

ERCOT Nodal Operating Guides

Section 4: Emergency Operation

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4 EMERGENCY OPERATIONS

4.1 Introduction

- (1) Emergency operation is intended to address operating conditions under which the reliability of the ERCOT System is inadequate and there is no solution readily apparent. During a declared system emergency, ERCOT can instruct Transmission Operators (TOs) and Qualified Scheduling Entities (QSEs) to take specific operating actions that would otherwise be discretionary. Upon receiving a Verbal Dispatch Instruction (VDI) from ERCOT, and in compliance with these Operating Guides, the QSEs shall direct relevant Resources or groups of Resources to respond to the instruction. ERCOT shall coordinate with QSEs and TOs to assure that necessary actions are taken to maintain reliability.
- (2) It is essential that good, timely, and accurate communication routinely occur between ERCOT, TOs, and QSEs. QSE and TO personnel shall report unplanned equipment status changes as outlined in this Section. ERCOT System Operators may ask for status updates as required in order to gather information to make decisions on system conditions to determine what type of emergency communication may be appropriate.
- (3) ERCOT may issue communications in the form of Operating Condition Notices (OCNs), Advisories, Watches and Emergency Notices. These communications may relate to but are not limited to, weather, transmission, computer failure, or generation information. ERCOT shall specify the severity of the situation, the area affected, the areas potentially affected, and the anticipated duration of the Emergency Condition. These communications will be issued by ERCOT to inform all TOs and QSEs of the current operating situation. TOs will notify their represented Transmission Service Providers (TSPs) and Load Serving Entities (LSEs). QSEs will in turn notify the appropriate Resources, Retail Electric Providers (REPs) and LSEs. QSEs and TOs shall establish and maintain internal procedures for contingency preparedness or to expedite the resolution of the conditions communicated by ERCOT that threaten system reliability.
- (4) Before deciding which emergency communication to issue, ERCOT must consider the possible severity of the operating situation before an Emergency Condition occurs. If practicable, the market shall be allowed to attempt to mitigate or eliminate any possible Emergency Condition. ERCOT has the responsibility to issue the appropriate communications to facilitate a solution by Market Participants.

4.2 Communication Under Emergency Conditions

4.2.1 *Operating Condition Notice*

- (1) An Operating Condition Notice (OCN) will be issued by ERCOT in accordance with Protocol Section 6.5.9.3.1, Operating Condition Notice. OCNs are for communication only, and ERCOT exercises no extra authority with the issuance of this type of notice.
- (2) ERCOT may require information from Qualified Scheduling Entities (QSEs) and Transmission Operators (TOs). Typical information requested may include, but is not limited to:

- (a) Resource fuel capabilities;
 - (b) Resource condition details; and
 - (c) Actual weather conditions.
- (3) ERCOT will provide verbal notice of an OCN to all TOs and QSEs and post the message electronically to the ERCOT Market Information System (MIS) Secure Area. When an OCN is issued, it does not place ERCOT in an emergency operating state. QSEs should notify appropriate Resources, Retail Electric Providers (REPs) and Load Serving Entities (LSEs). TOs should notify their represented Transmission Service Providers (TSPs) as appropriate.

4.2.2 *Advisory*

- (1) An Advisory will be issued by ERCOT in accordance with Protocol Section 6.5.9.3.2, Advisory, when it recognizes that conditions are developing or have changed such that QSE and/or TO actions may be prudent in response to impending severe conditions.
- (2) ERCOT may require information from QSEs and TOs. Typical information requested may include, but is not limited to:
- (a) Resource fuel capabilities;
 - (b) Resource condition details; and
 - (c) Actual weather conditions.
- (3) ERCOT shall provide verbal notice of an Advisory to all TOs and QSEs and shall post the message electronically to the MIS Secure Area. When an Advisory is issued, it does not place ERCOT in an emergency operating state. QSEs shall notify appropriate Resources, REPs and LSEs of Advisories. TOs should notify their represented TSPs as appropriate of Advisories.

4.2.3 *Watch*

- (1) A Watch may be issued by ERCOT in accordance with Protocol Section 6.5.9.3.3, Watch, when it recognizes that conditions have developed such that an insecure operating state exists or is imminent.
- (2) ERCOT may require information from QSEs and TOs. Typical information requested may include, but is not limited to:
- (a) Resource fuel capabilities;
 - (b) Resource condition details; and
 - (c) Actual weather conditions.

