**ERCOT Nodal Operating Guides**

**Section 3: ERCOT and Market Participant Responsibilities**

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# ERCOT and market participant responsibilities

3.1 System Control Interfaces with ERCOT

3.1.1 Introduction

(1) This section defines the specific responsibilities between Qualified Scheduling Entities (QSEs) and Transmission Service Providers (TSPs) to support ERCOT in the security and reliability of the ERCOT System. Resource Entities may communicate directly with ERCOT under emergency and specific scheduling activities. All other Entities operating in ERCOT shall communicate with their appropriate QSE or TSP.

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| ***[NOGRR177: Replace paragraph (1) above with the following upon system implementation of NPRR857:]***  (1) This section defines the specific responsibilities of Qualified Scheduling Entities (QSEs), Transmission Service Providers (TSPs), and Direct Current Tie Operators (DCTOs) to support ERCOT in the security and reliability of the ERCOT System. Resource Entities may communicate directly with ERCOT under emergency and specific scheduling activities. All other Entities operating in ERCOT shall communicate with their appropriate QSE or TSP. |

3.1.2 Compliance with Dispatch Instructions

(1) Each QSE and Transmission Operator (TO) within the ERCOT System shall comply fully and promptly with valid Dispatch Instructions as specified in Protocol Section 6.5.7.9, Compliance with Dispatch Instructions.

3.1.3 Dispatch Instructions

(1) The following section applies only to Dispatch Instructions issued for Real-Time operations intended to change or preserve the state, status, output, or input of an element or facility of the ERCOT System.

(a) The following actions shall be taken by ERCOT and Market Participants upon the issuance and receipt of a Verbal Dispatch Instruction (VDI).

(i) When issuing a VDI, ERCOT shall take one of the following actions:

(A) Confirm the Market Participant’s response if the repeated VDI is correct;

(B) Reissue the VDI if the repeated VDI is incorrect or requested by the Market Participant; or

(C) Reissue the VDI or take an alternative action if the VDI was not understood by the Market Participant.

(ii) Each QSE, when re-issuing the ERCOT VDI to the appropriate Resource, shall take one of the following actions:

(A) Confirm the Resource’s response if the repeated VDI is correct;

(B) Reissue the VDI if the repeated VDI is incorrect or requested by the Resource; or

(C) Coordinate an alternative action, as required in the ERCOT Protocols, with ERCOT if a response is not received or if the VDI was not understood by the Resource.

(iii) Each TO, when re-issuing the ERCOT VDI to the appropriate Distribution Service Provider (DSP) or Resource, shall take one of the following actions:

(A) Confirm the DSP’s or Resource’s response if the repeated VDI is correct;

(B) Reissue the VDI if the repeated VDI is incorrect or requested by the DSP or Resource; or

(C) Coordinate an alternative action with ERCOT, as required in the ERCOT Protocols, if a response is not received or if the VDI was not understood by the DSP or Resource.

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| ***[NOGRR177: Replace paragraph (iii) above with the following upon system implementation of NPRR857:]***  (iii) Each TO, when re-issuing the ERCOT VDI to the appropriate Distribution Service Provider (DSP), DCTO, or Resource, shall take one of the following actions:  (A) Confirm the DSP’s, DCTO’s, or Resource’s response if the repeated VDI is correct;  (B) Reissue the VDI if the repeated VDI is incorrect or requested by the DSP, DCTO, or Resource; or  (C) Coordinate an alternative action with ERCOT, as required in the ERCOT Protocols, if a response is not received or if the VDI was not understood by the DSP, DCTO, or Resource. |

(b) After receipt of the VDI, the receiving Market Participant shall take one of the following actions:

(i) Repeat, not necessarily verbatim, the VDI and receive confirmation that the response was correct; or

(ii) Request that the VDI be reissued.

(c) When ERCOT initiates a Hotline VDI, ERCOT shall confirm that the VDI was received by at least one Market Participant on the Hotline call.

(d) When issuing or re-issuing a Dispatch Instruction, ERCOT, QSEs, and TOs shall specify the time using a 24-hour clock in Central Prevailing Time (CPT) if the Dispatch Instruction is not to be acted upon immediately.

(e) When issuing or re-issuing a Dispatch Instruction for Transmission Elements and Transmission Facilities, ERCOT, QSEs, and TOs shall utilize the nomenclature specified in the ERCOT Network Operations Model.

3.2 Qualified Scheduling Entities

3.2.1 Operating Obligations

(1) Qualified Scheduling Entities (QSEs) that are Wide Area Network (WAN) Participants shall maintain a control or operations center with qualified personnel with the authority to commit and bind the QSE, as described in Protocol Section 16.2, Registration and Qualification of Qualified Scheduling Entities. QSEs shall communicate with ERCOT for the purpose of meeting their obligations specified in the Protocols and these Operating Guides. Each QSE shall designate an Authorized Representative as defined in Protocol Section 2.1, Definitions.

(2) QSEs that are WAN Participants shall submit to ERCOT, by March 15 of each year, a written back-up control plan to continue operation of the control or operations center in the event the QSE’s control or operations center becomes inoperable. Back-up control plans shall be submitted to ERCOT via secured webmail or encrypted data transfer. QSEs shall request that a secure email account be created with ERCOT by sending an email to [shiftsupervisors@ercot.com](mailto:shiftsupervisors@ercot.com).

