

***OPERATING PROCEDURE***

***MANUAL***

**Transmission and Security**

**Desk**

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# 1. Introduction

## 1.1 Purpose

This procedure provides the System Operator assigned to the Transmission and Security Desk with detailed procedures required for performing duties assigned to that position.

The Transmission and Security Operator shall ensure that the transmission system is operated so that instability, uncontrolled separation, or cascading outage will not occur as a result of the most severe single Contingency. The Transmission and Security Operator directs actions or issues Operating Instructions to the ERCOT Transmission Operators or other Market Participants as required while maintaining or restoring the security/reliability of the ERCOT System.

## 1.2 Scope

The instructions contained in this procedure are limited to those required for the Transmission and Security Desk. Instructions for other ERCOT control room positions are contained in separate procedures, one for each position. This procedure does not imply that the duties contained herein are the only duties to be performed by this position. The individual assigned to this position will be required to follow any other instructions and to perform any other duties as required or requested by appropriate ERCOT supervision. Although the steps within the procedures are numbered, the numbering is for indexing purposes and are not sequential in nature.  The System Operator will determine the sequence of steps, exclude steps, or take any additional actions required to ensure system security based on the information and situational awareness available during both normal and emergency conditions.

# 2. General

## 2.1 System Operator Responsibility and Authority

**Procedure Purpose:** To ensure the System Operators know their roles, responsibility and authority.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **6.5.1.1** | **6.5.1.2(3)** | **6.5.2** | **6.5.3(1)** |
| **Guide Reference** | **4.5.2(1)** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 5** | **Effective Date: March 31, 2017** |

ERCOT ISO as a Transmission Operator (TOP), the single Balancing Authority (BA), and only Reliability Coordinator (RC) registered within the ERCOT Interconnection shares all information between these roles simultaneously and acts concurrently as a single entity, satisfying coordination between the TOP, BA and RC.

The System Operator (SO) shall, in accordance with NERC Reliability Standards and ERCOT Protocols, have clear decision-making authority to act to address the reliability of its Reliability Coordinator Area by direct actions or by issuing Operating Instructions during both normal and emergency conditions. These actions shall be taken without delay and may include shedding of firm load to prevent or alleviate System Operating Limits (SOLs) and the Interconnection Reliability Operating Limit (IROL) without obtaining approval from higher-level personnel.

The SO on duty is, in accordance with the ERCOT Protocols, Operating Guides, and NERC Reliability Standards, and acting as the Balancing Authority, Transmission Operator, and Reliability Coordinator shall request and receive information required to continually monitor the operating conditions which will assure security and reliability of the ERCOT system.

The SO issues Dispatch Instructions / Operating Instructions for the Real-Time operation of Transmission Facilities to a TO and to a QSE for the Real-Time operation of a Resource.

The SO shall, on an ERCOT-wide basis, coordinate the ERCOT System Restoration (Black Start) Plan. The SO shall implement the Black Start Plan and shall direct the reconnection efforts of the islands, established by restoration activities.

The SO shall consider all equipment operating limits when issuing Dispatch Instructions / Operating Instructions. During Emergency Conditions, the SO may verbally request QSEs to operate its Resources outside normal operating parameters. If a Dispatch Instruction / Operating Instruction conflicts with a restriction placed on equipment by a TO or QSE to protect the integrity of equipment, ERCOT shall honor the restriction.

The SO performs security analyses on a Day Ahead and real-time basis and ensures all Forced Outages are entered into the Outage Scheduler. The SO shall obtain or arrange to provide emergency energy over the DC Tie(s) on behalf of ERCOT.

The SO shall issue appropriate OCN’s, Advisories, Watches, and Emergency Notices, and coordinate the reduction or cancellation of clearances, re-dispatch of generation, and request, order, or take other action(s) that the SO determines is necessary to maintain safe and reliable operating conditions on the ERCOT system in accordance with ERCOT Protocols, Operating Guides, and NERC Reliability Standards. The SO will implement and terminate ERCOT Time Corrections, and will determine the need for and implement the operation of a QSE on Constant Frequency Control for loss of ERCOT’s load frequency control system.

# 2.2 Communication

**Procedure Purpose:** To ensure proper communication is used to reduce the possibility of miscommunication that could lead to action or inaction harmful to the reliability of the grid.

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| **Protocol Reference** | **6.5.7.8** |  |  |  |
| **Guide Reference** | **3.1.3** |  |  |  |
| **NERC Standard** | **COM-002-4** |  |  |  |

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| **Version: 1** | **Revision: 5** | **Effective Date: May 1, 2018** |

| **Step** | **Action** |
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| Three-Part Communication | |
| **NOTE** | * Operating Instructions and Dispatch Instructions are synonymous and both require ‘three-part communication’. * Refer to the Communications Protocols document for requirements. |
| **1** | When issuing Operating Instructions, use three-part communication:   * Issue the Operating Instruction * Receive a correct repeat back * Give an acknowledgement |
| **2** | Many scripts have been placed throughout the procedures as a reminder for the three-part communication. However, a script cannot be provided for every scenario. Effective three-part communication skills are mandatory. |
| Hotline Call Communication | |
| **1** | When making Hotline calls, verify that every TO has answered.  **IF:**   * Not every TO answered the Hotline;   **THEN:**   * Contact them using their OPX line or LD line to provide them with the message * Inquire why they were not on the Hotline call * Open a Help ticket if ERCOT’s Telecommunications department is needed to investigate. |
| Master QSE | |
| **1** | Issue the VDI to the Master QSE of a Generation Resource that has been split to function as two or more Split Generation Resources as deemed necessary by ERCOT to effectuate actions for the total Generation Resource for instances when electronic Dispatch Instructions are not feasible. |
| **LOG** | Log all actions. |

## 2.3 Site Failovers and Database Loads

**Procedure Purpose:** To provide notice to the TOs when ERCOT is performing updates to their Energy and Market Management Systems.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **TOP-001-4**  **R9** |  |  |  |

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| **Version: 1** | **Revision: 17** | **Effective Date: March 31, 2017** |

| **Step** | **Action** |
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| **EMS**  **Changes** | **Approximately 5 - 30 minutes before a database load, local failover, or EMS migration, make the following Hotline call to TOs:**  **T#15 - Typical Hotline Script for EMS changes** |
| **MMS**  **Changes** | **Approximately 5 - 30 minutes before a MMS migration, make the following Hotline call to TOs:**  **T#16 - Typical Hotline Script for MMS changes** |
| **Site**  **Failover** | **Approximately 5 - 30 minutes before site failover, make the following Hotline call to TOs:**  **T#17 - Typical Hotline Script for Site Failover** |
| **Site**  **Failover**  **Complete** | **T#18 - Typical Hotline Script for Site Failover Complete** |
| **LOG** | Log actions. |

## 2.4 Switching Control Centers

**Procedure Purpose:** To provide notice to the TOs when ERCOT is working from the Alternate Control Center.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 7** | **Effective Date: March 31, 2017** |

| **Step** | **Action** |
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| **Hotline**  **Call** | **When transferring operations from primary site to alternate site (and vice versa). Make the following hotline call to TOs:**  **T#19 - Typical Hotline Script for working from Alternate site**  **T#20 - Typical Hotline Script for working from Primary site:** |
| **MIS**  **Posting** | Verify with Real-Time operator that posting was made.  **Typical MIS Posting Script for working from Alternate site:**  ERCOT is working from alternate control center.  **Typical MIS Posting Script for working from Primary site:**  ERCOT is working from primary control center. |
| **LOG** | Log actions. |

# 3. Review and Analyze System Security

## 3.1 System Overview

**Procedure Purpose:** Review, monitor and analyze data to maintain system security.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **6.3.2(3)(a)(i)** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **IRO-002-5 R5** | **NUC-001-3**  **R4, R4.1, R4.2, R9, R9.2, R9.2.1, R9.2.2, R9.4, R9.4.1, R9.4.2** | **TOP-001-4**  **R10, R10.1, R10.2, R10.4, R10.5, R10.6** | **VAR-001-5**  **R2** |

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| **Version: 1** | **Revision: 10** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
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| **Review** | REVIEW each of the following as necessary to confirm system reliability status:   * Alarms * State Estimator (SE) * Real Time Contingency Analysis (RTCA) * Transmission Constraint Manager (TCM) * Approved and Forced Outages * Load Forecast * Voltage and Stability Limits * Real Time Monitoring (RTMONI) * Security Constrained Economic Dispatch (SCED) * Real Time Reserve Monitoring |
| **Gap**  **Study** | Run a gap study for the next day’s peak hour to ensure all contingencies can be solved. If necessary:   * Request the Operations Support Engineer to review results and create CMPs as needed * Coordinate with TOs * If both CPSES units are offline, the Auxiliary load will need to be manually adjusted to 45 MW at both units * Refer to Desktop Guide Transmission Desk Section 2.5 Conducting Future Security Analysis * Save study * Log the following: * Study name * Any issues that could not be resolved and actions taken. |
| **STP**  **Lines** | A minimum of two transmission lines should be in service at all times. The in-service lines should be from at least two of the groups in the table below:  Independent Groups of STP Transmission Lines   |  |  |  | | --- | --- | --- | | Group 1 | Group 2 | Group 3 | | STPZWP39 | STPELM18 | JCKSTP18 | |  | STPELM27 | REFSTP27 | |  | STPWAP39 |  |   Note: Transmission lines, STP – Blessing (BLESSING), STP – HILLJE (HLJSTP64), and STP – HILLJE (CKT\_3124) (EMS naming convention) are not included in this table because these circuits are not part of STP’s credited offsite sources.  **IF:**   * A minimum of two lines are not in service;   **THEN:**   * Notify the Nuclear Plant’s QSE.   + Give an explanation of the event, if known and an estimate of when expected to return to normal |
| **Dynamic**  **Transmission**  **Limits** | **IF:**   * Any changes in the system that could affect the security and dynamic transmission limits;   **THEN:**  Post message on MIS Public. |

## 3.2 Alarm Processing and Acknowledgement

**Procedure Purpose:** To monitor and acknowledge system alarms.

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| --- | --- | --- | --- | --- | --- |
| **Protocol Reference** | | **3.10.7.5.1(5)** | **3.10.7.5.2(7)** | **6.5.7.1.6(1)** |  |
| **Guide Reference** | |  |  |  |  |
| **NERC Standard** | |  |  |  |  |
|  |  | |  | | |
| **Version: 1** | **Revision: 4** | | **Effective Date: March 31, 2017** | | |

| **Step** | **Action** |
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| **NOTE** | The Alarm Displays for ERCOT are primarily used to show changes in equipment status.  The alarms are categorized based on alarm criticality and prioritization on the Alarm Summary Display: |
| **Categories** | Tab 1: 345 KV Transmission Equipment Status  Tab 2: 138 KV Transmission Equipment Status  Tab 3: Generator Breaker, AVR, CAPS, REACTOR and RAS Status  Tab 4: RLC alerts  Tab 5: Transmission Line Overloads - Voltage Violations - Critical Alarms  Tab 6: QKNET alarms  Tab 7: ICCP status  Tab 8: All other alarms |
| **1** | Monitor the Alarm Summary Display pages 3, 6 and 7 as necessary to confirm system reliability status. |
| **2** | Take appropriate action as system conditions warrant. |
| **3** | Coordinate with the Real-Time Operator to clear the alarms approximately every 24 hours or as needed. |

## 3.3 Analysis Tool Outages

**Procedure Purpose:** To notify TOs to monitor SOLs, IROLs and GTCs in their areas during tool outages. Also, to ensure proper notification is made for these failures along with notification for ICCP, MIS and Outage Scheduler outages on the ERCOT systems.