- (3) When a post-contingency overload of a non-critical element can not be rectified by congestion management methods, including Remedial Action Plans (RAPs) (see Section 4.3.1, Remedial Action Plans), or mitigation plans, ERCOT shall issue a Watch. A “non-critical element” is one whose loss will not result in an uncontrolled separation of cascading outages or large scale service disruptions to Load or overload of a critical Transmission Element.
- (4) ERCOT shall provide verbal notice of the Watch to all TOs and QSEs and shall post the message electronically to the MIS Secure Area. QSEs shall notify appropriate Resources, REPs and LSEs. TOs shall notify their represented TSPs.

4.2.4 Emergency Notice

- (1) An Emergency Notice will be issued by ERCOT in accordance with Protocol Section 6.5.9.3.4, Emergency Notice. ERCOT is considered to be in an insecure state whenever ERCOT Transmission Grid status is such that a Credible Single Contingency event presents the threat of uncontrolled separation of cascading outages and/or large-scale service disruption to Load (other than Load being served from a single-feed transmission service) and/or overload of a critical Transmission Element, and no timely solution is obtainable from the market.
- (2) ERCOT shall provide verbal notice of an Emergency Notice to all TOs and QSEs and shall post the message electronically to the MIS Secure Area.
- (3) When an Emergency Notice is issued, ERCOT is operating in an emergency operating condition. QSEs shall notify appropriate resources, REPs and LSEs. TOs shall notify their represented TSPs and LSEs.

4.3 Operation to Maintain Transmission System Security

- (1) ERCOT Operators are responsible for operating the ERCOT System within “First Contingency” (N-1) transfer limits so that there is no overload of any significant Transmission Element whose loss could jeopardize the reliability of the ERCOT System. Whenever the ERCOT System is not engaged in emergency operation, it will be operated in such a manner that the occurrence of a Credible Single Contingency will not cause any of the following:
 - (a) Uncontrolled breakup of the transmission system;
 - (b) Loading of Transmission Facilities above defined Emergency Ratings which can not be eliminated in time to prevent damage or failure following the loss through execution of specific, predefined operating procedures;
 - (c) Transmission voltage levels outside system design limits which can not be corrected through execution of specific, predefined operating procedures before voltage instability or collapse occurs; or
 - (d) Customer Outages, except for high set interruptible and radially served loads.

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- (2) Significant Transmission Overload – ERCOT can:
 - (a) Order adjustment to unit generation schedules, switching of Transmission Elements or Load interruption to relieve a severely overloaded Transmission Element;
 - (b) Order a Transmission Element whose loss would not have a significant impact on the reliability of transmission system switched out to increase interconnected system transfers.
 - (3) Violation of “First Contingency” (N-1) Criteria – ERCOT can order changes to unit dispatch or commitment to eliminate a “First Contingency” (N-1) criteria violation. Normally these changes should be performed via the market control mechanisms of constraint management as described in the Protocols, but ERCOT Operators have the authority to issue Verbal Dispatch Instructions (VDIs) independent of these systems.
 - (4) Violation of Voltage/Reactive Criteria – ERCOT can order changes in unit dispatch if coordinated voltage and Reactive Power criteria that are considered critical to interconnection reliability are violated for the existing or “Contingency” (N-1) conditions.
 - (5) Total or Partial System Blackout – ERCOT shall implement Black Start procedures.