(3) Each back-up control plan shall be reviewed and updated annually and shall include as a minimum, the following:

(a) Description of actions to be taken by QSE personnel to avoid placing a prolonged burden on ERCOT and other Market Participants, while operating in back-up control mode;

(b) Description of specific functions and responsibilities to be performed to continue operations from an alternate location;

(c) Procedures and responsibilities for maintaining basic voice communications capabilities with ERCOT; and

(d) Procedures for back-up control function testing and the training of personnel.

(4) As an option, the back-up control plan may include arrangements made with another Entity to provide the minimum back-up control functions in the event the QSE’s primary functions are interrupted.

(5) For connectivity requirements for back-up sites, refer to Section 7, Telemetry and Communication.

3.2.2 Changes in Resource Status

(1) QSEs shall verbally notify ERCOT of unplanned changes in the status of a Resource as soon as practicable following the event as referenced in Protocol Section 6.5.5.1, Changes in Resource Status.

(2) QSEs shall verbally notify ERCOT and/or Transmission Service Provider (TSP) of equipment changes that affect the reactive capability of an operating Generation Resource or Energy Storage Resource (ESR).

(3) QSEs shall submit a Current Operating Plan (COP) in accordance with Protocol Section 3.9, Current Operating Plan (COP).

3.2.3 Regulatory Required Incident and Disturbance Reports

(1) In the event of a system incident or disturbance, as described by North American Electric Reliability Corporation (NERC) and the Department of Energy (DOE), QSEs, and TSPs or their Designated Agents shall provide required reports to ERCOT, the DOE and/or NERC. Types of incidents or disturbances which may trigger these reporting requirements are:

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| ***[NOGRR177: Replace paragraph (1) above with the following upon system implementation of NPRR857:]***  (1) In the event of a system incident or disturbance, as described by North American Electric Reliability Corporation (NERC) and the Department of Energy (DOE), QSEs, TSPs, and Direct Current Tie Operators (DCTOs), or their Designated Agents, shall provide required reports to ERCOT, the DOE and/or NERC. Types of incidents or disturbances which may trigger these reporting requirements are: |

(a) Uncontrolled loss of Load;

(b) Load shed events;

(c) Public appeal for reduced use of electricity;

(d) Actual or suspected attacks on the transmission system;

(e) Vandalism;

(f) Actual or suspected cyber attacks;

(g) Fuel supply emergencies;

(h) Loss of electric service to large customers;

(i) Loss of bulk transmission component that significantly reduces integrity of the transmission system;

(j) Islanding of transmission system;

(k) Sustained voltage excursions;

(l) Major damage to power system components; and

(m) Failure, degradation or misoperation of Remedial Action Schemes (RASs) or other operating systems.

(2) Full descriptions of the DOE and NERC reports are available on their respective websites.

3.2.4 Ancillary Service Qualification and Testing Program

(1) Resources designated to provide Ancillary Services must qualify with ERCOT prior to participation in the Ancillary Service market.

(2) ERCOT shall reject offers to provide Ancillary Services received from an unqualified Resource and shall notify the appropriate QSE that the Resource is not qualified.

(3) ERCOT, at its sole discretion, may provisionally qualify Load Resources to provide Ancillary Services, without completion of a qualification test, for 90 days.

(4) ERCOT shall evaluate the actual performance of all Resources providing Ancillary Services in accordance with Protocol Section 8, Performance Monitoring. ERCOT shall notify the QSE of a Resource failing to meet the performance requirements as specified in Protocol Section 8. A Resource failing to meet the performance requirements for two consecutive months shall be required to develop and implement a corrective action plan to address its failure as specified in Protocol Section 8.4, ERCOT Response to Market Non-Performance.

(5) ERCOT shall, in accordance with Protocol Section 8.4, revoke the qualification to provide Ancillary Services for any Resource failing an Ancillary Service performance standard for four consecutive months.

(6) Any Resource with a revoked Ancillary Service qualification may be re-tested at the sole discretion of ERCOT only after demonstrating and implementing a corrective action plan as described in Protocol Section 8.4.

3.3 Resource Entities

(1) The operation of a Generation Resource and Energy Storage Resource (ESR) shall conform to the requirements of the Protocols, North American Electric Reliability Corporation (NERC) Reliability Standards and these Operating Guides. As prescribed in Protocol Sections, 3.7.1.1, Generation Resource Parameters, 3.7.1.2, Load Resource Parameters, 3.7.1.3, Energy Storage Resource Parameters, and 3.10.7.2, Modeling of Resources and Transmission Loads, the Qualified Scheduling Entities (QSEs) and Resource Entities shall provide ERCOT and the Transmission Service Provider (TSP) with modeling information describing each Generation Resource, ESR, and Load Resource.

(2) As prescribed in Protocol Section 3.10.7.1.4, Transmission, Main Power Transformers (MPTs) and Generation Resource Step-Up Transformers, Resource Entities will provide information on these transformers to TSPs.

(3) As prescribed in Protocol Sections 3.10.7.5, Telemetry Requirements, 6.5.5.2, Operational Data Requirements, and 8, Performance Monitoring, the QSE reporting for a Resource Entity shall provide operational information for generation facilities greater than 10 MW.

