion	Identify special operating procedures that may be necessary to maintain acceptable transmission loading
65	Congestion	Initiate line loading relief procedures upon request of members of the Interconnection using appropriate priority levels
66	Congestion	Initiate transmission loading relief procedures to relieve potential or actual loading on a constrained facility
67	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	Notify all affected areas that line loading relief has been requested, and that corrective actions are required
69	Congestion	Request the reliability coordinator to mitigate equipment overloads
70	Congestion	Run day-ahead congestion management market

ITEM#	TYPE OF ACTIVITY	TRANSMISSION TASKS
71	Congestion	Run hour-ahead congestion management market to allocate available transmission capacities
72	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	Utilize the Interchange Distribution Calculator to determine transaction curtailments for transmission load relief
74	Congestion	Calculate and post changes in available transmission capacity
75	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	Issue corrective actions (e.g., curtailments or load shedding) to transmission operators, transmission service providers
79	Load	Adjust both short-term and future forecasts using actual load data and correction factors
80	Load	Call for interruptible loads to be shed when required
81	Load	Collect individual load profiles and forecasts of end-users energy requirements, and develop overall load profiles
82	Load	Compile load forecasts from load-serving entities within a balancing area
83	Load	Coordinate load shedding, and load restoration with, or as directed by the reliability coordinator
84	Load	Coordinate or direct use of controllable loads that have been bid as interconnected operations services
85	Load	Develop both short-term and future forecasts using actual load data and correction factors
86	Load	Monitor an area's estimated and actual loads
87	Load	Respond to light load conditions

**Generation Tasks:**

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

ITEM#	TYPE OF ACTIVITY	GENERATION TASKS
27	Balancing	Respond to generation losses, recognizing economic and reliability restrictions
28	Balancing	Publish hour-ahead market results
29	Balancing	Publish day-ahead market results
30	Balancing	Declare an Energy Emergency Alert (EEA) when generation resources and reserves are inadequate to meet demand
31	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	Review generation commitments, dispatch, and load forecasts
33	Balancing	Receive and review generation operations plans and commitments from balancing authorities for reliability assessment
34	Balancing	Control or direct generation biasing to provide overlap regulation service to other balancing authorities in accordance with contractual obligations
35	Balancing	Ensure adequate energy resources are available to meet external and internal requirements (real-time or hourly)
36	Congestion	Direct the reduction or shedding of load if needed to ensure balance within its balancing authority area.
37	Congestion	Direct generator operators to implement redispatch for congestion management.
38	Congestion	Issue corrective actions (e.g., curtailments or load shedding) to balancing authorities.
39	Congestion	Procure alternate sources of energy when reliability coordinator curtails transactions or calls for generation re-dispatch
40	Congestion	Issue generation dispatch adjustments to mitigate transmission congestion
41	Congestion	Direct balancing authorities to take actions to mitigate interconnection reliability operating limits
42	Congestion	Control, direct, or manage generation dispatch to avoid transmission reliability limit violations
43	Operating	Monitor output of units ensuring that MW output is within operating limits
44	Operating	Monitor output of units ensuring that MVAR output is within operating limits
45	Operating	Operate generation to minimize inadvertent power flow
46	Operating	Operate the SCADA and analog systems to control generation and monitor telemetered information
47	Operating	Select proper mode of automatic generation control for system conditions
48	Operating	Suspend automatic generation control as required
49	Operating	Monitor system fuel reserves
50	Operating	Communicate with generating station regarding work for anticipated increases or decreases that may cause limit changes
51	Operating	Monitor generation production data for correctness and ensure that records are developed and maintained as required