4.3.1 Remedial Action Plans

- (1) Generation facilities or constrained Transmission Elements that would otherwise be subject to restrictions can operate to full rating if appropriate Special Protection Systems (SPSs) or Remedial Action Plans (RAPs) are in place (see Section 6.2.2, Design and Operating Requirements for ERCOT System Facilities, for SPS requirements). A RAP refers to predetermined operator actions to maintain reliability in a defined adverse operating condition. Normally, it is desirable that a Transmission Service Provider (TSP) constructs Transmission Facilities adequate to eliminate the need for any RAP; however, in some circumstances, such construction may be unachievable in the available time frame.
- (2) A RAP may be proposed by any Market Participant, but must be approved by ERCOT prior to implementation. RAPs must meet the following requirements:
 - (a) Be coordinated and approved with the operators of facilities included in the RAP;
 - (b) Limit use to the time required to construct replacement Transmission Facilities; however, the RAP will remain in effect if replacement Transmission Facilities have been determined by ERCOT to be impractical;
 - (c) Comply with all applicable ERCOT and North American Electric Reliability Corporation (NERC) requirements;
 - (d) Clearly define and document Transmission Operator (TO) actions;
 - (e) Include the option for the TO to override the procedures if the RAP will not improve system reliability;
 - (f) Operators must be trained in RAP implementation; and

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- (g) Be defined in the Network Operations Model and considered in the Security-Constrained Economic Dispatch (SCED) and Reliability Unit Commitment (RUC). RAPs that cannot be modeled using ERCOT's existing infrastructure shall be refused or a plan developed to work around the infrastructure problem with explicit approval by the Technical Advisory Committee (TAC).

4.4 Block Load Transfers between ERCOT and Non-ERCOT System

Under Watch, Energy Emergency Alert (EEA) conditions, or for local transmission constraints, it may become necessary to implement Block Load Transfer (BLT) schemes which will transfer Loads normally located in ERCOT to a non-ERCOT System. Similarly, when a non-ERCOT System experiences certain transmission contingency or short supply conditions, ERCOT may be requested to transfer Loads normally located in the non-ERCOT System to ERCOT. All BLTs must comply with Protocol Section 6.5.9.5, Block Load Transfers between ERCOT and Non-ERCOT Control Areas.

4.5 Energy Emergency Alert (EEA)

4.5.1 General

- (1) At times it may be necessary to reduce ERCOT System demand because of a temporary decrease in available electricity supply. The reduction in supply could be caused by emergency Outages of generators, transmission equipment, or other critical facilities; by short-term unavailability of fuel or generation; or by requirements or orders of government agencies. To provide an orderly, predetermined procedures for curtailing Demand during such emergencies, ERCOT shall initiate and coordinate the implementation of the Energy Emergency Alert (EEA) in accordance with Protocol Section 6.5.9.4, Energy Emergency Alert.
- (2) The goal of the EEA is to provide for maximum possible continuity of service while maintaining the integrity of the ERCOT System to reduce the chance of cascading outages.

4.5.2 Operating Procedures

- (1) The ERCOT System Operators have the authority to make and carry through decisions that are required to operate the ERCOT System during emergency or adverse conditions. ERCOT will have sufficiently detailed operating procedures for emergency or short supply situations and for restoration of service in the event of a partial or complete system shutdown. These procedures will be distributed to the personnel responsible for performing specified tasks to handle emergencies, remedy short supply situations, or restore service. Transmission Service Providers (TSPs) will develop procedures to be filed with ERCOT describing implementation of ERCOT requests in emergency and short supply situations, including interrupting Load, notifying others and restoration of service.
- (2) ERCOT and each TSP will endeavor to maintain transmission ties intact if at all possible. This will:

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- (a) Permit rendering the maximum assistance to an area experiencing a deficiency in generation;
 - (b) Minimize the possibility of cascading loss to other parts of the system; and
 - (c) Assist in restoring operation to normal.
- (3) ERCOT's operating procedures will meet the following goals while continuing to respect the confidentiality of market sensitive data. If all goals cannot be respected simultaneously then the priority order listed below shall be respected:
- (a) Maintain station service for nuclear generating facilities;
 - (b) Securing startup power for power generating plants;
 - (c) Operating generating plants isolated from ERCOT without communication;
 - (d) Restoration of service to critical Loads such as:
 - (i) Military facilities;
 - (ii) Facilities necessary to restore the electric utility system;
 - (iii) Law enforcement organizations and facilities affecting public health; and
 - (iv) Communication facilities
 - (e) Maximum utilization of ERCOT System capability;
 - (f) Utilization of Responsive Reserve (RRS) services and other Ancillary Services to the extent permitted by ERCOT System conditions;
 - (g) Utilization of the market to the fullest extent practicable without jeopardizing the reliability of the ERCOT System; and
 - (h) Restoration of service to all Customers following major system disturbances, giving priority to the larger group of Customers.