(4) At a minimum, a Resource Entity shall notify ERCOT and the QSE of the following:

(a) 60 days prior to implementation of any planned equipment changes that affect the reactive capability of an operating Generation Resource or ESR.

(b) Any such changes that decrease the reactive capability of the Generation Resource or ESR below the required level and changes that decrease the voltage ride-through capability of the Resource must be approved by ERCOT prior to implementation;

(c) As soon as practicable when high reactive loading or reactive oscillations on Generation Resources or ESRs are observed; and

(d) As soon as practicable when a Generation Resource or ESR trips Off-Line due to voltage or reactive problems.

(5) When scheduled to ERCOT, Resource Entities shall be staffed or monitored 24x7, by personnel capable of making operating decisions. Each Resource Entity shall designate an Authorized Representative as defined in Protocol Section 2.1, Definitions. This applies to all:

(a) Generation Resources or ESR greater than 10 MW; and

(b) Load Resources.

(6) The Resource Entity shall implement the following in a reliable and safe manner and in accordance with the switching procedure of the directly connected TSP:

(a) Synchronizing of the generation to the ERCOT System; and

(b) Transmission switchyard switching or clearances.

(7) Any Resource or Customer-owned switching device that can interrupt flow through network transmission equipment, 60 kV or greater in nominal voltage, must have an agreement with the Transmission Operator (TO) to schedule Outages on, and perform emergency switching of, the device.

(8) The Generation Resource or ESR specifically licensed by a federal regulatory agency shall, through its QSE representative, provide any applicable grid interconnection and performance licensing requirements to ERCOT and the TSP to which the licensee is connected.

(9) The TSP is obligated to incorporate any such licensing requirements into its planning and operations, and ERCOT shall support such requirements. Both ERCOT and the TSP will create necessary procedures for satisfying these requirements. Such procedures will include provisions to notify the facility licensee through its QSE of any requirements that cannot be satisfied.

(10) Any proposal for revision of this Operating Guide and the procedures incorporating the licensee requirements that would diminish the obligation or ability of ERCOT or the TSP to support these requirements shall be provided to the licensee through its QSE to afford it an opportunity for review and response. Any such proposal that is approved, as a result of which the licensee is required to implement changes to meet its license requirements or to seek amendment to its license, shall become effective no sooner than six months following the approval.

(11) Resource Entities must provide Resource-owned Transmission Elements data requirements as prescribed in Protocol Section 3.10.7, ERCOT System Modeling Requirements. Additional distribution voltage level devices and connectivity may be required as well to adequately represent the modeling of the Resource within ERCOT computer systems.

3.3.1 Unit Capability Requirements

(1) In the event that a QSE fails to meet Protocol Section 8.1.1.2, General Capacity Testing Requirements, which requires Seasonal unit capability reporting and testing, ERCOT shall provide this QSE with Notice of its failure to meet the Protocols. This Notice shall be sent to the primary contact of the QSE representing the Generation Resource or ESR via email. In addition to this written Notice, ERCOT shall make a reasonable effort to notify the QSE via telephone.

(2) ERCOT shall allow the QSE three days to correct the omission by submitting ERCOT approved test results. If the Resource in question is operated during these three days, and no test results are provided to ERCOT, then the QSE shall be disqualified from provision of Ancillary Services.

(3) If the Resource is not operated and included in a QSE Current Operating Plan (COP) after the notification of the Protocol violation, then ERCOT shall not disqualify the Ancillary Service provider unless or until the Resource is operated and included in the COP that might be depended upon for Ancillary Services.

3.3.2 Unit Reactive Capability Requirements

#### 3.3.2.1 Corrected Unit Reactive Limits (CURL)

(1) A reactive capability curve and associated data for each unit on the ERCOT System shall be submitted to ERCOT through the Market Information System (MIS) Certified Area and must contain the most limiting elements for the leading and lagging reactive output. The limiting factors such as under-excitation limiters, over-excitation limiters, ambient temperature limitations across the MW range of the unit at the unit terminals or any other factor that limits the reactive output of the unit and is verifiable through engineering calculations or testing shall be updated and provided on the corrected reactive capability curve. The corrected reactive capability curve establishes the Corrected Unit Reactive Limits (CURL) at the unit terminals that ERCOT Planning and ERCOT Operations, and TSPs will use for their studies. For Intermittent Renewable Resources (IRRs) the CURL data shall be reported at the low side of the MPT. Resources will provide these updated curves and associated test data to ERCOT by submitting test information to the Net Dependable Capability and Reactive Capability (NDCRC) application located on the MIS Secure Area. Once approved by ERCOT per Section 3.5, ERCOT Implementation, Resources will provide updated data by submitting changes to the appropriate ERCOT Resource Registration information in accordance with Planning Guide Section 6.8, Resource Registration Procedures. Prior to including the submitted data into the Network Operations Model, ERCOT will notify the TSP to which the Resource Entity is interconnected that the test data is posted on the MIS Secure Area. ERCOT and TSPs may review the data and provide any comments within ten Business Days. ERCOT will include these changes in the future Network Operations Model and forward the changes to the TSPs and the Steady State Working Group (SSWG) for use in their studies. The CURL should be available in the Resource Entities’ control room where the tests are conducted and at the QSE’s Real-Time generation dispatch desk. During any test, the Generation Resource must maintain its generator cooling system at normal operating conditions, the Automatic Voltage Regulator (AVR) in service and all auxiliary equipment in service that is needed for expected normal operation.