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| **Protocol Reference** | **6.3.3(1)** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **IRO-008-2**  **R4** | **NUC-001-3**  **R4, R4.3, R9, R9.3, R9.3.4, R9.4, R9.4.1** | **TOP-001-4**  **R9, R13** |  |

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| **Version: 1** | **Revision: 22** | **Effective Date: November 1, 2019** |

| **Step** | **Action** |
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| STATE ESTIMATOR/RTCA | |
| **1** | **IF:**   * The SE/RTCA has not solved;   **THEN:**   * Coordinate with the Operations Support Engineer for up to 15 minutes from last successful solution; * Refer to Desktop Guide Transmission Desk Section 2.1 to assist with troubleshooting,   **IF:**   * The SE/RTCA remains partially solved or unsolved;   **THEN:**   * Make notifications, * Continue to monitor the system as possible, * Coordinate with the Operations Support Engineer to ensure a Real-time Assessment (RTA) is performed within 30 minutes of the last SE/RTCA solution and within 30 minutes of each RTA conducted thereafter, * Refer to section 3.7 to ensure congestion management continues with manual RTAs. |
| **2** | **Must be completed within 30 minutes of the tool outage:**  Notify the two master QSEs that represent the Nuclear Plants that ERCOTs [State Estimator/RTCA] is not functioning and is expected to be functional within approximately [# minutes]. |
| **3** | **If the State Estimator/RTCA has NOT solved within the last 30 minutes:**  Make a Hotline call to issue an Advisory to the TOs:  **T#21 - Typical Hotline Script for Advisory for State Estimator/RTCA Not Solved** |
| **4** | Notify Real-Time operator to make hotline call to QSEs. |
| **5** | Post Advisory message on MIS Public.  **Typical Posting Script:**  Advisory issued due to ERCOT’s [State Estimator/RTCA] is currently unavailable. |
| **6** | **Once the State Estimator/RTCA is operational:**  Make a Hotline call to cancel the Advisory to the TOs:  **T#22 - Typical Hotline Script to Cancel Advisory for State Estimator/RTCA:** |
| **7** | Notify the two master QSEs that represent the Nuclear Plants that the [State Estimator/RTCA] is now functional. |
| **8** | Notify Real-Time operator to make hotline call to QSEs. |
| **9** | Cancel Advisory message on MIS Public. |
| **LOG** | Log all actions. |
| Voltage Security Assessment Tool (VSAT) | |
| **1** | **IF:**   * VSAT has not run in the last 15 - 20 minutes, **OR** * VSAT is indicating “Stopped”, “Incomplete”, or “Server Invalid”;   **THEN:**   * Continue to monitor the flows in RTMONI * Rerun the RTNET, RTCA, and RTDCP (VSA) * Notify the Operations Support Engineer |
| **2** | **If VSAT has NOT solved within the last 30 minutes:**  Make a Hotline call to issue an Advisory to the TOs:  **T#23 - Typical Hotline Script for Advisory for VSAT Tool outage** |
| **3** | Notify Real-Time operator to make Hotline call to QSEs. |
| **4** | Post Advisory message on MIS Public.  **Typical MIS Posting:**  Advisory issued due to ERCOT’s Voltage Security Assessment Tool is currently unavailable. |
| **5** | **IF:**   * A major topology change occurs while VSAT is unavailable;   **THEN:**   * Notify and request the Operations Support Engineer to run a manual study to verify limits * Update any limits in RTMONI or manual Real Time Assessments as necessary. * Take action as necessary |
| **6** | **Once VSAT is operational:**  Make a Hotline call to cancel the Advisory to the TOs:  **T#24 - Typical Hotline Script to Cancel Advisory for VSAT Tool** |
| **7** | Notify Real-Time operator to make Hotline call to QSEs. |
| **8** | Cancel Advisory message on MIS Public. |
| **LOG** | Log all actions. |
| ICCP, MIS, and Outage Scheduler Outages | |
| **1** | For any planned or unplanned outage of ERCOT’s ICCP, MIS (affecting COP submissions) or the Outage Scheduler lasting longer than 30 minutes, notifications to TOs is required.  **IF:**   * ERCOT’s ICCP, MIS (affecting COP submissions) or the Outage Scheduler has a planned or unplanned outage that is expected to last 30 minutes or more;   **THEN:**   * Make a Hotline call to the TOs:   **T#97 - Typical Hotline Script for ERCOT’s ICCP, MIS, or the Outage Scheduler Planned or Unplanned Outage** |
| **2** | **Once ERCOT operational:**  Make a Hotline call to notify TOs:  **T#98 - Typical Hotline Script for ERCOT’s ICCP, MIS or Outage Scheduler back to Normal** |
| **LOG** | Log all actions. |

## 3.4 Forced Outage Detection

**Procedure Purpose:** To detect forced outages of transmission facilities

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.10.7.5.1(5)** | **6.5.7.1.6** |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 3** | **Effective Date: December 13, 2013** |

| **Step** | **Action** |
| --- | --- |
| **Transmission Forced Outages** | |
| **NOTE** | If the Forced Outage of a Transmission Facility continues for longer than a configurable time (initially 2 hours), and an entry is not made in the Outage Scheduler, the Forced Outage Detector (FOD) will continue to generate a new alarm at a pre-determined interval (initially 15 minutes) until the outage is entered into the Outage Scheduler. |
| **NOTE** | The TO has up to two hours to enter a forced outage in the Outage Scheduler. |
| **Un-documented**  **Outages** | **WHEN:**   * A FOD alarm is received in the Undocumented Outages section;   **DETERMINE:**   * If the alarm is a valid Forced Outage,   + Telemetry is accurate.   + Alarm is not due to an Approved Outage of less than one hour in duration. * If immediate action needs to be taken. |
| **Immediate Action** | **IF:**   * Alarm is valid and immediate action needs to be taken;   **THEN:**   * Perform a study to determine the effects the outage has on the ERCOT system,   + If the outage will put ERCOT in an emergency condition or RTCA shows post-contingency loading greater than 98% of the “Emergency Rating”, employ congestion management techniques as necessary**.** * Notify TO enter a forced outage in the Outage Scheduler. |
| **NOTE** | Outages can only be extended one time and the extension must be entered previous to the outages Planned End time. Outages that are not complete by their Planned End time and will remain in an Outage condition for longer than two hours must be entered into the Outage Scheduler as a Forced Outage. |
| **Extended Outages** | **WHEN:**   * An FOD alarm is received in the Extended Outages section,   **DETERMINE:**   * If the alarm is valid,   + Telemetry is accurate,   + Verify the Alarm is a result of equipment not returned to its normal state at the Planned End Time (plus 30 Minutes) in the Outage Scheduler, * If immediate action needs to be taken, * The estimated time when the Outage will be completed. |
| **Immediate Action** | **IF:**   * The alarm is valid and immediate action needs to be taken;   **THEN:**   * Perform a study to determine the effects the outage has on the ERCOT system,   + If the outage will put ERCOT in an emergency condition or RTCA shows post-contingency loading greater than 98% of the “Emergency Rating”, employ congestion management techniques as necessary**.**   Notify TO to enter a forced outage in the Outage Scheduler. |
| **Log** | Log all actions. |

## 3.5 Geomagnetic Disturbance Notification

**Procedure Purpose:** To disseminate forecasted and current space weather information when a K-7 and greater or G3 and greater GMD storm has entered a Warning and / or Alert.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **4.7** |  |  |  |
| **NERC Standard** | **EOP-010-1**  **R1, R1.1, R2** |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 10** | **Effective Date: March 29, 2019** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | * The Geomagnetic Disturbance Reference Document can be found in Section 2.13 of the Common to Multiple Desks Desktop Reference Guide. * An Advisory is issued when a GMD Alert of K-7 or higher is issued, however the Advisory will not be canceled until the GMD Warning is canceled. |
| **1** | **WHEN:**   * Notified by the Shift Supervisor that an Alert from the Space Weather Prediction Center has been issued for a K-7 and greater or G3 and greater;   **THEN:**   * Issue an Advisory by making a Hotline call to TOs * Post message on MIS Public * Notify Real-Time operator to make hotline call to QSEs   **T#25 - Typical Hotline Script for Advisory for GMD Alert**  **Typical MIS Posting Script:**  Advisory issued for a geomagnetic disturbance of [state K-Index level] until [time]. |
| **Extend** | **IF:**   * The Alert is extended;   **THEN:**   * Post message on MIS Public and * Cancel the older message   **Typical MIS Posting:**  The Space Weather Prediction Center has extended the Alert of [state level] until [time]. |
| **K Level**  **Increases / Decreases** | **IF:**   * Notified by the Shift Supervisor that an Alert from the Space Weather Prediction Center has been increased or decreased for a K-7 and greater or G3 and greater;   **THEN:**   * Making a Hotline call to TOs * Update message on MIS Public * Notify Real-Time operator to make hotline call to QSEs   **T#26 - Typical Hotline Script for GMD K- Level Increase/Decrease**  **Typical MIS Posting Script:**  Advisory issued for a geomagnetic disturbance of [state K-Index level] until [time]. |
| **Mitigating**  **Activities** | When suspected GMD activity is observed or reported by a TO, consider the following:   * Series capacitors are in-service (where installed) * Delay Planned outages and return outaged equipment to service where possible, especially series capacitors * Remove transformer(s) from service if imminent damage due to overheating * Remove transmission line(s) from service especially the lines most influenced by GMD or the lines which show wide voltage swings * Shed load as required |
| **Issues** | **IF:**   * Any TO reports equipment outages, misoperations, etc. from a GMD event;   **THEN:**   * Coordinate an action plan if necessary, * Report issues to Shift Supervisor |
| **Cancel** | **WHEN:**   * Notified by the Shift Supervisor that the GMD Warning has expired;   **THEN:**   * Cancel the Advisory by making a Hotline call to TOs * Cancel message on MIS Public * Notify Real-Time operator to make hotline call to QSEs.   **T#27 - Typical Hotline Script to Cancel Advisory for GMD** |
| **Log** | Log all actions. |

## 3.6 Resolving Real-Time Data Issues

**Procedure Purpose:** To provide a mutually agreed process for resolving Real-Time data issues between ERCOT and the Entities that provide data to ERCOT.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **7.3.3** | **7.3.4** | **7.3.5** | **7.3.6** |
| **NERC Standard** | **IRO-018-1(i)**  **R1, R1.3, R2, R2.2, R2.3** | **TOP-003-3**  **R5.2** | **TOP-010-1 (i)**  **R1, R1.3, R2, R2.3, R3, R3.2, R3.3** |  |

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| **Version: 1** | **Revision: 4** | **Effective Date: March 30, 2018** |

| **Step** | **Action** |
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| **Real-Time Data Issues known by the TO** | |
| **NOTE** | * Manually replaced telemetry data is data entered by a QSE or TO on their systems that is transmitted to ERCOT via ICCP in place of the normal points experiencing an issue.     **Refer to Desktop Guide Common to Multiple Desks 2.27 Quality of Real-time Data.** |
| **IROL** | ERCOT provides read permission to CenterPoint for the IROL MW limit and flow via ICCP.  **IF:**   * The ICCP link goes down or for bad telemetry;   **THEN:**   * An alternate method for updating the value of the IROL will be used (i.e., verbal notification, manually replaced data, etc.). |
| **Notification of Telemetry**  **Data**  **Issue** | **IF:**   * Notified of a telemetry data issue (telemetry data will not be available or is unreliable for operational purposes;   **THEN:**   * The TO or QSE should correct of the telemetry data as soon as practicable, or, * Manually replace the data, if available. |
| **Cannot**  **Resolve** | **IF:**   * The TO or QSE cannot resolve the telemetry data issue within two Business Day, fix the issue in a timely manner;   **THEN:**   * The TO or QSE shall provide an estimated time of resolution. |
| **Real-Time Data Issues that affect Network Security Analysis** | |
| **NOTE** | Real-Time telemetry data issues that affect ERCOT’s Network Security Analysis (NSA) are issues that cause unacceptable NSA results such as but not limited to invalid State Estimator solutions. If Reliability issues can’t be resolved in a timely manner, ERCOT reserves the right to order the Resource off-line until the problem is resolved. |
| **Identify**  **And**  **Notify** | **IF:**   * There is a Real-Time telemetry data issue affecting the State Estimator solution;   **THEN**   * Notify the Operations Support Engineer to help identify the TO or QSE responsible for the data causing the invalid solution. |
| **Notify** | **Once Identified:**   * Notify the TO or QSE responsible for data issue;   **THEN:**   * Request the TO or QSE to address the data issue with either manually replaced telemetry data if secondary sources are available, OR * A correction of the telemetry data issue as soon as practicable. |
|  | **IF:**   * The TO or QSE cannot address the issue within 10 minutes of notification;   **THEN:**   * The TO or QSE shall coordinate with ERCOT to verbally agree to the best assumed data value(s). * The TO or QSE shall use verbally agreed data to manually replace the data point to reflect the best assumed data value(s) until the Real-Time data issue is resolved. |
|  | **IF:**   * The TO or QSE cannot resolved the Real-Time telemetry data issue that is affecting ERCOT NSA within two Business Days, it shall provide an estimated time of resolution;   **THEN:**   * Notification by the TO or QSE will be made once the Real-Time telemetry data issue is resolved. |

## 3.7 Manual Real-time Assessment (RTA)

**Procedure Purpose:** To ensure the IROL, SOLs and GTCs are monitored and corrective actions are taken for post-contingency overloads and basecase overloads.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **IRO-008-2**  **R4** | **TOP-001-4**  **R14** |  |  |