4.5.3 Implementation

- (1) ERCOT shall be responsible for monitoring system conditions, initiating the EEA levels below, notifying all Qualified Scheduling Entities (QSEs) and Transmission Operators (TOs), and coordinating the implementation of the EEA conditions while maintaining transmission security limits. QSEs and TOs will notify all the Market Participants they represent of each declared EEA level.
- (2) During the EEA, ERCOT has the authority to obtain energy from non-ERCOT Control Areas using Direct Current Tie(s) (DC Tie(s)) or by using Block Load Transfers (BLTs) to move load to non-ERCOT Control Areas. ERCOT maintains the authority to curtail energy

schedules flowing into or out of the ERCOT System across the DC Ties in accordance with North American Electric Reliability Corporation (NERC) scheduling guidelines.

- (3) ERCOT, at management's discretion, may at any time issue an ERCOT-wide appeal through the public news media for voluntary energy conservation.
- (4) There may be insufficient time to implement all levels in sequence. ERCOT may immediately implement Level 3 of the EEA any time the steady-state system frequency is below 59.8 Hz and shall immediately implement Level 3 any time the steady-state frequency is below 59.5 Hz.
- (5) Percentages for Level 3 Load shedding will be based on the previous year's TSP peak Loads, as reported to ERCOT, and will be reviewed by ERCOT and modified annually.
- (6) The ERCOT System Operator shall declare the EEA levels to be taken by QSEs and TSPs. QSEs and TSPs shall implement actions under that level (and all above if not previously accomplished) and if ordered by the ERCOT shift supervisor or his designate, shall report back to the ERCOT System Operator when the requested level has been completed.
- (7) During EEA Level 3, ERCOT must be capable of shedding sufficient firm Load to arrest frequency decay and to prevent generator tripping. The amount of firm Load to be shed may vary depending on ERCOT Transmission Grid conditions during the event. Each TSP will be capable of shedding its allocation of firm Load, without delay. The maximum time for the TSP to interrupt firm Load will depend on how much Load is to be shed and whether the Load is to be interrupted by Supervisory Control and Data Acquisition (SCADA) or by the dispatch of personnel to substations. Since the need for firm Load shed is immediate, interruption by SCADA is preferred. The following requirements apply for an ERCOT instruction to shed firm Load:
 - (a) Load interrupted by SCADA will be shed without delay and in a time period not to exceed 30 minutes;
 - (b) Load interrupted by dispatch of personnel to substations to manually shed Load will be implemented within a time period not to exceed one hour;
 - (c) The initial clock on the firm Load shed shall apply only to Load shed amounts up to 1000 MW total. Load shed amount requests exceeding 1000 MW on the initial clock may take longer to implement; and
 - (d) If, after the first Load shed instruction, ERCOT determines that an additional amount of firm Load should be shed, another clock will begin anew. The time frames mentioned above will apply.
- (8) Each TSP, or its designated agent, will provide ERCOT a status report of Load shed progress within 30 minutes of the time of ERCOT's instruction or upon ERCOT's request.

4.5.3.1 General Procedures Prior to EEA Operations

Prior to declaring EEA Level 1 detailed in Section 4.5.3.3, EEA Levels, ERCOT may perform the following operations consistent with Good Utility Practice:

- (1) Provide Dispatch Instructions to QSEs for specific Resources to operate at an Emergency Base Point to maximize Resource deployment so as to increase Responsive Reserve levels on other Resources;
- (2) Commit available Resources as necessary that can respond in the timeframe of the emergency. Such commitments will be settled using the Hourly Reliability Unit Commitment (HRUC) process;
- (3) Start Reliability Must-Run (RMR) Units available in the time frame of the emergency. RMR Units should be loaded to full capability;
- (4) Issue Dispatch Instructions to QSEs to suspend any ongoing ERCOT-required generating unit testing or Resource performance testing;
- (5) Utilize available resources providing Non-Spinning Reserve (Non-Spin) services as required; and
- (6) ERCOT shall use the Physical Responsive Capability (PRC) to determine the appropriate emergency Notification and EEA levels.