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| NOGRR204: Replace Section 3.3.2.1 above with the following upon system implementation of NPRR989:]  3.3.2.1 Corrected Unit Reactive Limits (CURL)  (1) A reactive capability curve and associated data for each unit on the ERCOT System shall be submitted to ERCOT through the Market Information System (MIS) Certified Area and must contain the most limiting elements for the leading and lagging reactive output. The limiting factors such as under-excitation limiters, over-excitation limiters, ambient temperature limitations across the MW range of the unit at the unit terminals or any other factor that limits the reactive output of the unit and is verifiable through engineering calculations or testing shall be updated and provided on the corrected reactive capability curve. The corrected reactive capability curve establishes the Corrected Unit Reactive Limits (CURL) at the unit terminals that ERCOT Planning and ERCOT Operations, and TSPs will use for their studies. For Intermittent Renewable Resources (IRRs) the CURL data shall be reported at the low side of the MPT. Resources will provide these updated curves and associated test data to ERCOT by submitting test information to the Net Dependable Capability and Reactive Capability (NDCRC) application located on the MIS Secure Area. Once approved by ERCOT per Section 3.5, ERCOT Implementation, Resources will provide updated data by submitting changes to the appropriate ERCOT Resource Registration information in accordance with Planning Guide Section 6.8, Resource Registration Procedures. Prior to including the submitted data into the Network Operations Model, ERCOT will notify the TSP to which the Resource Entity is interconnected that the test data is posted on the MIS Secure Area. ERCOT and TSPs may review the data and provide any comments within ten Business Days. ERCOT will include these changes in the future Network Operations Model and forward the changes to the TSPs and the Steady State Working Group (SSWG) for use in their studies. The CURL should be available in the Resource Entities’ control room where the tests are conducted and at the QSE’s Real-Time generation dispatch desk. During any test, the Generation Resource or ESR must maintain its generator cooling system at normal operating conditions, the Automatic Voltage Regulator (AVR) in service and all auxiliary equipment in service that is needed for expected normal operation. |

3.3.2.2 Reactive Testing Requirements

(1) Reactive testing may be performed as either “Coordinated,” or “Non-Coordinated,” the difference being the amount of notification provided to ERCOT and the TO, and level of their involvement in testing.

(a) Coordinated Testing

(i) Coordinated testing is the preferred method for new or larger-capacity units, as it provides a greater amount of coordination with ERCOT and the TO, allowing testing impacts and any potential adjustments to local voltage levels to be studied in advance.

(ii) The Resource Entity requesting a Coordinated test must submit a test request to ERCOT and the TO via their QSE, by no later than 15:00, one day prior to the proposed test date. ERCOT and the TO then have until 17:00 of the day prior to the proposed test date, to either approve or disapprove the test request.

(iii) Both ERCOT and the TO have the right to deny or cancel a test at any time, if they feel that system reliability may be adversely impacted by the test.

(iv) The test requests should contain the proposed time and date of the test, type of test (leading or lagging), expected unit MW and MVAr output range during the test, and a copy of the reactive capability curve.

(b) Non-Coordinated Testing

(i) The Resource Entity representing the resource requesting a Non-Coordinated test must inform ERCOT and the TO via their QSE at least two hours prior to the proposed start of the test.

(ii) Both ERCOT and the TO have the right to deny or cancel a test at any time, if they feel that system reliability may be adversely impacted by the test.

(2) Lagging Reactive Testing

(a) It is recommended, but not required, that lagging reactive tests be performed when system voltage is within the voltage profile, such as during high load periods.

(b) Lagging tests should meet the following performance criteria:

(i) Lagging Test 1: Test at or above 95% of the unit’s High Sustained Limit (HSL) for at least 15 minutes. IRRs should test at or above 60% of their HSL. Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.

(ii) Lagging Test 2: Test at the unit’s HSL for at least one hour. IRRs should test with at least 90% of photovoltaic inverters or wind turbines on-line. Testing acceptance criteria is met if the unit achieved at least 50% of the units CURL for one hour.

(iii) Lagging Test 3: Test at the unit’s normally expected minimum real power output during system light load conditions for at least one minute. IRRs and nuclear units are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.

(3) Leading Reactive Testing

(a) It is recommended, but not required, that leading reactive tests be performed when system voltage is within the voltage profile, such as during low load periods.

(b) Leading tests should meet the following performance criteria:

(i) Leading Test 1: Test at the unit’s normally expected maximum real power output during system light load conditions for at least 15 minutes. IRRs should test at or below 60% of their HSL. Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s original manufacturer reactive curve or most recent CURL.

(ii) Leading Test 2: Test at the unit’s HSL for at least one minute. IRR units are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.

(iii) Leading Test 3: Test at the unit’s normally expected minimum real power output during system light load conditions for at least one minute. IRRs and nuclear units are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.