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| **Version: 1** | **Revision: 0** | **Effective Date: July 28, 2017** |

| **Step** | **Action** |
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| **NOTE** | The Reliability Coordinator must ensure, if analysis tools are unavailable, that a RTA is performed at least once every 30 minutes. The analysis tools applicable are:   * State Estimator * RTCA * RTMONI |
| **NOTE** | A RTA is an evaluation of system conditions using Real-time data to assess existing (pre-Contingency) and potential (post-Contingency) operating conditions.  The RTA is required to include applicable load, generation output levels, known Protection System and Remedial Action Scheme (RAS) status or degradation, Transmission and Generation outages, DC Tie schedules, Facility Ratings, and identified phase angle and equipment limitations.  This RTA must evaluate for all SOL exceedances (e.g. Facility Ratings, voltage limits, and any GTLs). |
| **1** | **WHEN:**   * The Operations Support Engineer performs a manual RTA (at least every 30 minutes) and saves the study;   **THEN:**   * Open the save case to review the results;   **Considerations:**   * If SE/RTCA is not operational due to TO/QSE ICCP data issues, results could be erroneous. Coordination with the appropriate TOs will be necessary. * Use the most limiting parameter when determining corrective actions for SOL exceedances, unless the parameter is determined to be erroneous by both ERCOT and the TO/QSE.   **IF:**   * TCM is operational;   **THEN:**   * The Operations Support Engineer will build manual constraints for SCED to re-dispatch   **IF:**   * TCM in not operational and manual re-dispatch is necessary;   **THEN:**   * Manually re-dispatch using a VDI and notify the appropriate TO   **IF:**   * If SCED is operational;   **THEN:**   * Monitor constraints in SCED to ensure resolution   **UPDATE:**   * RTMONI as necessary for GTLs |
| **2** | **WHEN:**   * Topology changes are reported;   **THEN:**   * Notify the Operations Support Engineer is aware for the manual RTA.   **IF:**   * If requested by Shift Supervisor or Operations Support Engineer to manually replace data/statuses;   **THEN:**   * Replace the topology changes that were reported.   **Other Considerations:**   * System Load changes, * Large generation re-dispatch |
| **3** | **ONCE:**   * The tools are back operational and manual RTAs are no longer needed;   **THEN:**   * Coordinate with the Operations Support Engineer to remove any unneeded manually replace data/statuses. |
| **LOG** | Log all actions. |