ITEM#	TYPE OF ACTIVITY	GENERATION TASKS
52	Operating	Monitor output of units ensuring that MW output is operating according to schedules
53	Operating	Monitor output of units ensuring that MVAR output is operating according to schedules
54	Operating	Supervise and coordinate all activity at generating stations
55	Operating	Monitor hydro generation and pond levels
56	Operating	Monitor generating unit governors to verify their operational status
57	Operating	Initiate manual control of generation, and maintain scheduled interchange following an AGC system component failure
58	Operating	Operate power facilities in compliance with environmental standards (e.g., air quality, wildlife)
59	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	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	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	Test/verify the reactive capability of generating units
63	Operating	Administer generator start-up and shutdown schedules
64	Operating	Report the status of generator automatic voltage regulators and/or power system stabilizers to transmission operators
65	Operating	Provide oversight of generation operational plans, direct revisions as required, and as permitted by agreements
66	Operating	Validate adequacy of resource plans (in near real time)
67	Operating	Procure interconnected operations services from generator owners to ensure voltage support from generating resources is adequate
68	Operating	Notify generator operators of voltage limitations, or equipment overloads that may impact, or are impacting generator operations
69	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	Plan next-day generation required to implement a proposed outage
71	Outage	Implement terms of interruption for generation services according to contractual provisions
72	Outage	Implement or delay generation outages to ensure system reliability
73	Outage	Coordinate ramp down of unit going on planned outage
74	Outage	Adjust generation levels to implement proposed transmission system outage plan
75	Outage	Perform reliability analysis to determine impact of both scheduled and forced

ITEM#	TYPE OF ACTIVITY	GENERATION TASKS
		<del>generation outages</del>
76	Outage	<del>Separate or shut down generators that are unsafe to operate during or after an area disturbance</del>
77	Outage	<del>Direct generation operators to revise maintenance plans as required, and as permitted by agreements</del>
78	Reserves	<del>Apply operating reserves when needed</del>
79	Reserves	<del>Respond to reserve sharing group requests for emergencies</del>
80	Reserves	<del>Perform day-ahead ancillary services auction</del>
81	Reserves	<del>Produce list of resources to meet additional energy requirements (from ancillary service market) to purchase in real time</del>
82	Reserves	<del>Monitor and analyze regional reactive reserve availability</del>
83	Reserves	<del>Perform instantaneous reserve checks</del>
84	Reserves	<del>Dispatch operating reserves to alleviate system emergency conditions</del>
85	Reserves	<del>Perform hour-ahead ancillary services auction</del>
86	Reserves	<del>Monitor and analyze regional operating reserves availability</del>
87	Reserves	<del>Reestablish required operating reserve levels as soon as possible following a contingency that results in operating reserve usage</del>
88	Reserves	<del>Administer performance tests for generating resources providing ancillary services (e.g., spinning, regulation, unit ramp rates)</del>
89	Reserves	<del>Determine required quantities of ancillary services</del>
90	Reserves	<del>Determine reserves needed for the next hour</del>
91	Reserves	<del>Determine reserves needed for the next day</del>
92	Reserves	<del>Determine reserves needed for future days (long term)</del>
93	Reserves	<del>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</del>
94	Reserves	<del>Restore reactive reserves to acceptable levels as soon as possible after use</del>
95	Reserves	<del>Ensure adequate spinning and operating reserves are on-line</del>
96	Reserves	<del>Ensure adequate spinning and/or operating reserves are dispersed throughout the system</del>
97	Reserves	<del>Monitor available operating reserves and take corrective actions to correct deficiencies</del>

**Interchange Tasks:**

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



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

ITEM#	TYPE OF ACTIVITY	INTERCHANGE TASKS
48	Operating	Identify potential parallel flow impacts on pending interchange
49	Operating	Approve interchange transactions based upon a reliability perspective
50	Operating	Monitor dynamic energy schedules for the appropriate use of transmission rights
51	Operating	Administer interchange scheduling and recordkeeping requirements with interconnected balancing authorities or transmission operators or other utilities
52	Operating	Implement interchange schedules
53	Operating	Approve or deny bilateral schedules from the reliability perspective
54	Operating	Confirm and approve interchange transactions from ramping ability perspective
55	Operating	Enter interchange transaction information into reliability assessment tools
56	Operating	Determine and post available transfer capability values
57	Operating	Secure energy and transmission services to serve end-use customers
58	Operating	Perform after the hour checkout of actual and scheduled interchange with adjacent balancing authorities
59	Operating	Approve or deny transmission service requests in accordance with any tariff requirements (OASIS)
60	Operating	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	Capacity	Request emergency energy upon loss of a resource
2	Capacity	Respond to capacity deficiency
3	Capacity	Respond to loss of energy resources within allowable regional or pool timeframe
4	Capacity	Prepare for a capacity emergency by bringing on all available generation
5	Capacity	Prepare for a capacity emergency by postponing equipment maintenance
6	Capacity	Prepare for a capacity emergency by scheduling emergency energy purchases
7	Capacity	Prepare for a capacity emergency by reducing load
8	Capacity	Prepare for a capacity emergency by initiating voltage reductions
9	Capacity	Prepare for a capacity emergency by requesting emergency assistance from other systems
10	Capacity	Schedule available emergency assistance with as much advance notice as possible given a capacity emergency
11	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	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	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	Freq	Direct corrective actions to correct abnormal frequency
15	Load Shed	Manually shed load to alleviate system emergency conditions
16	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	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	Load Shed	Following the activation of automatic load shedding schemes, monitor system voltage levels to ensure high voltage conditions do not develop
19	Load Shed	Following the activation of automatic load shedding schemes, monitor system frequency to ensure high frequency conditions do not develop
20	Load Shed	Following the activation of automatic load shedding schemes, monitor the performance of any automatic load restoration relays
21	Load Shed	Following the activation of automatic load shedding schemes, resynchronize transmission at preplanned locations if possible
22	Load Shed	Following the activation of automatic load shedding schemes, disable automatic underfrequency relays if system conditions warrant
23	Load Shed	Direct distribution providers to shed load when required for system reliability