(4) The Resource Entity shall measure the tested reactive capability on the generator output terminals for non-IRR Generation Resources. The value recorded shall represent the gross MVAr output of the Generation Resource. Additionally, the net reactive capability shall be measured at the high side of the GSU transformer and at the POIB, if metering is available. The high side values shall have the Generation Resource’s auxiliary reactive consumption and the GSU losses deducted from the Generation Resource’s gross reactive output. The POIB values shall have the plant’s auxiliary load and any additional load deducted from the Generation Resource’s gross reactive output. If metering is not available at the high side, the Resource Entity shall calculate the reactive capability at the high side and at the POIB. These values are required and must be submitted through the MIS Certified Area. CURLs shall be attached to the test results submitted, and shall be clearly defined. All applicable test data shall be submitted on the form in the NDCRC application.

(5) The QSE representing a Generation Resource shall be responsible for scheduling reactive verification tests when requested by the Resource Entity in accordance with the conditions outlined above. If ERCOT does not issue a specific request for a Generation Resource reactive capability verification, the Generation Resource shall complete a reactive verification test at least every five years.

(6) ERCOT shall have the option to waive the requirement to perform Leading Test 1 for any Generation Resource that seldom runs during such light Load periods. The granting of such a waiver shall be effective for five years.

(7) The Resource Entity representing a Generation Resource shall be responsible for the timely and accurate reporting of test results to ERCOT and to the QSE representing the Generation Resource. The Resource Entity representing a Generation Resource must properly complete all required data fields in the NDCRC application for a test to be considered valid.

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| [NOGRR204: Replace Section 3.3.2.2 above with the following upon system implementation of NPRR989:]  **3.3.2.2 Reactive Testing Requirements**  (1) Reactive testing may be performed as either “Coordinated,” or “Non-Coordinated,” the difference being the amount of notification provided to ERCOT and the TO, and level of their involvement in testing.  (a) Coordinated Testing  (i) Coordinated testing is the preferred method for new or larger-capacity units, as it provides a greater amount of coordination with ERCOT and the TO, allowing testing impacts and any potential adjustments to local voltage levels to be studied in advance.  (ii) The Resource Entity requesting a Coordinated test must submit a test request to ERCOT and the TO via their QSE, by no later than 15:00, one day prior to the proposed test date. ERCOT and the TO then have until 17:00 of the day prior to the proposed test date, to either approve or disapprove the test request.  (iii) Both ERCOT and the TO have the right to deny or cancel a test at any time, if they feel that system reliability may be adversely impacted by the test.  (iv) The test requests should contain the proposed time and date of the test, type of test (leading or lagging), expected unit MW and MVAr output range during the test, and a copy of the reactive capability curve.  (b) Non-Coordinated Testing  (i) The Resource Entity representing the resource requesting a Non-Coordinated test must inform ERCOT and the TO via their QSE at least two hours prior to the proposed start of the test.  (ii) Both ERCOT and the TO have the right to deny or cancel a test at any time, if they feel that system reliability may be adversely impacted by the test.  (2) Lagging Reactive Testing  (a) It is recommended, but not required, that lagging reactive tests be performed when system voltage is within the voltage profile, such as during high load periods.  (b) For Generation Resources, lagging tests should meet the following performance criteria:  (i) Lagging Test 1: Test at or above 95% of the unit’s High Sustained Limit (HSL) for at least 15 minutes. IRRs should test at or above 60% of their HSL. Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.  (ii) Lagging Test 2: Test at the unit’s HSL for at least one hour. IRRs should test with at least 90% of photovoltaic inverters or wind turbines on-line. Testing acceptance criteria is met if the unit achieved at least 50% of the units CURL for one hour.  (iii) Lagging Test 3: Test at the unit’s normally expected minimum real power output during system light load conditions for at least one minute. IRRs, ESRs, and nuclear units are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.  (c) For inverter-based ESRs, lagging tests should meet the following performance criteria:  (i) Lagging Test 1a: Test at or above 95% the unit’s Maximum Operating Discharge Power Limit for at least 15 minutes or entire duration if less than 15 minutes.  Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.  (ii) Lagging Test 1b: Test at or above 95% of the unit’s Maximum Operating Charge Power Limit for at least 15 minutes or entire duration if less than 15 minutes.  Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.  (iii) Lagging Test 2: Test with at least 90% of the ESR’s inverters On-Line for at least one hour. Testing acceptance criteria is met if the unit achieved at least 50% of its CURL for 1 hour at any MW level.  (3) Leading Reactive Testing  (a) It is recommended, but not required, that leading reactive tests be performed when system voltage is within the voltage profile, such as during low load periods.  (b) For Generation Resources, leading tests should meet the following performance criteria:  (i) Leading Test 1: Test at the unit’s normally expected maximum real power output during system light load conditions for at least 15 minutes. IRRs should test at or below 60% of their HSL. Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s original manufacturer reactive curve or most recent CURL.  (ii) Leading Test 2: Test at the unit’s HSL for at least one minute. IRR units and ESRs are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.  (iii) Leading Test 3: Test at the unit’s normally expected minimum real power output during system light load conditions for at least one minute. IRRs and nuclear units are exempt from this test. Testing acceptance criteria is met if the unit achieved at least 50% of the unit’s CURL.  (c) For ESRs leading tests should meet the following performance criteria:  (i) Leading Test 1a: Test at or above 95% of the unit’s Maximum Operating Discharge Power Limit for at least 15 minutes or entire duration if less than 15 minutes.  Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.  (ii) Leading Test 1b: Test at or above 95% of the unit’s Maximum Operating Charge Power Limit for at least 15 minutes or entire duration if less than 15 minutes.  Testing acceptance criteria is met if the unit achieved no less than 90% of the unit’s most recent CURL.  (4) The Resource Entity shall measure the tested reactive capability on the generator output terminals for non-IRR Generation Resources. The value recorded shall represent the gross MVAr output of the Generation Resource or ESR. Additionally, the net reactive capability shall be measured at the high side of the GSU transformer and at the POIB, if metering is available. The high side values shall have the Generation Resource’s or ESR’s auxiliary reactive consumption and the GSU losses deducted from the Generation Resource’s or ESR’s gross reactive output. The POIB values shall have the plant’s auxiliary load and any additional load deducted from the Resource’s gross reactive output. If metering is not available at the high side, the Resource Entity shall calculate the reactive capability at the high side and at the POIB. These values are required and must be submitted through the MIS Certified Area. CURLs shall be attached to the test results submitted, and shall be clearly defined. All applicable test data shall be submitted on the form in the NDCRC application.  (5) The QSE representing a Generation Resource or ESR shall be responsible for scheduling reactive verification tests when requested by the Resource Entity in accordance with the conditions outlined above. If ERCOT does not issue a specific request for a Generation Resource or ESR reactive capability verification, the Generation Resource or ESR shall complete a reactive verification test at least every five years.  (6) ERCOT shall have the option to waive the requirement to perform Leading Test 1 for any Generation Resource or ESR that seldom runs during such light Load periods. The granting of such a waiver shall be effective for five years.  (7) The Resource Entity representing a Generation Resource or ESR shall be responsible for the timely and accurate reporting of test results to ERCOT and to the QSE representing the Generation Resource or ESR. The Resource Entity representing a Generation Resource or ESR must properly complete all required data fields in the NDCRC application for a test to be considered valid. |