# 4. Manage Transmission Congestion

## 4.1 Transmission Congestion Management

**Procedure Purpose:** To verify and take corrective action for post-contingency overloads for various conditions.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.10.4(2)** | **6.1(4)** | **6.5.5.2(1)** | **6.5.7.1.10** |
| **6.5.7.1.11** | **6.5.7.8** | **6.5.9(2)** | **6.5.9.2(3)** |
|  | **6.5.9.3.3** | **6.5.9.3.4** |  |  |
| **Guide Reference** | **2.2.2** |  |  |  |
| **NERC Standard** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R4, R5, R6** | **TOP-001-4**  **R1, R10, R10.1, R10.3, R10.4, R10.6, R14, R18** |
| **VAR-001-5**  **R2, R3** |  |  |  |
|  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 53** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | Although the steps within the procedure are numbered, the numbering is for indexing purposes and are not sequential in nature. The system operator will determine the sequence of steps, exclude steps, or take any additional actions required to ensure system security based on the information and situational awareness available during both normal and emergency conditions. Refer to Section 2.6 of the Transmission & Security Desktop Guide for the contingency solution results legend. |
| **Authority** | ERCOT System Operators have the authority to take or direct timely and appropriate real-time action, up to and including shedding firm load to alleviate System Operating Limit (SOL) violations. Following a separation from the Interconnection, and following automatic under-frequency load shedding, System Operators will also instruct TOs to shed additional load manually when there is insufficient capacity to restore system frequency.  To include directing physical operation of the ERCOT Transmission Grid, including circuit breakers, switches, voltage control equipment, and Load-shedding equipment. |
| **CAUTION** | **IF:**   * At any time, the prescribed measures within this procedure fail to resolve the congestion, **AND** * The transmission system is in an unreliable state (see Section 4.2 if a DC-Tie has a shift factor)   **THEN:**   * Issue an Emergency Notice * See Generic Script in Section 7.1 * Notify Real-Time operator to make hotline call to QSEs. |
| **Critical**  **Facilities** | Critical facilities are the ERCOT defined contingencies that show up after running Real Time Contingency Analysis (RTCA) as a post-contingency overload. This list is located in the EMS and an electronic copy is located on the MIS Secure site:  Select: Grid>Generation>Reliability Unit Commitment>Standard Contingency List’  Select “Standard Contingency List” Open the zip file>Open the CIM file>Select the Standard\_Contingency\_List tab and view the contingencies.  A potential critical facility becomes a critical facility when the contingency appears in RTCA as a post-contingency overload. |
| **NOTE** | Congestion Management techniques consist of:   * SCED * Phase Shifters (shift factors are on the TCM display) * Remedial Action Plan (RAP) * Pre-Contingency Action Plan (PCAP) * Mitigation Plan (MP) – enacted Post-Contingency * Temporary Outage Action Plans (TOAP) * Building a manual constraint * Non-Spin   The electronic and hard copy for the RAPs, PCAPs, and MPs are to be considered current. Should a conflict exist between the electronic and hard copy, the electronic version is to be used.   * This data can be viewed at ERCOT SharePoint > System Operations – Control Center > Quick Links > Remedial Action Schemes (RAS) and/or MP/PCAP/RAP , * OCTOAPs are located in the daily Outage Notes. |
|  |  |
| Review Planned Outage Notes | |
| **Non-Cascading**  **Condition** | **Review daily outage notes:**  **IF:**   * Studies indicate a high post-contingency overload (125% of Emergency rating or greater) due to a Planned outage AND it is not a cascading condition;   **THEN:**   * Allow the outage * Activate the constraint and step the constraint down by adjusting the %Rating (increments of 5%) |
| **Cascading**  **Condition** | **IF:**   * Studies indicate a high post-contingency overload (125% of Emergency rating or greater), AND it is a cascading condition, OR * An unsolved contingency, OR * A Basecase overload;   **THEN:**   * Take pre-posturing measures to reduce the flow before the outage is taken   + Use RTMONI if available on a GTC, OR   + Have a manual constraint created if needed   **IF:**   * Constraint is ineffective   **THEN:**   * Use HDL/LDL overrides as required to pre-posture for an expected Outage as last resort * Post message on MIS Public anytime manual action is taken   **Typical MIS Posting Script:**  ERCOT is taking manual actions to pre-posture for XXXX outage  **ONCE:**   * Studies show that the post-contingency is below 125% of Emergency rating, unsolved contingency, or Basecase overload is resolved   + Give approval for the outage,   + Activate constraint, and   + Release manual override after SCED runs * Cancel MIS posting. |
| **Log** | Log all actions. |
| Evaluate Real Time Contingency Analysis (RTCA) Results | |
| **1** | **IF:**   * A major topology change has occurred;   **THEN:**   * Re-run RTCA and VSAT.   **IF:**   * A constraint needs to be controlled before the next SCED run   **THEN:**   * Manually run RTCA after activating the constraint, AND * Manually execute the SCED process |
| **Log** | Log all actions. |
| Post-Contingency Overloads | |
| **1** | **IF:**   * A post-contingency overload is approaching 98% of its Emergency Rating;   **THEN:**   * Verify the contingency definition associated with the constraint is accurate and appropriate given the current state of the grid * Verify SCADA is of similar magnitude to the pre-contingency value (MW and MVAR flows) * Review the limits in DYNRTG static table in order to ensure that the telemetry of the lines is within the acceptable range. |
| **2** | **IF:**   * Inaccurate, * Indicate NOSCED,   **THEN:**   * **DO NOT** employ congestion management techniques,   + Notify the Shift Supervisor and Operations Support Engineer to investigate or create a CMP.   + Acknowledge the constraint and list a reason using the drop down box,   + The comment field should be used for additional information |
| **3** | **IF:**   * Accurate,   **THEN:**   * Verify no RAS (identified as RAS in EMS), or RAP exist * Activate constraint   + Lower the value in the % Rating column in TCM to tighten the constraint as needed (minimum of 95%, excluding GTCs)   **IF:**   * A PST can help solve the congestion;   **THEN:**   * Activate the constraint until the PST is studied and moved. |
| **4** | **IF:**   * A post-contingency overload of 98% or greater of the Load Shed Rating exist with a RAP in place;   **THEN:**   * Activate the constraint to reduce the predicted post-contingency loading to no more than 98% of the Load Shed Rating;   **IF:**   * Constraint needs to be controlled within the next 5 minutes;   **THEN:**   * Manually run RTCA after activating the constraint, * Manually execute the SCED process, * Refer to “Managing Constraints in SCED”. |
| Monitoring Sub Synchronous Resonance (SSR) with Capacitor switching action | |
| **CAUTION** | * There are two series Capacitors at Gauss substation. One should remain bypassed all of the time. The ERCOT outage monitoring tool will verify these conditions. * Only one set of series capacitors at either Edison or Oersted will be in service at any time. The ERCOT outage monitoring tool will verify these conditions. * Prior to energizing or bypassing any series capacitors from service, ERCOT System Operators should run an STNET power flow study and contingency analysis. |
| **Capacitors**  **With SSR issues** | |  | | --- | | ***Name EMS ID Transmission Operator*** | | Edison EDISON AEP TO | | Orsted OERSTED AEP TO | | Gauss GAUSS AEP TO | | Kirchhoff KIRCHHOF AEP TO | | Ctt\_Cros CTT\_CROS CROSS TEXAS TO | |
| **NOTE** | * SSR Studies identify the conditions for SSR. These outages are programmed into the EMS monitoring tool. * TO(s) should contact ERCOT System Operations prior to energizing or bypassing any Series Capacitor. * **WARNING:** If the generator plant is three contingencies away from SSR vulnerability, a notification will inform a system operator to review the procedural plan. * **ALARM:** If the generator plant is two or fewer contingencies away from SSR vulnerability, an alarm will inform a system operator to implement the procedural action plan. A Generator is allowed to reside in this condition for 8 hours. * The ERCOT EMS system will be utilized to monitor transmission outages. A double circuit transmission outage is considered as one contingency in Operations. |
| **Output**  **Displays** | **REVIEW REFERENCE DISPLAY:**  **ERCOT EMS Applications>OLNETSEQ – Real-Time Network On-line Sequence**  **Contingency Violation Display**  **SSR Summary Display**  **IF:**   * You receive an SSR alarm but the impacted Resource is offline.   **THEN:**   * Take action accordingly because the SSR tool does not take into account if the unit is planned ON/OFF |
| **Warning** | **IF:**   * EMS SSR Notification (Warning) Three Contingencies away from SSR vulnerability   **THEN:**   * Notify Shift Supervisor * Instruct Operations Support Engineer to review Action Plan * Consider restoring planned outages with less than 8 hours restoration times |
| **Alarm** | **IF:**   * EMS SSR Notification (Alarm) Two Contingencies away from SSR vulnerability   **THEN:**   * Notify Shift Supervisor and Operations Support Engineer * Assess system with series Capacitors bypassed   **IF:**   * Congestion is identified during the assessment   **THEN:**   * Activate the Manual Constraint * Bypass Series Capacitors promptly   **Typical Script for TO:**  This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is issuing [TO] an Operating Instruction to bypass the [Edison and Oersted], [Cross and Gauss], or [Kirchhoff] Series Capacitor for SSR mitigation and update the Outage Scheduler. Notify ERCOT when this task is complete. Please repeat this back to me. That is correct, thank you.”   * Post message on MIS Public   **Typical MIS Posting of the SSR Mitigation:**  “ERCOT is bypassing the [Series Capacitor] for SSR mitigation.”   * Activate Constraint (if any) * Contact affected TOs, Inquire if planned/forced outages can be restored within 8 hours |
| **1** | **IF:**   * There are two Contingencies away from SSR vulnerability Series Capacitor cannot be opened or the planned/forced outages cannot be restored within 8 hours   **THEN:**   * Notify Shift Supervisor and Operations Support Engineer * Assess system with [Kendall – Big Hill 345 kV line], [Edith Clarke – Clear Crossing 345 kV line] and/or [Tule Canyon – Tesla 345 kV line], or [Dermott Switch – Clear Crossing 345 kV line] opened   **IF:**   * Congestion is identified during the assessment   **THEN:**   * Activate the Manual Constraint * Instruct TO to open [Kendall – Big Hill 345 kV line], [Edith Clarke – Clear Crossing 345 kV line] and/or [Tule Canyon – Tesla 345 kV line], or [Dermott Switch – Clear Crossing 345 kV line] * Consider RUC De-Commit of a Resource if this action is less restrictive and additional capacity is needed.   **Refer to Desktop Guide Transmission Desk 2.18 Sub-Synchronous Resonance** |
| **2** | **The MIS posting of the SSR Mitigation MUST be posted prior to SSR Notification (Alarm) One Contingency away from SSR vulnerability.**    **IF:**   * EMS SSR Notification (Alarm) identifies one Contingency away from SSR vulnerability   **THEN:**   * Confirm previous steps have been completed; and * Notify QSE with impacted resource |
| **Normal Operations** | **WHEN:**   * Back to normal operations and there is no SSR vulnerability.   **CANCEL:**   * SSR mitigation message on MIS Public.   **THEN:**   * Assess system with series Capacitors in service * Insert Series Capacitors   **Typical Script for TO:**  This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is issuing [TO] an Operating Instruction to close the [Edison and Oersted], [Cross and Gauss], or [Kirchhoff] Series Capacitor as conditions have improved and there is no reportable SSR condition at this time. Notify ERCOT when this task is complete. Please repeat this back to me. That is correct, thank you.” |
| **Log** | Log all actions. |
| Monitoring Sub Synchronous Resonance (SSR) without Capacitor switching action | |
| **Capacitors**  **With SSR issues** | |  | | --- | | ***Name EMS ID Transmission Operator*** | | North Edinburg NEDIN AEP TO | | Rio Hondo RIOHONDO AEP TO | |
| **NOTE** | * SSR Studies identify the conditions for SSR. These outages are programmed into the EMS monitoring tool. * TO(s) should contact ERCOT System Operations prior to energizing or bypassing any Series Capacitor. * **WARNING:** If the generator plant is three contingencies away from SSR vulnerability, a notification will inform a system operator to review the procedural plan. * **ALARM:** If the generator plant is two or fewer contingencies away from SSR vulnerability, an alarm will inform a system operator to implement the procedural action plan. A Generator is allowed to reside in this condition for 8 hours. * The ERCOT EMS system will be utilized to monitor transmission outages. A double circuit transmission outage is considered as one contingency in Operations. |
| **Output**  **Displays** | **REVIEW REFERENCE DISPLAY:**  **ERCOT EMS Applications>OLNETSEQ – Real-Time Network On-line Sequence**  **Contingency Violation Display**  **SSR Summary Display**  **IF:**   * You receive an SSR alarm but the impacted Resource is offline.   **THEN:**   * Take action accordingly because the SSR tool does not take into account if the unit is planned ON/OFF |
| **Warning** | **IF:**   * EMS SSR Notification (Warning) Three Contingencies away from a SSR vulnerability   **THEN:**   * Notify Shift Supervisor * Inform QSE resource may be requested offline for Valley SSR mitigation |
| **Alarm** | **IF:**   * EMS SSR Notification (Alarm) Two Contingencies away from a SSR vulnerability   **THEN:**   * Notify Shift Supervisor * Issue QSE operating instruction to order the resource offline   **Typical Script for TO:**  This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is issuing [QSE] an Operating Instruction to take [resource] offline for SSR mitigation. Notify ERCOT when this task is complete. Please repeat this back to me. That is correct, thank you.”   * Post message on MIS Public   **Typical MIS Posting of the SSR Mitigation:**  “ERCOT is taking manual actions for SSR mitigation.” |
| **1** | **Refer to Desktop Guide Transmission Desk 2.18 Sub-Synchronous Resonance** |
| **2** | **The MIS posting of the SSR Mitigation MUST be posted prior to SSR Notification (Alarm) One Contingency away from SSR vulnerability.**    **IF:**   * EMS SSR Notification (Alarm) identifies one Contingency away from SSR vulnerability   **THEN:**   * Confirm previous steps have been completed; and * Notify QSE with impacted resource |
| **Normal Operations** | **WHEN:**   * Back to normal operations and there is no SSR vulnerability.   **CANCEL:**   * SSR mitigation message on MIS Public.   **THEN:**   * Notify QSE resource is released to come online   **Typical Script for TO:**  This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is notifying [QSE] [resource] is released to come online. Please repeat this back to me.  That is correct, thank you.” |
| **Log** | Log all actions. |
| Post-Contingency Overloads on the South DC Ties | |
| **NOTE** | Ensure all available generation has been committed and the constraint binding before curtailing any South DC-Ties. Curtail only enough to maximize the flow across the South DC-Ties at all times. |
| **1** | **IF:**   * A post-contingency overload is approaching 98% of the Emergency Rating with shift factors for a DC-Tie export;   **THEN:**   * Activate the constraint.   **IF:**   * Shift factors exists for a DC-Tie export only or if activating the constraint does not fully resolve the congestion;   **THEN:**   * Ensure appropriate Resources have been committed, * Request DC-Tie Operator to curtail the appropriate South DC-Tie to a specific MW amount to resolve the overload * Ensure a Mitigation Plan exists for the contingency and review with TO, * If no Mitigation Plan exists, notify Operations Engineer to create one. |
| Basecase Overloads | |
| **1** | **IF:**   * A Basecase exists   **THEN:**   * Verify SCADA is of similar magnitude to the Actual Basecase value (MW and MVAR flows) * Example: Review the SCADA value with Actual (state estimation value) |
| **2** | **IF:**   * Inaccurate, * Indicate NOSCED |
| **3** | **IF:**   * Accurate,   **THEN:**   * Activate constraint   + Lower the value in the % Rating column in TCM to tighten the constraint as needed (minimum of 95%, excluding GTCs)   **IF:**   * A PST can help solve the congestion;   **THEN:**   * Activate the constraint until the PST is studied and moved. |
| **ONTEST** | Resources with a Resource Status of ONTEST, may not be issued dispatch instructions / Operating Instructions except:   * For Dispatch Instructions / Operating Instructions that are a part of the testing; or * During conditions when the Resource is the only alternative for solving a transmission constraint (would need QSE to change Resource Status); or * During Force Majeure Events that threaten the reliability of the ERCOT System. |
| **QSGR** | Market Operation>Real-Time Market>SCED Displays>DSI Displays>DSI Data Processes>DSI Operator Manual Overide HDL And LDL  **IF:**   * A QSGR is needed for voltage support or an unsolved contingency;   **THEN:**   * Override LDL to a level greater than or equal to the COP LSL   + DO NOT override while SCED is running,   + Notify QSE as time permits   + Post message on MIS   **Typical MIS Posting Script:**  ERCOT is taking manual actions for XXXX constraint.   * These Resources can be viewed at ERCOT SharePoint > System Operations – Control Center > Quick Links > Approved Quick Start (QSGR) Resources |
| **Not Dispatchable to SCED** | **REVIEW REFERENCE DISPLAY:**  **EMS Applications>Generation Control>Resource Limit Calculation>RLC Unit Input Data and RLC Unit Output Data**  **IF:**   * A QSE has telemetered more A/S on a specific Resource that is greater than their HSL, OR * A Resource is generating more than their telemetered HSL;   **THEN:**   * SCED will set the HDL=LDL=MW making the Resource un-dispatchable, * Request the QSE to make corrections to telemetry (Resource status, Resource limits, A/S responsibilities, etc.) * Disregard IRRs unless transmission constraint is active. |
| **Qualifying**  **Facilities** | **A list of Qualifying Facilities can be found in Desktop Guide Common to Multiple Desk section 2.20**  **IF:**   * A Qualifying Facility (QF) is needed to operate below its LSL, or be ordered off-line to solve congestion;   **THEN:**   * An Emergency must be declared * Issue an electronic Dispatch Instruction confirmation to the appropriate QSE,   + Choose “DECOMMIT or ERCOT REQUESTED QF OPERATE BELOW LSL” as the Instruction Type from Resource level   + Enter contingency name in “other information”   When issuing a VDI or confirmation, ensure the use of three-part communication:   * + Issue the Operating Instruction   + Receive a correct repeat back   + Give an acknowledgement * Issue an Emergency Notification via Hotline call to TOs, * Instruct the Real-Time Operator to make Hotline call to QSEs, * Post message to MIS Public.   **T#28 - Typical Hotline Script for Emergency Notice for instructing Qualifying Facility to operate offline/below LSL** |
| **Log** | Log all actions. If known, log the outage that is causing the congestion. |
| Basecase / Post-Contingency Exceedance of Phase Angle | |
| **1** | **IF:**   * A Phase Angle exceedance exists,   **THEN:**   * Verify SCADA is of similar magnitude to the Actual value (MW and MVAR flows)   Example: Review the SCADA value with Actual (state estimation value) |
| **2** | **IF:**   * Phase Angle exceedance is valid;   **THEN:**   * Notify the appropriate TO and make them aware of the potential that reclosure of breakers could be affected,   **IF:**   * The TO needs assistance from ERCOT to get Phase Angle exceedance adjusted;   **THEN:**   * This could be transmission switching, creation of a manual constraint, bringing on an additional Resource, returning a planned outage, or development of a CMP. |
| **Log** | Log all actions. |
| Post-Contingency Overloads on Private Use Networks (PUNs) or Customer Owned Equipment behind the Meter | |
| **1** | **IF:**   * A post-contingency overload is 100% of its Emergency Rating on a PUN or customer owned equipment;   **THEN:**   * Contact the appropriate QSE/PUN to alert them of the post-contingency overload,   **VERIFY:**   * There is a plan to mitigate the overload if the contingency were to occur. |
| **2** | **IF:**   * It is determined that the QSE/PUN has no way to mitigate or correct the congestion;   **THEN:**   * Instruct the QSE/PUN to take action such as lower/raise generation or load (verbal Operating Instruction only, do not override HDL/LDL or activate constraint in SCED) and * Acknowledge the post-contingency overload in TCM. |
| **3** | **IF:**   * The contingency occurs;   **THEN:**   * Notify the QSE/PUN to ensure action is being taken on the plan. |
| **4** | **IF:**   * A post-contingency overload of 98% or greater of its Emergency Rating on transmission equipment (non-PUN or customer owned equipment);   **THEN:**   * Activate the constraint. |
| **Log** | Log all actions. |
| Managing Constraints in SCED | |
| **NOTE** | One of the key tasks is to properly monitor and manage transmission constraints. Keep track of non-binding constraints that have flows approaching their limits and be prepared to take action as the constraint approaches its rating. |
| **Output**  **Displays** | REVIEW REFERENCE DISPLAY:  Market Operation>Real-Time Market>SCED Displays>DSP Displays>DSP Constraint Summary  Once SCED has completed its run, check the validity of the binding/exceeded constraints, limits, shadow price, and current real-time flows. |
| **In**  **Series** | It is common for series elements to have nearly identical shift factors for a given contingency. If post-contingency loading of 98% or greater occurs for multiple elements which have been identified as being in series with each other, only the most limiting constraints should be activated to mitigate all the series element congestion.  **Example: Contingency A overloads X, Contingency A overloads Y** |
| **Same**  **Element** | If post-contingency loading of 98% or greater occurs on the same element for multiple contingencies and they have nearly identical shift factors, only one of the most limiting constraints should be activated to mitigate the congestion.  **Example: Contingency A overloads X, Contingency B overloads X** |
| **1** | Verify that the SCED executions are reducing the flows on each constraint that is binding. |
| **2** | When a constraint becomes violated in SCED, which is when it has reached its max shadow price and is exceeding its Emergency rating, review the following bullets to take the appropriate action(s):   * Confirm that pre-determined relevant RAPs are properly modeled in the EMS, * Ensure base points are being followed , * Remove Resource from ONTEST , * Remove A/S to increase capacity available to SCED (see procedure below), * Determine if a unit carrying Off-line Non-Spin could be used,   + Ask Resource Operator to deploy Non-Spin for the specific unit   + The telemetered Non-Spin schedule must be changed to 0 for SCED to dispatch the Resource * Determine if additional units could be committed/decommitted, * Confirm SCED is balancing conflicting constraints * Ensure reactive devices are being utilized |
| **3** | **IF:**   * All applicable steps above have been completed, AND constraint is still exceeding its Emergency Rating;   **THEN:**   * Seek to determine what unforeseen change in system condition has arisen and where possible, seek to reverse the action, * Instruct Operations Support Engineer to develop a mitigation plan, AND * Notify Shift Supervisor to contact the Director Control Room Operations and/or Designee to investigate further * Refer to Section 4.3, Closely Monitored SOLs |
| **NOTE** | EMP Applications>TCM-Transmission Constraint Manager>Related Displays>Message Log for CAM  **IF:**   * No shift factors are passed for the constraint;   **THEN:**   * Contact Help Desk to issue a ticket to EMMS Production to fix immediately. |
| **Log** | Log all action taken including the following:   * Reason for doing a manual override * Any security violations that were ≥ 125% of the Emergency Rating |
| Remove A/S to Increase Capacity available to SCED | |
| **1** | **RLC Unit Input Data display**  **IF:**   * A/S needs to be removed from a specific unit in order to increase capacity to SCED;   **THEN:**   * Instruct the QSE to remove the A/S by updating their telemetry to ON to free that capacity to SCED   + Notify Resource Operator with undeliverable A/S type, amount and approximate hours. |
| **LOG** | Log all actions. |
| Unsolved Contingencies | |
| **1** | Periodically check the “Contingency Solution Results” display:  **IF:**   * An unsolved contingency exist;   **THEN:**   * Run the State Estimator again, * If unsolved contingency remains, notify the Operations Support Engineer to investigate   **IF:**   * Generation needs to be re-dispatched to solve the contingency   **THEN:**   * Use HDL/LDL override   + Post message on MIS Public anytime manual action is taken   + Log all actions   **IF:**   * EMR Generation needs to be committed such as Hydro   **THEN:**   * Issue an Emergency Notice * Notify the RUC Operator to commit the resource(s) * Log all actions   **IF:**   * It has been determined that a Resource is needed in real-time for a transmission condition after the close of the Adjustment Period (Typically will be short start);   **THEN:**   * Notify the RUC Operator to issue a VDI and an a electronic Dispatch Instruction   + Refer to RUC Procedure 3.7 Manual Dispatch of Resources “Manual Commit of a Resource”   + Post message on MIS Public anytime manual action is taken   **Typical MIS Posting Script:**  ERCOT is taking manual actions for an unsolved contingency.  **WHEN:**   * Constraint solves and the contingency comes into RTCA   + Activate constraint, and   + Release manual override after SCED runs   + Cancel MIS posting. |
| **LOG** | Log all action taken including the following:   * Reason for unsolved contingency * Actions taken to resolve |
| Unresolvable Congestion with EMR Generation available | |
| **1** | **IF:**   * Post-contingent rating exceedance in excess of 115% of the Emergency Rating, * An unsolved contingency, * Real-time exceedance, OR * A CMP that does not maintain Reliability;   **THEN:**   * Verify the contingency definition associated with the constraint is accurate and appropriate given the current state of the grid   **IF:**   * EMR Generation is available to be dispatched to resolve the Reliability issue,   **THEN:**   * Issue a Transmission Emergency Notice * Post message on MIS Public * Notify Real-Time Desk to make Hotline call to QSEs * Notify the RUC Operator to commit the appropriate EMR resource(s)   **Typical MIS Posting Script:**  Transmission Emergency Notice has been issued for the [Specific Area] due to [state issue used in hotline call].  Edit script as needed to fit situation.  **WHEN:**   * Contingency or Constraint solves and is no longer a Reliability concern   + Release the EMR Generation   + Cancel the Transmission Emergency Notice * Cancel MIS posting. |
| **LOG** | Log all action taken including the following:   * Reason for Transmission Emergency Notice * Actions taken to resolve |
| Model Inconsistencies/Updates | |
| **1** | **IF:**   * Any inconsistencies in ratings, impedance changes, etc. are found;   **THEN:**   * Notify Operations Support Engineer so that they can work with the TO to confirm the correct information and if required, correct it through the NOMCR process. |
| **2** | **IF:**   * There is a difference in a Facility rating or system voltage limit between ERCOT and a TO;   **THEN:**   * The most limiting rating will be used until the correct rating can be determined, * Notify Operations Support Engineer so that they can work with the TO to confirm the correct information and if required correct it through the NOMCR process. |
| **LOG** | Log all actions. |
| QSE Requests to Decommit a Resource | |
| **1** | **IF:**   * Notified by the Resource/RUC Operator of a request to decommit a self-scheduled Resource;   **THEN:**   * Perform a real-time study (if necessary) to determine that no violation of security criteria exist with the Resource off-line and no additional active constraints for SCED will occur, * Notify the Resource/RUC Operator with determination. |
| Phase Shifters | |
| **1** | **IF:**   * A TO calls to requests that a Phase Shifter position be adjusted and there is no longer any known Reliability issues in the area;   **THEN:**   * As time permits, run a study to re-evaluate the phase shifter position; * Coordinate with the TO and adjust the phase shifter as needed to an agreed upon position (preferably as close to neutral as possible). |
| **LOG** | Log all actions. |