4.5.3.2 General Procedures During EEA Operations

ERCOT Control Area authority will re-emphasize the following operational practices during EEA operations to minimize non-performance issues that may result from the pressures of the emergency situation.

- (1) ERCOT shall suspend Ancillary Service obligations that it deems to be contrary to reliability needs;
- (2) ERCOT shall notify each QSE and TO via Hotline of declared EEA level;
- (3) QSEs and TOs shall notify each represented Market Participant of declared EEA level;
- (4) ERCOT, QSEs and TSPs shall continue to respect confidential market sensitive data;
- (5) QSEs shall update Resource plans to limit or remove capacity when unexpected start-up delays occur or when ramp limitations are encountered;
- (6) QSEs shall report when On-Line or available capacity is at risk due to adverse circumstances;
- (7) QSEs, TSPs, and all other Entities must not suspend efforts toward expeditious compliance with the applicable EEA level declared by ERCOT nor initiate any reversals of required actions without ERCOT authorization; and
- (8) ERCOT shall define procedures for determining the proper redistribution of reserves during EEA operations.

4.5.3.3 EEA Levels

(1) **EEA Level 1 – Maintain a sum total of 2,300 MW that results from adding the amount of ERCOT PRC MW (Protocol Section 6.5.7.5, Ancillary Services Capacity Monitor) and the amount of RRS MW which is supplied from Load Resources.**

(a) ERCOT will:

(i) Notify the Southwest Power Pool Reliability Coordinator;

(ii) Initiate manual HRUC Dispatch Instructions to Generation Resources available and off-line that can perform within the expected timeframe of the emergency; and

(iii) Use available DC Tie import capacity that is not already being used and inquire about availability of BLTs.

(b) QSEs will notify ERCOT of any Resources uncommitted but available in the timeframe of the emergency.

(2) **Level 2A – Maintain a sum total of 1,750 MW that results from adding the amount of ERCOT PRC MW (Protocol Section 6.5.7.5) and the amount of RRS MW which is supplied from Load Resources.**

(a) In addition to measures associated with Level 1, ERCOT:

(i) Will instruct TSPs and Distribution Service Providers (DSPs) or their agents to reduce Customers' Load by using distribution voltage reduction measures, if deemed beneficial by the TSP or DSP;

(ii) Will instruct QSEs to deploy all RRS that is supplied from Load Resources (controlled by high-set under-frequency relays) in accordance with the following:

(A) Instruct QSEs to deploy half of the RRS that is supplied from Load Resources (controlled by high-set under-frequency relays) by instructing the QSE representing the specific Load Resource to interrupt Group 1 Load Resources providing RRS. QSEs shall deploy Load Resources according to the group designation and will be given some discretion to deploy additional Load Resources from Group 2 if Load Resource operational considerations require such. ERCOT shall issue notification of the deployment via XML message. ERCOT shall follow this XML notification with a Hotline Verbal Dispatch Instruction (VDI), which shall initiate the ten-minute deployment period;

(B) At the discretion of the ERCOT Operator, instruct QSEs to deploy the remaining RRS that is supplied from Load Resources (controlled by high-set under-frequency relays) by instructing the QSE representing the specific Load Resource to interrupt Group 2 Load Resources providing RRS. ERCOT shall issue notification of the deployment

via XML message. ERCOT shall follow this XML notification with a Hotline VDI, which shall initiate the ten-minute deployment period;