3.3.3 Resource Entity Responsibilities for Equipment Ratings

(1) Resource Entities that own Transmission Facilities are responsible for determining the Ratings of its Transmission Facilities and shall send the methodology used to ERCOT in accordance with the Protocols. Technical limits established for the operation of Transmission Facilities and associated equipment shall be applied consistently in engineering and planning studies, Real-Time security analyses, and operator actions.

(2) Resource Entity owners of Transmission Facilities shall provide to ERCOT all nominal Transmission Facility Ratings.

(3) In operating the ERCOT Transmission Grid, ERCOT shall use these Ratings as follows:

(a) ERCOT shall limit pre-contingency flows to enforce the Normal Rating.

(b) If an approved Remedial Action Plan (RAP) is unavailable to unload the Transmission Facility post-contingency, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the Emergency Rating. The enforcement shall be implemented in a manner such that the post-contingency loading will be at, or below, Normal Rating within two hours.

(c) If an approved RAP is available, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the 15-Minute Rating. The RAP shall be implemented in a manner such that the RAP post-implementation loading will be at, or below, the Emergency Rating within 15 minutes and subsequently, at or below, Normal Rating within two hours.

(d) ERCOT shall use best efforts to restore all Transmission Facilities to within Normal Ratings as soon as practicable, based on Good Utility Practice.

3.4 Load Resource Testing Requirement

(1) After initial qualification, a Load Resource’s telemetry shall be evaluated annually and applicable relay functionality will be tested and validated by ERCOT every 24 months as required by these Operating Guides. In addition, ERCOT shall annually verify the telemetry attributes of each Load Resource providing ERCOT Contingency Reserve Service (ECRS) or Responsive Reserve (RRS) using high-set under-frequency relay. If a Load Resource fails to provide the appropriate documents as required in the annual and biennial verification test for two consecutive years, ERCOT shall notify the associated Qualified Scheduling Entity (QSE) of non-compliance. After a 30-day allowance for the deficiency to be corrected, ERCOT shall reduce the Resource’s ability to provide Ancillary Services in the ERCOT market to zero.

3.5 ERCOT Implementation

(1) Reactive test results shall be reviewed by ERCOT to validate the accuracy and consistency of the test data provided, and to determine the appropriateness of unit loading and system conditions during the test. ERCOT shall have the right to order a re-test of the unit, if it determines there are significant discrepancies with the test data.

(2) Reactive test results shall be reviewed by ERCOT to determine if test results met the acceptance criteria of Section 3.3.2.2, Reactive Testing Requirements. If the test results fail to meet the acceptance criteria of Section 3.3.2.2, ERCOT shall have the right to either order the Resource Entity to produce a new Corrected Unit Reactive Limit (CURL), or to order a re-test of the unit.

(3) Reactive test results shall be reviewed by ERCOT against the most recent CURL for the unit. If unit reactive capability appears to fail the acceptance criteria of Section 3.3.2.2, ERCOT shall contact the Resource Entity and attempt to resolve the limitation. ERCOT shall have the right to order the Resource Entity to produce a new CURL that reflects current operating limits.

(4) Any new CURL produced by a Resource Entity in response to new operating limits, shall be submitted by the Resource Entity via the Resource Registration process within four weeks of ERCOT’s approval of the test. ERCOT will notify Transmission Service Providers (TSPs) after Resource Registration information submittal as described in Section 3.3.2.1, Corrected Unit Reactive Limits (CURL).