## 4.2 Transmission Congestion in the Rio Grande Valley

**Procedure Purpose:** To verify and take corrective action for post-contingency overloads and/or voltage conditions.

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| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** | **2.2.2** |  |  |  |
| **NERC Stadard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.4** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** |
| **TOP-001-4**  **R1, R7, R8, R10, R10.1, R10.3, R10.6, R14** |  |  |  |

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| **Version: 1** | **Revision: 32** | **Effective Date: January 31, 2019** |

| **Step** | **Action** |
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| Rio Grande Valley | |
| **NOTE** | DC Tie exports shall not be curtailed during the Adjustment Period, or for more than one hour at a time, except for the purpose of maintaining reliability. |
| **RUC/**  **Future**  **Studies** | **IF:**   * HRUC or off-line studies indicate the need to commit Valley Resources,   **THEN:**   * Commit for time-frame needed   **IF:**   * If studies show high probability of load shed with all available Valley Resources committed, exports on DC-R curtailed, available emergency energy from DC-R, and any outages that can be returned to service within time-frame needed;   **THEN:**   * Issue a transmission emergency for the hours projected to be in this condition |
| **Topology**  **Change** | **IF:**   * A topology change occurs;   **THEN:**   * Re-run RTCA and VSAT.   **IF:**   * A constraint needs to be controlled before the next SCED run   **THEN:**   * Manually run RTCA after activating the constraint, AND * Manually execute the SCED process |
| **Reliability Margin** | **IF:**   * Reliability Margin ≤350 MW   **THEN:**   * Instruct TOs in the affected areas to coordinate with generators and TOs to increase voltages by placing capacitor banks in-service and turning off reactors near the weak busses that are available without exceeding high Voltage SOLs.   **T#93 Rio Grande Valley Reliability Margin ≤350 MW:**  **Example of stations:**  COFFPORT GARZA LA\_PALMA NEDIN RANGERVL RIOHONDO RIO\_GRAN RIO\_RICO STEWART WESLACO |
| **1** | **IF:**   * A post-contingency overload is approaching 98% of the Emergency Rating with shift factors for a DC-Tie export;   **THEN:**   * Activate the constraint.   **IF:**   * Shift factors exists for a DC-Tie export only or if activating the constraint does not fully resolve the congestion;   **THEN:**   * Ensure appropriate Resources have been committed, * Issue a Transmission Watch   + Make Hotline call to TOs   + Post message on MIS Public   + Notify Real-Time Desk to make Hotline call to QSEs * Remove any A/S to Increase Capacity available to SCED * Deploy any available non-spin * Request DC-Tie Operator to curtail the Railroad DC-Tie to a specific MW amount to resolve the overload and post a DC Tie Curtailment Notice (DCTCN) on the MIS Secure Area * Ensure a Mitigation Plan exists for the contingency and review with TO, * If no Mitigation Plan exists, notify Operations Engineer to create one.   **T#89 - Typical Hotline Script for Transmission Watch for the Rio Grande Valley Import**  **Typical MIS Posting Script:**  A Transmission Watch has been issued for the Rio Grande Valley due to the Rio Grande Valley Import. |
| **2** | **WHEN:**   * VSAT runs and provides an updated limit for the Valley Import;   **THEN:**   * Update RTMONI.   **WHEN:**   * The Valley Import is approaching 85% of the limit, OR * The Reliability margin is approaching 150;   **THEN:**   * Activate the Valley Import constraint.   **OR**  **WHEN:**   * There is a transmission outage on a 345kV into the Valley (refer to Operations Support Engineer for limit);   **THEN:**   * Ensure RTMONI is updated with the limit.   **WHEN:**   * The Valley Import is approaching 85% of the limit,   **THEN:**   * Activate the Valley Import constraint.   **Note:** For an unsolved contingency scenario or the Reliability margin is approaching 150, activate the Valley Import (VALIMP) constraint to get the contingency to solve. This may require setting the %Rating lower than 85% to get the constraint to bind. |
| **3** | **IF:**   * One of the following conditions exist **without a generation solution**:   + Unsolved contingency   + Post-contingency loss of a 345kV to the Valley overloads a 345kV   + Post-contingency overload above 125%   + **Valley import is above 90%**   + **Reliability margin is below 95;**   **THEN:**   * Issue a Transmission Emergency Notice   + Make Hotline call to TOs   + Posting message on MIS Public   + Notify Real-Time Desk to make Hotline call to QSEs   **T#29 - Typical Hotline Script for Transmission Emergency for the Rio Grande Valley or Laredo Area**  **Typical MIS Posting Script:**  Transmission Emergency Notice has been issued for the Rio Grande Valley due to [state issue used in hotline call].  Edit script as needed to fit situation. |
| **4** | **IF:**   * The Transmission Emergency is issued, AND * One of the following conditions exist **without a generation solution**:   + Unsolved contingency   + Post-contingency loss of a 345kV to the Valley overloads a 345kV   + Post-contingency overload above 125%   + **Valley import is above 90%**   + **Reliability margin is below 95;**   **THEN:**   * Request Resource Operator to deploy Load Resources in the Valley that have an obligation. |
| **5** | **IF:**   * The Transmission Emergency is issued, AND * One of the following conditions exist **without a generation solution**:   + Unsolved contingency   + Post-contingency loss of a 345kV to the Valley overloads a 345kV   + Post-contingency overload above 125%   + **Valley import is above 95%**   + **Reliability margin is below 85**;   **THEN:**   * Request DC-Tie Operator to curtail any exports on the Railroad DC-Tie * Request emergency energy from the appropriate DC-Tie Operator across the Railroad DC-Tie.   **IF:**   * CENACE is able to send emergency   + Notify ERCOT DC-Tie Operator |
| **6** | **IF:**   * There are no exports schedules to curtail or exports have been curtailed and the transmission area is in an unreliable condition **without a generation solution** and includes one of the following:   + Unsolved contingency   + Post-contingency loss of a 345kV to the Valley overloads a 345kV   + Post-contingency overload above 125%   + Valley import is above 100%   + Reliability margin is below 25;   **THEN:**   * Follow mitigation plan |
| **Cancel** | Make appropriate cancellations when back to normal operations. |
| **LOG** | Log all actions. |
| Transmission/Capacity Issues within the CENACE Area | |
| **NOTE** | On the CENACEE side of the Railroad DC-Tie, there is an automatic runback scheme that runs back the DC-Tie under CENACE contingency conditions. |
| **1** | **IF:**   * Notified by a DC-Tie Operator that CENACE is unable to maintain reliability and needs to curtail an E-Tag;   **THEN:**   * Verify the MW amount, DC-Tie and time of the curtailment, * Notify ERCOT DC-Tie operator with information. |
| **2** | **IF:**   * Notified by a DC-Tie Operator that CENACE is requesting emergency energy;   **THEN:**   * Determine which DC-Tie(s) and amount being requested, * Determine or have Operations Support Engineer determine that sending emergency energy to CENACE would not put ERCOT in an emergency condition   **IF:**   * ERCOT is able to send CENACE emergency energy;   **THEN:**   * Notify ERCOT DC Tie Operator with information and request they issue an electronic Dispatch Instruction. |
| **3** | **WHEN:**   * Notified by a DC-Tie Operator that CENACE no longer is in need of emergency energy;   **THEN:**   * Notify the ERCOT DC Tie Operator with information. |
| **LOG** | Log all actions. |

## 4.3 Closely Monitored SOLs

**Procedure Purpose:** To identify SOLs that should be closely monitored.

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| **Protocol Reference** | **6.5.7.1.10** | **6.5.9.2** |  |  |
| **Guide Reference** | **2.2.2** | **4.5.2(2)(b)** |  |  |
| **NERC Standard** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** | **IRO-009-2**  **R2** |
| **TOP-001-4**  **R1, R10, R10.1, R10.3** |  |  |  |

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| **Version: 1** | **Revision: 16** | **Effective Date: August 1, 2019** |

| **Step** | **Action** |
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| **Cascading**  **Outages** | Uncontrolled successive loss of system elements – widespread electric service interruption that cannot be restrained from sequentially spreading beyond an area predetermined by studies. |
| **SOL**  **Turns**  **Into**  **IROL** | An SOL is an IROL if:   * Loss of load (manual or auto) is greater than 6% of the ERCOT load level used in the study * Triggers automatic under-frequency load shedding * Observable inter-area oscillation with damping ratio less than 3% |
| **NOTE** | Monitor for any of the following conditions:   * Post-contingent rating exceedance in excess of 125% of the Emergency Rating * An unsolved contingency * A divergent case in VSAT * Under-voltage condition characterized by bus voltages of less than 90% across three or more related BES facilities * Over-voltage condition greater than 110% across three or more BES facilities |
| **1** | **IF:**   * Any of the above exists;   **THEN:**   * Confirm the appropriate transmission congestion procedures have been completed, * Notify the Operations Support Engineer to perform cascading outage studies |
| **Studies** | If a facility approaches 125% of Emergency Rating, a study for the loss of the contingency element and the overloaded facility will be conducted.   * Manually remove the contingency in the study and run powerflow, and * Manually remove the facility identified to be loaded above 125% of its Emergency Rating (Breaker to Breaker), and * Run powerflow.   **IF:**   * The study results indicate no additional facilities will be overloaded over 125% of their Emergency rating,   **THEN:**   * This is determined to be a localized event and no additional pre-contingency actions will be taken,   **IF:**   * The study results in an additional facility(s) over 125% of its Emergency rating, continue the analysis to also trip the additional facilities (Breaker to Breaker). This analysis will be performed tripping a maximum of 5 study iterations.   **THEN:**   * If the study indicates either a non-converged case OR continues to show facilities exceeding 125% of their Emergency ratings, this will be considered a potential cascade condition. |
| **Localized**  **Event** | **IF:**   * It is determined to be a localized event;   **THEN:**   * A Mitigation Plan should be developed and reviewed with the affected TO(s) |
| **Cascading**  **Condition** | **IF:**   * It is determined to be a cascading condition (not a local radial load pocket);   **VERIFY (time permitting):**  All of the following relevant actions have been implemented:   * All available generation has been brought online * All generation redispatch options have been utilized * No switching action is available * All available load resources have been deployed * All available reactive devices have been deployed or adjusted without exceeding voltage limits * \*All available load management programs have been deployed by the ERCOT TO (if available) * All DC Tie transactions have been curtailed that negatively impacts * Emergency Energy has been requested or is being imported * Any Distribution Voltage Reduction has been implemented * All necessary Public Appeals have been made   \* Only applies June through September in EEA 2. EEA 2 and EEA3 implements any available Load management plan to reduce Customer Load.  **THEN:**   * Proceed to the next procedure “Pre-contingency Load Shedding to avoid Post-contingency cascading”. |
| Pre-contingency Load Shedding to avoid Post-contingency cascading | |
| **1** | **IF:**   * Load shed is the only option to prevent a cascading condition;   **THEN:**   * Obtain the necessary information from the Operations Support Engineer and review with the affected TO   + The amount of load shed should be enough to remain below the load shed rating of the first overloaded facility   + Verify if load shed needed to be location specific * Inform TO that a Transmission Emergency will be issued * Issue Operating Instruction for load shed |
| **2** | **IF:**   * Load shed is 100 MW or greater;   **THEN:**   * Notify the Operations Support Engineer and Shift Supervisor to initiate the NXT for load shed (SO Request for Firm Load) |
| **3** | Issue a Transmission Emergency:   * Make a Hotline call to TOs * Post message on MIS Public. * Notify Real-Time operator to make hotline call to QSEs   **T#30 - Typical Hotline Script for Transmission Emergency for Cascading Condition**  **Typical MIS Posting Script:**  “ERCOT issued a Transmission Emergency for an expected cascading condition in the [area] with the contingency loss of [constraint name].” |
| **4** | **WHEN:**   * Load can be restored;   **THEN:**   * Issue Operating Instruction to restore the load * Make Hotline call to end the Transmission Emergency * Notify Real-Time Operator to make hotline call to QSEs * Cancel message on MIS * Notify the Operations Support Engineer and Shift Supervisor to initiate the NXT for restoration of load shed (SO Requested Firm Load restoration) |
| **Log** | Log all actions. |

## 4. 4 North-Houston Voltage Stability Limit

**Procedure Purpose:** Maintain transmission Stability between the North and Houston. The North-Houston is a Generic Transmission Constraint (GTC).