- (C) The ERCOT Operator may deploy both of the groups of Load Resources providing RRS at the same time. ERCOT shall issue notification of the deployment via XML message. ERCOT shall follow this XML notification with a Hotline VDI, which shall initiate the ten-minute deployment period; and
 - (D) ERCOT shall post a list of Load Resources on the Market Information System (MIS) Certified Area immediately following the Day-Ahead Reliability Unit Commitment (DRUC) for each QSE with a Load Resource obligation which may be deployed to interrupt under paragraph (A), Group 1 and paragraph (B), Group 2. ERCOT shall develop a process for determining which individual Load Resource to place in Group 1 and which to place in Group 2. ERCOT procedures shall select Group 1 and Group 2 based on a random sampling of individual Load Resources. At ERCOT's discretion, ERCOT may deploy all Load Resources at any given time during EEA Level 2A; and
- (iii) With approval of the affected non-ERCOT Control Area, may instruct TSPs or DSPs or their agents to implement BLTs, which transfer Load from the ERCOT Control Area to non-ERCOT Control Areas. Use of BLT will be defined in these Operating Guides.
- (b) Confidentiality requirements regarding transmission operations and system capacity information will be lifted, as needed to restore reliability.
- (3) **Level 2B – Maintain System frequency at 60 Hz. Following deployment of the measures associated with EEA Levels 1 and 2A, ERCOT will deploy available contracted Emergency Interruptible Load Service (EILS) Loads, via a single VDI to the all-QSE Hotline; as follows:**
- (a) If less than 500 MW of EILS is available for deployment, ERCOT shall deploy all EILS Loads as a single block.
 - (b) If the amount of EILS available for deployment equals or exceeds 500 MW, ERCOT may deploy EILS Loads as a single block or may deploy EILS Loads sequentially in two groups of approximately equal size as designated by ERCOT. For a sequential group deployment, ERCOT shall instruct QSEs to deploy Group 1 immediately and to deploy Group 2 at a specified time in the future. ERCOT shall develop a random selection methodology for determining which individual EILS Loads to place in Group 1 and which to place in Group 2, and shall describe the methodology in a document posted to the MIS Public Area. Prior to an EILS Contract Period, ERCOT shall notify QSEs representing EILS Loads of their EILS Loads' Group assignments.
 - (c) QSEs shall instruct the EILS Loads to curtail Load consistent with their commitments.

- (d) EILS may be deployed at any time in a Settlement Interval.
- (e) Once ERCOT has deployed EILS, EILS Loads shall remain reduced until ERCOT specifically releases the EILS deployment via a VDI to the all-QSE Hotline.
- (f) Unless scheduled to go Off-Line, due either to an EILS Time Period transition or a previously scheduled period of unavailability, an EILS Load deployed for EILS shall return to its committed operating level as soon as practical following an ERCOT recall. All EILS Load shall return to normal within ten hours of being recalled.
- (g) Unless a media appeal is already in effect, ERCOT shall issue an appeal through the public news media for voluntary energy conservation.
- (4) **EEA Level 3 - Maintain System frequency at 59.8 Hz or greater.**
- (a) In addition to measures associated with EEA Levels 1, 2A, and 2B, ERCOT shall direct all TSPs and DSPs or their agents to shed firm load, in 100 MW blocks, distributed as documented in these Operating Guides in order to maintain a steady state system frequency of 59.8 Hz.
- (b) In addition to measures under EEA Levels 1 2A, and 2B, TSPs and DSPs will keep in mind the need to protect the safety and health of the community and the essential human needs of the citizens. Whenever possible, TSPs and DSPs shall not manually drop load connected to under-frequency relays during the implementation of the EEA;

4.5.3.4 Load Shed Obligation

Obligation for Load shed is by DSP. Load shedding obligations need to be represented by an Entity with 24x7 operations and Hotline communications with ERCOT and control over breakers. Percentages for Level 3 Load shedding will be based on the previous year's TSP peak Loads, as reported to ERCOT, and will be reviewed by ERCOT and modified annually. (Use TOs as list of Entities)

ERCOT Load Shed Table

Transmission Operator	2009 Total Transmission Operator Load (MW)
American Electric Power	9.33
Austin Energy	3.96
Brazos Electric Power Cooperative	4.62
CenterPoint Energy	26.56
City of Bryan	0.57
City of College Station	0.29
City of Denton	0.49
City of Garland	0.74
CPS Energy	7.34

Greenville Electric Utility Service	0.17
Lower Colorado River Authority	5.21
Magic Valley Electric Cooperative	0.65
Oncor	35.55
Public Utility Board of Brownsville	0.43
Rayburn Country Electric Cooperative	0.93
South Texas Electric Coop-Medina Electric Coop	0.67
Texas New Mexico Power	2.35
Tex-La	0.14
ERCOT Total	100.00

4.5.3.5 EEA Termination

- (1) ERCOT shall:
 - (a) Continue EEA until sufficient Resources are available to ERCOT to eliminate the shortfall and restore adequate reserves;
 - (b) Restore full reserve requirements (normally 2300 MW);
 - (c) Terminate the levels in reverse order, where practical;
 - (d) Notify each QSE and TO of EEA level termination; and
 - (e) Maintain a stable ERCOT System frequency when restoring Load.
- (2) QSEs and TOs shall:
 - (a) Implement actions to terminate previous actions as EEA levels are released in accordance with these Operating Guides;
 - (b) Notify represented Market Participants of EEA levels changes;
 - (c) Report back to the ERCOT System Operator when each level is accomplished; and
 - (d) Loads will be restored when specifically authorized by the ERCOT.