3.6 Transmission Service Providers

(1) ERCOT and Transmission Service Providers (TSPs) shall operate the ERCOT Transmission Grid in compliance with Good Utility Practice, North American Electric Reliability Corporation (NERC) Reliability Standards, Protocols and Operating Guides.

(2) TSPs shall designate an Authorized Representative as defined in Protocol Section 2.1, Definitions.

(3) Each TSP, at its own expense, may obtain Operating Period data from ERCOT.

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| ***[NOGRR177: Replace Section 3.6 above with the following upon system implementation of NPRR857:]***  3.6 Transmission Service Providers and Direct Current Tie Operators  (1) ERCOT, Transmission Service Providers (TSPs), and Direct Current Tie Operators (DCTOs) shall operate the ERCOT Transmission Grid in compliance with Good Utility Practice, North American Electric Reliability Corporation (NERC) Reliability Standards, Protocols and Operating Guides.  (2) Each TSP, at its own expense, may obtain Operating Period data from ERCOT. |

3.7 Transmission Operators

(1) Transmission Operators (TOs) shall follow ERCOT instructions:

(a) Performing the physical operation of the ERCOT Transmission Grid, including circuit breakers, switches, voltage control equipment, protective relays, metering and Load shedding equipment;

(b) Directing changes in the operation of transmission voltage control equipment per Section 2.7.3, Real-Time Operational Voltage Control;

(c) Managing Voltage Profiles established by ERCOT and Voltage Set Points per Section 2.7.3;

(d) Taking those additional actions required to prevent an imminent Emergency Condition or to restore the ERCOT Transmission Grid to a secure state in the event of a system emergency; and

(e) In response to a System Operating Limit (SOL) exceedance communicated by ERCOT.

(2) TOs must meet all requirements identified in the Protocols for TOs in addition to those requirements stated below for all Transmission Facilities represented:

(a) Monitor system conditions and notify ERCOT when Transmission Facility elements reach maximum safe operating limits as soon as practicable;

(b) Notify ERCOT of any changes in its Transmission Facility status within ten seconds of the change of status as specified in Protocol Section 3.10.7.5, Telemetry Requirements;

(c) Operate and manage Transmission Facilities between energy sources and the point of delivery;

(d) Coordinate emergency communications between a represented Transmission Service Provider (TSP) system and ERCOT;

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| ***[NOGRR177: Replace paragraph (d) above with the following upon system implementation of NPRR857:]***  (d) Coordinate emergency communications between a represented Transmission Service Provider (TSP) or Direct Current Tie Operator (DCTO) system and ERCOT; |

(e) Monitor the loading of the transmission system(s);

(f) Notify ERCOT of all changes to the status of all Transmission Elements and Transmission Facilities;

(g) Act as Single Point of Contact for transmission Outages;

(h) Maintain continuous communication (24x7) with ERCOT;

(i) Ensure Dispatch Instructions, received for their system or on behalf of represented TSPs or Distribution Service Providers (DSPs), are carried out as issued;

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| ***[NOGRR177: Replace paragraph (i) above with the following upon system implementation of NPRR857:]***  (i) Ensure Dispatch Instructions, received for their system or on behalf of represented TSPs, DCTOs, or Distribution Service Providers (DSPs), are carried out as issued; |

(j) Maintain operational metering;

(k) Implement Black Start;

(l) Ensure the ability to receive pre- and post-contingency system operating limit exceedances communicated by ERCOT through at least one of the following methods at all times, unless both systems are unavailable:

1. Postings on the Market Information System (MIS) Secure Area; or
2. The GridGeo application.

Upon observation of a failure of the method that is being utilized, the TO will notify ERCOT as soon as practicable;

(m) Ensure the ability to monitor Generic Transmission Limits (GTLs) and the associated flows that affect their system via the Inter-Control Center Communications Protocol (ICCP); and

(n) Monitor GTLs and the associated flows that affect their system.

(3) TOs shall submit to ERCOT, by March 15 of each year, a written back-up control plan to continue operation in the event the TOs control center becomes inoperable. Back-up control plans shall be submitted to ERCOT via secured webmail or encrypted data transfer. TOs shall request that a secure email account be created with ERCOT by sending an email to [shiftsupervisors@ercot.com](mailto:shiftsupervisors@ercot.com).

(4) Each back-up control plan shall be reviewed and updated annually and shall meet the following minimum requirements:

(a) Include descriptions of actions to be taken by TO personnel to avoid placing a prolonged burden on ERCOT and other Market Participants;

(b) Include descriptions of specific functions and responsibilities to be performed to continue operations from an alternate location;

(c) Include procedures and responsibilities for maintaining basic voice communications capabilities with ERCOT; and

(d) Include procedures for back-up control function testing and the training of personnel.

(5) As an option, the back-up control plan may include arrangements made with another Entity to provide the minimum back-up control functions in the event the TO’s primary functions are interrupted.