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| **Protocol Reference** | **6.5.9.1(1)(e)** | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.4(1)** | **4.5.2(2)(b)** |  |  |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.4** | **IRO-001-4 R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** |
| **IRO-009-2**  **R1, R1.1, R1.2, R2, R3** | **TOP-001-4**  **R1, R7, R8, R10, R10.1, R10.6, R12, R14** | **VAR-001-5**  **R2** |  |

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| **Version: 1** | **Revision: 31** | **Effective Date: August 31, 2018** |

| **Step** | **Action** |
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| **IROL** | The North – Houston VSAT voltage stability limit is an IROL; the actual flow should not be allowed to exceed the limit, and ***MUST NOT*** exceed the limit for more than 30 minutes. If necessary, the System Operator has the authority to instruct load shedding before this IROL has been exceeded. |
| **NOTE** | Although the steps within the procedure are numbered, the numbering is for indexing purposes and are not sequential in nature. The system operator will determine the sequence of steps, exclude steps, or take any additional actions required to ensure system security based on the information and situational awareness available during both normal and emergency conditions. |
| **VSAT** | **WHEN:**   * VSAT runs and provides an updated limit for the North to Houston;   **THEN:**   * Update RTMONI.   **WHEN:**   * The North to Houston flow is approaching 90% of the limit;   **THEN:**   * Activate the North to Houston constraint. |
| **North-Houston**  **345kV Circuit Outage** | **IF:**   * Any of the 345kV lines going into the Houston area has a forced outage;   **THEN:**   * Manually run the entire sequence of RTNET, RTCA, and RTDCP (VSA) immediately and proceed to the Monitor Step in this procedure. |
| **Monitor** | Monitor each of the following Reliability Margins:     * N-H G * N-H L   If any of these Reliability Margins fall below the following pre-defined limits, take the appropriate corrective action for each limit and notify the Shift Supervisor. |
| **Reliability Margin** | **IF:**   * Reliability Margin ≤500 MW   **THEN:**   * Instruct TOs in the affected areas to increase voltages by placing capacitor banks in-service and turning off reactors near the weak busses that are available without exceeding high Voltage SOLs.   **T#95 North – Houston Reliability Margin ≤500 MW:** |
| **≤400MW** | Activate the appropriate constraint(s) such as:   * Thermal constraint(s) * North to Houston constraint   + For an unsolved contingency scenario or the Reliability margin is approaching 400, activate the North to Houston (N\_TO\_H) constraint to get the contingency to solve.   + This may require setting the % Rating lower than 90% to get the constraint to bind. |
| **≤300MW** | Instruct Resource Operator to deploy Non-Spin in the Coast Weather Zone (WZ\_COAST) and remove any A/S to Increase Capacity available to SCED   * Issue a Transmission Watch by making a Hotline call and posting on MIS Public * Notify Real-Time Operator to make Hotline notification to QSEs   **T#31 - Typical Hotline Script for Watch for North to Houston Interface** |
| **NOTE** | When the Non-Spin Resource is on-line, they must change their Non-Spin schedule to 0 in order for SCED to dispatch them. |
| **≤200MW** | VDI QSGR in the Houston area that were not bid in as Non-Spin. Determine QSGR in the Coast Weather Zone (WZ\_COAST)   * Request RUC Operator to issue electronic Dispatch Instruction to commit |
| **≤100MW** | * Instruct the Resource Desk Operator to deploy Load Resources providing RRS in Houston * Issue a Transmission Emergency Notice by making a Hotline call and posting on MIS Public * Notify Real-Time Operator to make Hotline notification to QSEs   **T#32 - Typical Hotline Script for Emergency Notice for North to Houston Interface** |
| **0MW** | * Instruct CenterPoint to drop firm load in 100 MW blocks. * Continue Transmission Emergency Notice by making a Hotline call and posting on MIS Public * Notify Shift Supervisor to make NXT notification   **Typical Script for CenterPoint:**  This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is issuing CenterPoint an Operating Instruction to drop [\*\*\* MW] of firm load for the North – Houston interface. Notify ERCOT when this task is complete. Please repeat this back to me. That is correct, thank you.”  **T#33 - Typical Hotline Script for Emergency Notice for North to Houston Interface, Firm Load Shed:** |
| **Cancel** | Make appropriate cancellations when back to normal operations. |
| **Log** | Log all actions. |

## 4.5 GTC Stability Limits

**Procedure Purpose:** Maintain transmission stability within the ERCOT region when there is a Generic Transmission Constraint (GTC).

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| **Protocol Reference** | **6.5.9.1(1)(e)** |  |  |  |
| **Guide Reference** | **2.2.2** | **4.5.2(2)(b)** |  |  |
| **NERC Standard** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** | **TOP-001-4**  **R1, R10, R10.1, R10.3, R10.6, R14** |

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| **Version: 1** | **Revision: 24** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
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| Panhandle Stability | |
| **NOTE** | The most limiting of the Weighted Short Circuit Ratio (WSCR) limit, the real-time VSAT steady-state voltage stability limit, and the dynamic voltage stability limit, is used when determining limits in real-time. |
| **1** | **WHEN:**   * VSAT runs and provides an updated limit for the Panhandle Stability;   **THEN:**   * Update RTMONI.   **If:**   * VSAT results indicates a lower matrix limit;   **THEN:**   * Verify dynamic voltage stability limit from table identified in Desktop Guide Transmission Desk 2.12 * Update RTMONI   **WHEN:**   * The BASECASE PNHNDL is approaching 85% of the limit;   **THEN:**   * Activate the BASECASE PNHNDL constraint in TCM, AND; * Raise the BASECASE PNHNDL to 95% as the flow stabilizes. |
| **NOTE** | For an unsolved contingency scenario, activate the BASECASE PNHNDL constraint to get the contingency to solve. This may require setting the %Rating lower than 85%. |
| **Topology**  **Change** | **IF:**   * A topology change occurs;   **THEN:**   * Re-run RTCA and VSAT.   **IF:**   * A constraint needs to be controlled before the next SCED run   **THEN:**   * Manually run RTCA after activating the constraint, AND   Manually execute the SCED process |
| **Log** | Log all actions. |
| Nelson Sharpe – Rio Hondo 345kV Stability | |
| **Note** | All lines are in-service, Rio Hondo 345 kV Series Cap in-service and improved reactive controls (capacitor switching scheme at Texas Gulf Wind is available) there is no local voltage stability issue in South Texas near Ajo. |
| **1** | **IF:**   * An outage has occurred on any of the identified elements in the table;   **THEN:**   * Refer to the constraint limit,   **WHEN:**   * The BASECASE NELRIO is approaching 85% of the limit;   **THEN:**   * Activate the BASECASE NELRIO constraint in TCM * The constraint activates AND; * Raise the BASECASE NELRIO to 98% as the flow stabilizes. |
| **2** | If there is more than one line out of service or AEP is unable to manage the reactors at Ajo to control voltages, use the most restrictive limit in RTMONI. With more than one line out of service, this becomes more of a thermal issue and RTCA will most likely be more binding than the GTC. |
| **Log** | Log all actions. |
| Red Tap Stability | |
| **NOTE** | When all lines are in-service, there is no local voltage stability issue. |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE REDTAP flow is approaching 85% of the limit in TCM;   **THEN:**   * Activate the BASECASE REDTAP constraint in TCM * The constraint activates AND; * Raise the BASECASE REDTAP to 98% as the flow stabilizes. |
| **Log** | Log all actions. |
| North Edinburg – Lobo Stability | |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE NE\_LOB flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE NE\_LOB constraint in TCM * The constraint activates AND; * Raise the BASECASE NE\_LOB to 98% as the flow stabilizes. |
| **Log** | Log all actions. |
| East Texas Stability | |
| **NOTE** | When all lines are in-service, there is no local voltage stability issue. |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE EASTEX flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE EASTEX constraint in TCM * The constraint activates AND; * Raise the BASECASE EASTEX to 98% as the flow stabilizes. |
| **Log** | Log all actions. |
| McCamey Stability | |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE MCCAMY flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE MCCAMY constraint in TCM * The constraint activates AND; * Raise the BASECASE MCCAMY to 98% as the flow stabilizes. |
| **Log** | Log all actions. |
| Treadwell Stability | |
| **NOTE** | When all lines are in-service, there is no local voltage stability issue. |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE TRDWEL flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE TRDWEL constraint in TCM * The constraint activates AND; * Raise the BASECASE Treadwell to 98% as the flow stabilizes. |
| **Log** | Log all actions. |
| Raymondville – Rio Hondo Stability | |
| **NOTE** | When all lines are in-service, there is no local voltage stability issue. |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE RV\_RH flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE constraint in TCM * The constraint activates AND; * Raise the BASECASE RV\_RH to 98% as the flow stabilizes |
| **Log** | Log all actions. |
| Bearkat Stability | |
| **NOTE** | When all lines are in-service, there is no local voltage stability issue. |
| **1** | **IF:**   * An outage has occurred on the identified element in the table (identified in Desktop Guide Transmission Desk 2.12);   **THEN:**   * Refer to the constraint limit from table to set the value (identified in Desktop Guide Transmission Desk 2.12); * Update RTMONI from table;   **WHEN:**   * The BASECASE BEARKT flow is approaching 85% of the limit in TCM   **THEN:**   * Activate the BASECASE constraint in TCM * The constraint activates AND; * Raise the BASECASE BEARKT to 98% as the flow stabilizes |
| **Log** | Log all actions. |

## 4.6 RAS, AMP, RAP, PCAP, MP, and TOAP

**Procedure Purpose:** To verify and take corrective action for post-contingency overloads for various conditions.

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| **Protocol Reference** | **6.5.7.1.10(3)** | **6.5.9.3.3** |  |  |
| **Guide Reference** | **2.2.2(3)(b)** | **4.2.3(3)** | **4.3.1** |  |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.3** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** |
| **PRC-001-1.1(ii)**  **R1** | **TOP-001-4**  **R1, R8, R10, R10.1, R10.2, R10.3, R10.5, R10.6, R11, R14** |  |  |
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| **Version: 1** | **Revision: 27** | **Effective Date: November 1, 2019** |