4.6 Black Start Service

- (1) This section provides general guidelines to be followed in the event of a partial or complete collapse of the ERCOT System. Timely implementation of a restoration plan compiled according to these Operating Guides should facilitate coordination between ERCOT, Qualified Scheduling Entities (QSEs), Resource Entities, and Transmission Operators (TOs) and ensure restoration of service to the ERCOT System at the earliest possible time. Those QSEs representing contracted Black Start Resources will provide ERCOT with the

individual plant start-up procedures for coordination of their activities with those of the appropriate TO.

- (2) Pre-established plans and procedures cannot foresee all the possible combinations of system problems that may occur after a major failure. It is the responsibility of ERCOT to restore the system to normal, applying the principles, strategies, and priorities outlined in the ERCOT Black Start Plan.

4.6.1 Principles

- (1) In order to minimize the time required, ERCOT will develop the Black Start Plan to utilize the principles, strategies, and priorities outlined in this Guide. The ERCOT Black Start Plan shall be coordinated with local TO Black Start plans, to provide a coordinated Black Start reference.
- (2) ERCOT shall establish and maintain a system Black Start capability plan that shall be coordinated, as appropriate, with the Black Start capability plans of neighboring regions. Documentation of system Black Start capability plans shall be provided to the North American Electric Reliability Corporation (NERC) on request.
- (3) Each contracted Black Start Resource and each QSE with contracted Black Start Resource(s) will have readily accessible and sufficiently detailed current operating procedures to assist in an orderly recovery.
- (4) Mutual assistance and cooperation will be essential during the restoration. Deliberate, careful action by each QSE, TO, and Resource Entity is necessary to minimize the length of time required for restoration and to avoid the reoccurrence of a partial or complete system collapse.
- (5) Throughout the restoration, recovery will depend on ERCOT receiving an accurate assessment of system conditions and status from each QSE, TO, and Resource Entity throughout the restoration. Adequate and reliable communications must be available within the ERCOT System. During Black Start recovery, communication restrictions are lifted to enable the sharing of that information that pertains to reliability including status information and recovery activities.

4.6.2 Strategies

In the event of a partial or complete system blackout, immediate steps must be taken to return the interconnected network to normal as quickly as possible. For detailed Black Start information, refer to Section 8, Attachment A, Detailed Black Start Information.

- (1) Each TO shall immediately initiate its portion of the ERCOT Black Start Plan and attempt to establish contact with ERCOT. If communications with ERCOT are unavailable the TO shall immediately establish communications with its interconnected Black Start Resource(s) and the Black Start Resource's QSE.

- (2) Each QSE with representing Black Start Resources should initiate communications with its Black Start Resources and immediately notify ERCOT and the appropriate TO of their condition and status.
- (3) Available Black Start Resources should immediately start their isolation and startup procedures and attempt to establish communications with the local TO.
- (4) As generating and transmission capabilities become available, systematic restoration of ERCOT Load with respect to priorities should begin in accordance with the local TO Black Start plans, taking care to balance Load and generating capability while maintaining an acceptable frequency.
- (5) Appropriate voltage levels and reactive control must be maintained during the restoration. Consideration should be given to connecting islands at locations having communications, frequency control, voltage control, synchronization facilities, and adequate transmission capacity. ERCOT will coordinate the return to full Automatic Generation Control (AGC) in the interconnection.