(6) By February 15 of each year, each TO shall submit to ERCOT its emergency operations plan to mitigate operating emergencies, as required by the applicable North American Electric Reliability Corporation (NERC) Reliability Standards, and in accordance with Section 8, Attachment L, Emergency Operations Plan. The emergency operations plan shall be submitted to ERCOT via secured webmail or encrypted data transfer. A TO may request a secure email account by sending an email to ERCOT at [transrep@ercot.com](mailto:transrep@ercot.com). If no changes have been made from the previous submission, the TO shall resubmit the emergency operations plan with a new revision date indicating that it has been reviewed and no changes were made. If a TO revises its emergency operations plan, the TO shall submit the revised emergency operations plan to ERCOT within 45 calendar days of the effective date of the revised plan and must include a summary of revisions.

(7) ERCOT shall review each TO’s emergency operations plan to ensure it addresses all relevant reliability risks and will notify the TO of its conclusions within 30 calendar days of receipt of a TO’s new or revised emergency operations plan. ERCOT shall coordinate with the TO on a mutually agreeable time frame for the resubmittal of the emergency operations plan if ERCOT determines that reliability concerns require revision to the emergency operations plan. Plans submitted for the annual review before February 15 will be deemed to have been received on February 15 for ERCOT to initiate the review described in this Section.

3.7.1 Transmission Owner Responsibility for a Vegetation Management Program

(1) Each transmission owner shall have a vegetation management program outlining procedures to prevent transmission line contact with vegetation. The transmission owner shall maintain documentation to verify the performance of the vegetation management program and shall provide that documentation to their respective TO and ERCOT upon request.

3.7.2 Transmission Service Provider Responsibilities for Equipment Ratings

(1) TSPs that own Transmission Facilities are responsible for determining the Ratings of their Transmission Facilities and shall send the methodology used to ERCOT in accordance with the Protocols. Technical limits established for the operation of Transmission Facilities and associated equipment shall be applied consistently in engineering and planning studies, Real-Time security analyses, and operator actions.

(2) TSPs owners of Transmission Facilities shall provide to ERCOT all nominal Transmission Facility Ratings.

(3) In operating the ERCOT Transmission Grid, ERCOT shall use these Ratings as follows:

(a) ERCOT shall limit pre-contingency flows to enforce the Normal Rating.

(b) If an approved Remedial Action Plan (RAP) is unavailable to unload the Transmission Facility post-contingency, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the Emergency Rating.

(c) If an approved RAP is available, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the 15-Minute Rating. The RAP shall be implemented in a manner such that the RAP post-implementation loading will be at, or below, the Emergency Rating within 15 minutes and subsequently at or below Normal Rating within two hours.

(d) ERCOT shall use best efforts to restore all Transmission Facilities to within Normal Ratings as soon as practicable, based on Good Utility Practice.

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| ***[NOGRR177: Replace Section 3.7.2 above with the following upon system implementation of NPRR857:]***  3.7.2 Transmission Service Provider and Direct Current Tie Operator Responsibilities for Equipment Ratings  (1) TSPs and DCTOs that own Transmission Facilities are responsible for determining the Ratings of their Transmission Facilities and shall send the methodology used to ERCOT in accordance with the Protocols. Technical limits established for the operation of Transmission Facilities and associated equipment shall be applied consistently in engineering and planning studies, Real-Time security analyses, and operator actions.  (2) TSPs and DCTOs that own Transmission Facilities shall provide to ERCOT all nominal Transmission Facility Ratings.  (3) In operating the ERCOT Transmission Grid, ERCOT shall use these Ratings as follows:  (a) ERCOT shall limit pre-contingency flows to enforce the Normal Rating.  (b) If an approved Remedial Action Plan (RAP) is unavailable to unload the Transmission Facility post-contingency, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the Emergency Rating.  (c) If an approved RAP is available, ERCOT shall control the post-contingency loading of the Transmission Facility to levels below the 15-Minute Rating. The RAP shall be implemented in a manner such that the RAP post-implementation loading will be at, or below, the Emergency Rating within 15 minutes and subsequently at or below Normal Rating within two hours.  (d) ERCOT shall use best efforts to restore all Transmission Facilities to within Normal Ratings as soon as practicable, based on Good Utility Practice. |

3.8 Requirements for Reporting Sabotage Information

(1) ERCOT Entities shall notify their designated Transmission Operator (TO) or Qualified Scheduling Entity (QSE) when experiencing disturbances or unusual occurrences suspected or determined to be caused by sabotage. Disturbances and unusual occurrences related to bulk electric system Facilities within the ERCOT Region are the only Facilities subject to reporting. ERCOT Entities shall have procedures for the recognition of sabotage events on its Facilities and multi-site sabotage.

(2) TOs or QSEs shall inform ERCOT of disturbances or unusual occurrences suspected or determined to be caused by sabotage.  TOs or QSEs may notify ERCOT by telephone or by email at [shiftsupervisors@ercot.com](mailto:shiftsupervisors@ercot.com).

(3) TOs and QSEs may inform other ERCOT Entities of the event(s), if, in the opinion of the TO or QSE, the situation impacts other Entities.

(4) ERCOT may inform TOs and QSEs of the event(s), if, in the opinion of ERCOT, the situation impacts ERCOT System reliability.

(5) ERCOT shall inform North American Electric Reliability Corporation (NERC) and governmental agencies of disturbances or unusual occurrences suspected or determined to be caused by sabotage in accordance with current laws and regulations.  This is in addition to the report submitted by the NERC registered Entity.