| **Step** | **Action** |
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| **NOTE** | MPs and PCAPs information is included in the EMS, refer to Desktop Guide Transmission Desk section 2.7  Electronic copies for the RASs, RAPs, PCAPs, and MPs can be found on SharePoint.  ERCOT SharePoint > System Operations – Control Center > Quick Links > Post-Contingency Overloads and/or MP/PCAP/RAP |
| **NOTE** | Remedial Action Schemes (RAS) (identified as RAS in EMS) **OR** Remedial Action Plans (RAP)   * EXAMINE the results of RTCA, * If the background has a color indicating a RAS or RAP,   + Refer to Desktop Guide Transmission Desk Section 2.7 for explanation of colors and for actions to be taken based on the color of the background. |
| **Log** | Log all actions. |
| Remedial Action Schemes (RAS) | |
| **NOTE** | Real-time Contingency Analysis (RTCA) indicates a Post Contingent overload(s) on a Contingency in which the RAS will not mitigate all the overloaded elements automatically. In this case, Congestion Management techniques will be utilized to return the system to the state in which the RAS was designed to automatically relieve the overload. |
| **NOTE** | **Use caution when the tolerance setting is <100% in RTCA.** If the post-contingency loading on an element monitored by an RAS is above the tolerance threshold, but below the activation point of the RAS (100%), the contingency associated with the RAS will show in the Transmission Constraint Manager (TCM) display. When this occurs, the result will be a light blue highlighted background identifying the device ID on the TCM display. In this scenario, congestion management is not needed until the criteria in Desktop Guide Transmission Desk Section 2.7, is met. |
| **Monitor** | Each RAS will be displayed on the “Real Time Values” spreadsheet, as the RAS activation threshold increases the display changes color as follows:   * Greater than 80% but less than 90% turns **Orange** * Greater than 90% turns **Red** |
| **1** | Typically RASs are to solve post-contingency overloads on the Transmission System.  **IF:**   * The Transmission system topology has temporarily changed due to outages (planned or forced) that affects an RAS;   **THEN:**   * Utilize congestion management techniques to prevent any known RAS from operating in a pre-contingent state. |
| **2** | **IF:**   * RTCA indicates a post-contingency overload(s) on a contingency in which the RAS will not mitigate all the overloaded elements automatically; Example: (Light blue or Salmon highlighted background and above 100% loading)   **THEN:**   * As system conditions warrant, activate congestion management techniques to relieve the overload. |
| **3** | **IF:**   * No reliability issues will arise as a result of a RAS’s operation;   **THEN:**   * At the Operator’s discretion, allow the RAS to perform its function. |
| **4** | **IF:**   * An RAS operates;   **THEN:**   * Notify affected TO to reset RAS as system conditions warrant |
| **RAS**  **Posting** | All RASs are considered in-service unless otherwise notified by the TO.  **IF:**   * An RAS is taken out of service and/or removed from RTCA;   **THEN:**   * Post the information on MIS Public   **WHEN:**   * The RAS is placed back in service,   **THEN:**   * Cancel the message.   **Typical MIS Posting:**  The [name] RAS has been [taken out of service/removed from RTCA]. |
| **Status**  **Change** | Monitor RAS Summary for status changes.  Refer to Desktop Guide Transmission Desk Section 2.14,  **WHEN:**   * Status changes for any type;   **THEN:**   * Acknowledge alarm   If notified that a RAS has changed status (taken out or placed in service):   * Send e-mail for notification and have RTCA updated,   + “OPS Support Engineering”   + “1 ERCOT System Operators”   + “DAMTeam” |
| **Basecase continuous RAS Triggering** | Continual triggering of a RAS during Basecase operations should be managed utilizing manual constraints created in TCM (only applies to manual reset of RAS controls causing a reliability issue).  **IF:**   * A RAS is continually triggered during Basecase operations;   **THEN:**   * Verify that an associated manual constraint exists for this RAS in TCM, and activate the manual constraint in SCED.   **IF:**   * A manual constraint does not exist for this RAS in TCM;   **THEN:**   * Coordinate with the Operations Support Engineer to build a manual constraint for the RAS action in TCM. |
| **LOG** | Log all actions. |
| Automatic Mitigation Plan (AMP) | |
| **NOTE** | There are no AMPs at this time. |
| Remedial Action Plan (RAP) | |
| **1** | **IF:**   * A RAP exists for the contingency;   **THEN:**   * Confirm that the relevant RAP is properly modeled, * Review the RAP with the impacted TO, * Notify the Shift Supervisor of the anticipated actions. |
| **2** | **IF:**   * A RAP is used to alleviate the identified problem regardless of the contingency listed on the RAP;   **THEN:**   * Make log entry. |
| **3** | **IF:**   * A RAP exists for the contingency **AND** does not solve the contingency **OR** the pre-RAP overload exceeds the 15 MN rating;   **THEN:**   * RTCA does not pass the 15MN (15 minute) rating to TCM, only the EMGY (2-hour emergency) rating. To properly constrain for RAP-associated elements, the % Rating column in TCM may need to be increased so that the constraint limit matches the 15MN value.   + Increase the value in the % Rating column in TCM to loosen the constraint (maximum 100% of 15MN value). |
| **4** | **IF:**   * RTCA indicates a post-contingency overload(s) on a contingency in which the RAP will not mitigate all the overloaded elements automatically; Example: (Light blue or Yellow highlighted background and above 100% loading)   **THEN:**   * Activate constraint. |
| **5** | **IF:**   * The contingency anticipated by the RAP takes place;   **THEN:**   * Instruct the implementation of the RAP, * Respond to requests made by the TO in accordance with the RAP, * If necessary, continue to use additional congestion management methods, * Notify the TO when the contingency clears. |
| **6** | **IF:**   * A RAP will not work as designed and needs to be disabled due to topology changes in the area;   **THEN:**   * Notify the affected TO of actions |
| **RAP**  **Posting** | All RAPs are considered in-service unless otherwise notified by ERCOT or the TO.  **IF:**   * A RAP is taken out of service and/or removed from RTCA;   **THEN:**   * Post the information on MIS Public   **WHEN:**   * The RAP is placed back in service,   **THEN:**   * Cancel the message.   **Typical MIS Posting:**  The [name] RAP has been [taken out of service/removed from RTCA] due to a [Planned/Forced Outage]. |
| **Status**  **Change** | If the RAP has changed status (taken out or placed in service):   * Send e-mail for notification and have RTCA updated,   + “OPS Support Engineering”   + “1 ERCOT System Operators”   + “DAMTeam” |
| **LOG** | Log all actions. |
| Pre-Contingency Action Plan (PCAP) | |
| **CAUTION** | Pre-Contingency Action Plans (PCAPs) are designed to be enacted before the contingency occurs. |
| **1** | **WHEN:**   * RTCA shows a post-contingency overload and a PCAP exists to resolve it;   **THEN:**   * Review the PCAP with the impacted Transmission Operator, * Notify the Shift Supervisor of the anticipated actions, * Instruct the execution of the PCAP with the impacted Transmission Operator.   **Typical Script to appropriate TO:**  “This is ERCOT Operator [first and last name]. At [xx:xx], ERCOT is giving an Operating Instruction [TO] to implement the \*\*\*\*PCAP and [open/close] [breaker(s)]. [TO] please repeat this back to me.”  If repeat back is **CORRECT**, “That is correct, thank you.”  If **INCORRECT**, repeat the process until the repeat back is correct. |
| **NOTE** | If necessary, use congestion management methods for post contingency loading after initiating the PCAP. |
| **2** | **WHEN:**  A PCAP is no longer needed; **THEN:**   * Instruct the impacted Transmission Operator to return the system to: * Its normal status, OR * Its status prior to implementation of the PCAP. |
| **3** | **IF:**   * A PCAP is used to alleviate the identified problem regardless of the contingency listed on the PCAP;   **THEN:**   * Make log entry. |
| **LOG** | Log all actions. |
| Mitigation Plan (MP) | |
| **NOTE** | Mitigation Plans (MPs) are pre-determined actions to be taken associated with the occurrence of a specific contingency event if congestion management methods cannot resolve the post-contingency overload. MPs are designed to be enacted POST-Contingency. They are NOT pre-emptive congestion management actions.   * A MP is developed when SCED cannot fully resolve the constraint, OR * A MP is developed when there are no generator shift factors greater than or equal to 2% as indicated in EMS, * If a MP is used to alleviate the identified problem regardless of the contingency listed on the MP, make a log entry. |
| **SCED**  **unable to**  **fully resolve**  **constraint** | **IF:**   * SCED is unable to resolve a constraint;   **THEN:**   * Keep constraint active in SCED, * Verify a MP or TOAP exists for the contingency, and review the MP or TOAP with the impacted TO   **IF:**   * No MP or TOAP exists for the constraint;   **THEN:**   * Keep constraint active in SCED, * Coordinate with Operations Support Engineer to develop a MP   + If constraint exists due to an outage, a TOAP should be developed (see TOAP procedure), * Issue a Transmission Watch if the MP or TOAP has not been developed within 30 minutes and the constraint remains violated in SCED. |
| **< 2%**  **Absolute**  **Shift**  **Factors** | **IF:**   * A constraint exists for which there are no generator shift factors greater than or equal to 2% as indicated in EMS;   **THEN:**   * Verify a MP or TOAP exists for the contingency, and review the MP or TOAP with the impacted TO   **IF:**   * No MP or TOAP exists for the constraint;   **THEN:**   * Coordinate with the Operations Support Engineer to develop MP   + If contingency exists due to an outage, a TOAP should be developed (see TOAP procedure) * Issue a Transmission Watch if the MP or TOAP has not been developed within 30 minutes. |
| **TO**  **Issue** | **IF:**   * Notified by a TO that it will take more time to implement the MP than is identified on the MP;   **THEN:**   * Notify the Operations Support Engineer to restudy and modify MP, * Log actions taken |
| **Issue**  **Watch** | When issuing a Transmission Watch for an unsolved post-contingency overload (and waiting on MP or TOAP to be developed:   * Make Hotline call to TOs * Instruct Real-Time Operator to call QSEs * Post message on MIS Public   **T#34 - Typical Hotline Script for Transmission Watch for Post-Contingency Overload**  **Typical MIS Posting Script:**  At [xx:xx] a Transmission Watch was issued due to the post-contingency overload of [constraint name], a [mitigation plan/temporary outage action plan] is being developed. |
| **Cancel**  **Watch** | When the MP or TOAP has been developed, cancel the Watch:   * Make Hotline call to TOs * Instruct Real-Time Operator to call QSEs * Cancel message on MIS Public   **T#35 - Typical Hotline Script to Cancel Transmission Watch for Post-Contingency Overload** |
| **Contingency**  **Occurs** | **IF:**   * The anticipated contingency takes place;   **THEN:**   * Instruct (if necessary) the implementation of the MP or TOAP to the impacted TO, * Respond as quickly as possible to requests made by the TO in accordance with the MP, * If necessary, continue to use congestion management methods for post-contingency loading after initiating the MP. * Notify the TO when the system can be returned to normal. |
| **LOG** | Log all actions. |
| Temporary Outage Action Plan (TOAP) | |
| **NOTE** | TOAPs are temporary since they are outage related   * A TOAP is developed when there is no generation shift factors greater than or equal to 2% as indicated in EMS, OR * A TOAP is developed when SCED cannot fully resolve the constraint |
| **Planned**  **Outage** | **IF:**   * A post-contingency overload is due to a planned outage on a transmission line(s) or a transmission facility;   **THEN:**   * Locate the TOAP in the Outage Notes, * Follow the same process as a MP outlined above. |
| **Forced**  **Outage** | **IF:**   * A post-contingency overload is due to a forced outage or planned outage not recognized by Outage Coordination on a transmission line(s) or a transmission facility;   **THEN:**   * Follow the same process as a MP outlined above. |
| **LOG** | Log all actions. |

## 4.7 Manual Dispatch of Resources

**Procedure Purpose:** Manually Dispatch Resources as necessary to ensure system security.

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| **Protocol Reference** | **6.5.7.8** | **6.5.9(3)** |  |  |
| **Guide Reference** | **4.1.(1)** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 15** | **Effective Date: March 31, 2017** |

| **Step** | **Action** |
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| **NOTE** | ERCOT shall honor all Resource operating parameters in Dispatch Instructions / Operating Instructions under normal conditions and Emergency Condition. During Emergency Conditions, ERCOT may verbally request QSE’s to operate its Resources outside normal operating parameters. If such request is received by a QSE, the QSE shall discuss the request with ERCOT in good faith and may choose to comply with the request. |
| Manual Dispatch to take a Unit Off-Line | |
| **1** | **IF:**   * A manual Dispatch Instruction / Operating Instruction will result in the unit being dispatched off-line (i.e., less than the minimum operating limit for that Resource);   **THEN:**   * Request RUC Operator to issue the VDI and electronic Dispatch Instruction. |
| Manual Commit of a Resource | |
| **1** | **IF:**   * It has been determined that a Resource is needed in real-time for a transmission condition;   **THEN:**   * Request RUC Operator to commit the Resource |
| **LOG** | Log all actions. |

## 4.8 Responding to Diminishing Reserves

**Procedure Purpose:** Monitor the Physical Responsive Capability (PRC) for issuing advance notice of diminishing Responsive Reserve. Steps within this procedure are intended to keep ERCOT from progressing into EEA.

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| **Protocol Reference** | **6.5.9.4.1** |  |  |  |
| **Guide Reference** | **4.5.3.1(e)** |  |  |  |
| **NERC Standard** | **TOP-001-4**  **R8** |  |  |  |

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| **Version: 1** | **Revision: 13** | **Effective Date: December 31, 2015** |

| **Step** | **Action** |
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| Advisory | |
| **Issue**  **Advisory** | **IF:**   * PRC < 3000 MW;   **THEN:**   * Using the Hotline, issue an Advisory.   **T#1 - Typical Hotline Script for Advisory PRC <3000 MW** |
| **Evaluate**  **Constraints** | **IF:**   * PRC is expected to continue to drop to the progression of an EEA 2;   **THEN:**   * Proceed to section 7.2, Congestion Management during EEA Levels. |
| **Cancel**  **Advisory** | **WHEN:**   * PRC > 3000 MW;   **THEN:**   * Using the Hotline, cancel the Advisory.   **T#2 - Typical Hotline Script to Cancel Advisory for PRC<3000 MW** |
| **Log** | Log all actions. |
| Watch | |
| **Issue**  **Watch** | **IF:**   * PRC < 2500 MW;   **THEN:**   * Using the Hotline, issue a Watch.   **T#3 - Typical Hotline Script for Watch for PRC <2500 MW**    After the repeat, give TOs an update of system conditions, including chances of proceeding into an EEA. |
| **Cancel**  **Watch** | **WHEN:**   * Notified by the Real-Time operator;   **THEN:**   * Using the Hotline, cancel the Watch.   **T#4 - Typical Hotline Script to Cancel Watch for PRC<2500 MW** |
| **Log** | Log all actions. |

## 4.9 Creation of new GTC in Real-time

**Procedure Purpose:** Unexpected change to system conditions that result in a new Generic Transmission Constraint or modified (GTC).