4.6.3 ***Priorities***

Priorities for an ERCOT System Black Start recovery are listed below:

- (1) Secure and/or stabilize generating units where necessary.
- (2) Prepare transmission corridors as necessary to support restoration.
- (3) Assess ERCOT System condition, and available communication facilities.
- (4) Restore and maintain communication facilities to the extent possible.
- (5) Bring units with contracted Black Start capability On-Line.
- (6) Provide service to critical facilities:
 - (a) Provide station service for nuclear generating facilities;
 - (b) Provide critical power to as many power plants as possible to prevent equipment damage;
 - (c) Secure or provide startup power for generating plants that do not have Black Start capability; and
 - (d) Supply station service to critical substations where necessary.
- (7) Connect islands at designated synchronization points taking care to avoid recurrence of a partial or complete system collapse.
- (8) Restore service to critical Loads such as:
 - (a) Military facilities;

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- (b) Facilities necessary to restore the electric utility system, including fuel sources;
 - (c) Law enforcement organizations and facilities affecting public health; and
 - (d) Public communication facilities.
- (9) Restore service to the remaining Customers. Attention should be given to restoring feeders with under-frequency relay protection.

4.6.4 Responsibilities

- (1) ERCOT's responsibilities are as follows:
- (a) Shall maintain a Black Start plan in accordance with NERC Reliability Standards;
 - (b) Coordinate and approve Planned Outage schedule for contracted Black Start Generation Resources;
 - (c) Train QSE, TO, Resource Entity, and Market Participant personnel in the implementation and use of the Black Start plan;
 - (d) Will review the plans and procedures for consistency and conformance with these Operating Guides and ensure that they are updated at least annually;
 - (e) Will make annual reports during the first quarter to the Reliability and Operations Subcommittee (ROS) of plan review and any testing activities of Black Start Generation Resources;
 - (f) Shall verify that the number, size, and location of system Black Start Generation Resources are sufficient to meet system restoration plan expectations; and
 - (g) In the event of an ERCOT System collapse, ERCOT will:
 - (i) Maintain continuous surveillance of the status of the ERCOT System;
 - (ii) Act as a central information collection and dissemination point for the ERCOT Region;
 - (iii) Coordinate reconnection of transmission;
 - (iv) Direct assistance for QSEs, TOs, Resource Entities, and Market Participants;
 - (v) Direct the distribution of reserve;
 - (vi) Coordinate the return of the ERCOT System to AGC.
- (2) TOs' responsibilities are as follows:
- (a) Shall maintain a local Black Start plan which coordinates with the ERCOT Black Start Plan; and

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- (b) In event of an ERCOT or wide area blackout:
 - (i) Shall communicate with local Black Start units and the Black Start unit's QSE;
 - (ii) Coordinate switching to next start units and local Load;
 - (iii) Shall implement its local Black Start plan;
 - (iv) Shall follow the direction of ERCOT on behalf of represented TSPs and DSPs;
 - (v) Shall act as the regional ERCOT representative in coordinating interconnection of units; and
 - (vi) Shall follow the direction of ERCOT for reconnection of islands.
 - (3) QSEs', Resource Entities', and Market Participants' responsibilities are as follows:
 - (a) Shall use the ERCOT and local TO Black Start plan;
 - (b) Verify that associated personnel are proficient in its implementation and use; and
 - (c) In the event of an ERCOT System collapse, the QSEs, Resource Entities, and Market Participants will:
 - (i) Take immediate steps to initiate the local Black Start plan;
 - (ii) Supply ERCOT and/or the local TO with information on the status of generation, fuel, transmission, and communication facilities;
 - (iii) Follow the direction of the local TO or ERCOT in picking up local Load and starting next units; and
 - (iv) Provide available assistance as directed by ERCOT or the local TO.
 - (4) Section 8, Attachment A, Detailed Black Start Information, provides a detailed and specific Black Start information guide. Interested parties should use this information for technical reference material, Black Start testing, development of Black Start plans, and training of personnel.

4.6.5 Black Start Emergency Back Up Communication Facilities Criteria

- (1) All back-up communications systems shall meet the following minimum requirements:
 - (a) Be operational for 72 hours immediately following the start of a blackout without external power from the ERCOT System;
 - (b) Provide direct voice communications between Black Start Resource and TO, TO and other appropriate TOs, and TO and ERCOT; and

- (c) Maintain written procedures that address operator training and the testing of the communication system;
- (2) TOs shall have a satellite phone that meets the minimum back up communication requirements as a back up communication system and that is compatible with ERCOT's satellite phone.