ITEM#	TYPE OF ACTIVITY	EMERGENCY OPERATIONS TASKS
24	Load-Shed	Use manual load shedding to prevent imminent separation from the interconnection due to transmission overloads or to prevent voltage collapse
25	Procedure	Implement emergency procedures.
26	Procedure	Notify the reliability coordinator of the implementation of its own emergency procedures.
27	Procedure	Comply with reliability coordinators' instructions during emergency conditions
28	Procedure	Direct implementation of emergency procedures
29	Procedure	Maintain knowledge of existing and proposed emergency assistance agreements and contracts
30	Procedure	Mandate the sale or purchase of energy to optimize reliability
31	Procedure	Respond to system emergencies and frequency deviations to meet local, regional, and NERC DCS requirements
32	Procedure	Notify appropriate personnel or departments in event of an emergency
33	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	Procedure	Perform regular testing of emergency procedures to determine preparedness and alertness of shift personnel
35	Procedure	Provide emergency services coordination for field personnel
36	Procedure	Respond to generation losses, recognizing economic and reliability restrictions to effectively maintain tie-line flows
37	Procedure	Respond to requests for emergency assistance from neighboring systems
38	Procedure	Declare system emergencies
39	Procedure	Develop and/or implement contingency plans when facilities/equipment are forced out of service
40	Procedure	Formulate a plan to implement corrective actions when equipment ratings are exceeded or anticipated to be exceeded
41	Procedure	Use sub-regional, regional, and NERC hotline to coordinate actions during emergency conditions
42	Procedure	Schedule emergency energy when needed and create interchange transaction tags within one hour
43	Procedure	Coordinate response to system emergencies
44	Procedure	Request emergency assistance from neighboring systems
45	Procedure	Assume sole control of designated telecommunication systems for use during an emergency
46	Procedure	Implement emergency procedures related to generating resources within a balancing area as directed by the reliability coordinator
47	Restoration	Direct the restoration of the transmission system following a major system outage, load shedding, islanding, or blackout

ITEM#	TYPE OF ACTIVITY	EMERGENCY OPERATIONS TASKS
48	Restoration	Ensure adequate protective relaying exists during all phases of the system restoration sequence
49	Restoration	Test or simulate system restoration procedures to validate restoration plans
50	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	Following a partial or total system shutdown, arrange for start up and/or emergency power for generation units as required
52	Restoration	Following a partial or total system shutdown, arrange for and utilize emergency (backup) telecommunications facilities as required
53	Restoration	Following a partial or total system shutdown, restore the integrity of the Interconnection as soon as possible
54	Transmission	Formulate a plan to implement corrective actions when an operating reliability limit violation is anticipated
55	Transmission	Determine the cause and extent of transmission system disturbances and interruptions and the impact on other facilities
56	Transmission	Apply relief measures as necessary to permit re-synchronizing and reconnecting to the Interconnection when separated from the Interconnection
57	Transmission	Use manual load shedding to prevent imminent separation from the Interconnection due to transmission overloads, or to prevent voltage collapse
58	Transmission	Implement load shedding as directed by a transmission operator
59	Transmission	Identify and take appropriate actions when partial or full system islanding occurs
60	Voltage	Implement voltage reductions to alleviate system emergency conditions
61	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~~