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| **Protocol Reference** | **3.10.7.6 (6)** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 7** | **Effective Date: March 29, 2019** |

| **Step** | **Action** |
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| **GTC** | If an unexpected change to system conditions occur that results in a new or modified GTC (one that had not previously been defined and posted):   * Declare an OCN * Make Hotline call to TOs * Notify Real-Time operator to make hotline call * Post message on MIS Public   **T#36 - Typical Hotline Script for OCN for new Generic Transmission Constraint**  **Typical MIS Posting Script:**  “An OCN has been issued due to ERCOT developing a [new/modified] Generic Transmission Constraint due to [reason].” |
| **NOTE** | If a OCN has been issued due to ERCOT developing a [new/modified] Generic Transmission Constraint   * Send e-mail for notification,   + 1 ERCOT System Operators   + OPS Support Engineering   + OPS Outage Coordination |
| **LOG** | Log all actions. |

# 5. Manage Outages

## 5.1 Outages

**Procedure Purpose:** Monitor and respond to various types of equipment outages, both Transmission and Generation, in order to maintain reliability of the ERCOT Grid.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.1.4.2** | **3.1.4.4** | **3.1.4.5** | **3.1.4.6** |
| **3.1.5.1** | **3.1.5.5** | **3.1.5.7** | **3.1.5.11** |
| **3.1.6.11** | **6.5.7.1.6** |  |  |
| **Guide Reference** | **2.4** |  |  |  |
| **NERC Standard** | **IRO-017-1**  **R2** |  |  |  |

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| **Version: 1** | **Revision: 13** | **Effective Date: August 31, 2017** |

| **Step** | **Action** |
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| **NOTE** | ERCOT Operators can only make the following changes in the Outage Scheduler:   * Remove actual start/end time if it is within 2 hours of the time the MP entered the outage, * Change status, * Add notes   If a MP needs assistance or is unable to enter their outages, direct them to Outage Coordination. Outage Coordination has an “Impersonation” certification that will allow them to make the needed changes. |
| **NOTE** | Forced Outages should be verbally communicated to ERCOT and must be entered into the Outage Scheduler if it is to remain an Outage for longer than two hours. |
| **1** | **IF:**   * An Emergency Condition is declared;   **THEN:**   * Determine if Outages can be returned to service if causing negative impacts to reliability, * Coordinate with the appropriate TO. |
| Monitor Mode | |
| 1 | **IF:**   * Any outages, either planned or forced, that may require additional monitoring;   **THEN:**   * Mark the outages in the Outage Scheduler OS Monitored Outage display as deemed necessary, * Verify that the marked outages are in monitor mode, * Continue to monitor the marked outages. |
| Forced and Unavoidable Extensions | |
| 1 | **IF:**   * A Forced or Unavoidable Extension is received, review the outage details;   **THEN:**   * Monitor congestion and make appropriate changes as necessary, * Determine if it will have an effect on previously approved outages which may need be to withdrawn. |
| Remedial Switching Action | |
| **Definition** | “Remedial Switching Action” is a Forced Outage sub-type in the Outage Scheduler. ERCOT must approve all Remedial Switching Actions prior to implementation by TOs. |
| **< 3 Days in length** | Remedial Switching Actions are limited to a maximum of 3 days. |
| **> 3 Days in length** | If the Remedial Switching Action is required to remain active for longer than 3 days, a Planned Outage must be submitted to change the position of effected breakers and switches. |
| **Approve** | **IF:**   * No issues identified;   **THEN:**   * Approve the Outage as received. |
| **Reject** | **IF:**   * Reliability issues;   **THEN:**   * Notify Operations Support Engineer; * Reject the outage to ensure system reliability. |
| **Restoration** | Breakers and switches in a Remedial Switching Action must be able to be returned to their normal position within 4 hours or less (this allows for drive time for remote switches w/o SCADA). |
| **Log** | Log all actions. |
| Maintenance Outages | |
| **Definition** | * Level 1- Equipment that must be removed from service within 24 hours to prevent a potential Forced Outage; * Level 2 - Equipment that must be removed from service within 7 days to prevent a potential Forced Outage; and * Level 3 - Equipment that must be removed from service within 30 days to prevent a potential Forced Outage. |
| **Maintenance Outage with start time ≤ 24 Hours** | **IF:**   * A Maintenance Outage is received, review the outage if the scheduled start time is within the next 24 hours;   **THEN:**   * Run a study to determine if the outage will cause any reliability issues. |
| **Approve**  **Maintenance Outage with start time ≤ 24 Hours** | **IF:**   * No reliability issues identified;   **THEN:**   * Approve the Maintenance Outage. |
| **Coordinate Maintenance Outage with start time ≤ 24 Hours** | **IF:**   * Reliability issues exist;   **THEN:**   * Coordinate the start of the outage with the TO to ensure system reliability as long as the outage is allowed to start within 24 hours, AND * Approve the Maintenance Outage. |
| **Coordinate**  **Maintenance Level 2 and 3 Outage ≤ 24 Hours** | **IF:**   * Maintenance Level 2 and 3 outages are received with a start time of less than the next 24 hours, AND * Reliability issues exist;   **THEN:**   * Coordinate the start of the outage with the TO to ensure system reliability as long as the outage is within the allowed Maintenance Level 2 (7 Days) and 3 (30 Days) outage criteria, * ERCOT Outage Coordination group may help coordinate a new start time,   **IF:**   * Reliability issues continue,   **THEN:**   * REQUEST the Operations Support Engineer investigate the development of a MP or TOAP (see section 4.7 Mitigation Plan), * Approve the Maintenance Outage after coordination. |
| **Maintenance Level 2 and 3 Outages** | **IF:**   * Maintenance Level 2 and 3 outages are received with a start time of greater than the next 24 hours;   **THEN:**   * The ERCOT Outage Coordination group has a process to review all Maintenance Level 2 and 3 outages without further action. |
| **Log** | Log all actions. |
| Consequential Outages | |
| **1** | **WHEN:**   * A TO enters the breaker and switch statuses associated with an Electrical Bus;   **THEN:**   * A downstream topology processor will evaluate the breakers and switches associated with the applicable Electrical Bus to determine if the Electrical Bus is consequentially outaged, and to thereby designate the status of the Electrical Bus. |
| **Evaluate** | **IF:**   * The TO has submitted the outage in the Outage Scheduler;   **THEN:**   * As time permits, perform a study to determine the effects the outage has on the ERCOT system and evaluate the request and verify the Outage meets the applicable requirements. |
| **No**  **Violations** | **IF:**   * NO, violations of applicable reliability standards exist;   **THEN:**   * Approve the request in the Outage Scheduler. |
| **Yes**  **Violations** | **IF:**   * YES, violations of applicable reliability standards exist;   **THEN:**   * Reject the request in the Outage Scheduler. |
| **Log** | Log all actions. |
| Returning from Planned Outage Early | |
| **1** | Before an early return from an Outage, a Resource Entity or QSE may inquire of ERCOT whether the Resource is expected to be decommitted by ERCOT upon its early return.  **IF:**   * A QSE is notified by ERCOT that the Resource will be decommitted if it returns early and the Resource Entity or QSE starts the Resource within the previously accepted or approved Outage period;   **THEN:**   * The QSE representing the Resource will not be paid any decommitment compensation. |
| Guidelines for Withdrawal of an Outage | |
| **1** | **IF:**   * Security analysis and/or Operator experience indicates that an “Approved” or “Active” outage may have an adverse impact on system reliability;   **THEN:**   * Review the restoration time of the outage and if necessary, * ERCOT may withdraw the outage. |
| **2** | **WHEN:**   * ERCOT withdraws an outage via the Outage Scheduler;   **THEN:**   * Enter an explanation in the “Reviewers Notes” listing the reliability concerns that caused the withdrawal, * Notify the following, by e-mail, as soon as possible: * OPS Outage Coordination * OPS Support Engineering * 1 ERCOT Shift Supervisors * Include the following information:   + From Station – To Station (if applicable)   + The planned Start and End date of the outage. |
| **3** | **IF:**   * A TO or QSE reports that the outage in question has progressed to a point that withdrawal is not practicable within the outages designated restoration time;   **THEN:**   * Record this information in the “Outage Scheduler Reviewer’s Notes”, * Log the outage in the Transmission Security Log, * Inform the Shift Supervisor, * Continue monitoring system security, * Request Operations Support Engineer to develop Mitigation plan if necessary. |
| Approval of an Outage on Transmission Devices of More than one hour duration | |
| 1 | **IF:**   * A verbal request for permission to remove a transmission device from service for more than one hour is received;   **THEN:**   * Verify with the TO that the work being done will not prevent the device from being placed back in service immediately if needed, * As time permits, determine that such operation will not affect the reliability of the Transmission System, * If outage will cause reliability issues, go to Step 2 * If no impact to the system, go to 3. |
| **2** | **IF:**   * System reliability is impacted;   **THEN:**   * Discuss with the TO the possibility of postponing the outage to a later time OR deny the request. |
| **3** | **IF:**   * There is no reliability issue;   **THEN:**   * Verbally approve for the TO to remove a transmission device from service. * Instruct TO to make notification when device is place back in service. |
| **Log** | Log all actions. |
| Simple Transmission Outage | |
| **NOTE** | A Simple Transmission Outage is a classification of outage that can be removed from service without effecting LMP prices or causing congestion. The Outages are limited to the following 3 basic descriptions:   * Expanded Bus Outage * Generator Breaker Maintenance * Open-ended Lines   Refer to Desktop Guide Transmission Desk Section 2.2. |
| **1** | **IF:**   * The outage meets the requirements of a Simple Transmission Outage, which are: * Has been submitted between 1 and 2 days in advance, * Cannot exceed 12 hours in duration, **AND** * Has a restoration time of 1 hour or less;   **THEN:**   * ERCOT will approve or reject within 8 business hours after receipt. |
| Opportunity Outages | |
| **Definition** | An Outage that may be accepted by ERCOT when a specific Resource is Off-Line due to an Outage. |
| **1** | Opportunity Outages for Resources are a special category of Planned Outages that may be approved by ERCOT when a specific Resource has been forced Off-Line due to a Forced Outage and the Resource has been previously accepted for a Planned Outage during the next eight days. |
| **2** | When a Forced Outage occurs on a Resource that has an accepted or approved Outage scheduled within the following eight days, the Resource may remain Off-Line and start the accepted or approved Outage earlier than scheduled. The QSE must give as much notice as practicable to ERCOT. |
| **3** | Opportunity Outages of Transmission Facilities may be approved by ERCOT when a specific Resource is Off-Line due to a Forced, Planned or Maintenance Outage. A TO may request an Opportunity Outage at any time. |
| **4** | When an Outage occurs on a Resource that has an approved Transmission Facilities Opportunity Outage request on file, the TO may start the approved Outage as soon as practical after receiving authorization to proceed by ERCOT. ERCOT must give as much notice as practicable to the TO. |
| Rescheduled High Impact Outage (RO) | |
| **Definition** | **An Outage on a High Impact Transmission Element (HITE) that was:**   * Originally submitted and Approved as a Planned Outage with greater than 90 days’ notice * Being considered for rescheduling due to withdrawal of the original Planned Outage or subsequent Rescheduled Outage(s) |
| **1** | **IF:**   * The outage meets the requirements of a High Impact Outage (HIO) Outage * The Outage interrupts flow on a High Impact Transmission element (HITE) * The Outage was submitted with greater than 90 days’ notice * The Outage needs to be Withdrawn or Rescheduled * The Requesting TO wants to Reschedule the Outage   **THEN:**   * Go to the Outage Detail Page and select “Reschedule Outage”. Select one element in the Group Outage converts the entire Group |
| **2** | **IF:**   * The Requesting TO does NOT want to reschedule the Outage.   **THEN:**   * Withdraw the outage |
| **Log** | Log all actions. |

## 5.2 Protective Relay Outages

**Procedure Purpose:** Be aware and respond if needed to protective relay system failures when notified by a QSE or TO.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **6.2.4** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 3** | **Effective Date: June 1, 2017** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | * Protective relay maintenance that ERCOT ISO has been made aware of can be found on the Outage Calendar located on the System Operations SharePoint. * Protective relay systems include: relays, associated communications systems, voltage and current sensing devices, station batteries, and DC control circuitry. |
| **Planned**  **Outage** | **IF:**   * Notified that a relay is going to be removed from service (Planned);   **THEN:**   * Verify or enter information on the Outage Calendar located on the System Operations SharePoint Site, * A relay can’t be removed from service unless there are secondary/back up relays that will be functional and no system degradation will occur;   **IF:**   * Secondary/back up relays in place;   **THEN:**   * Notify the TO they can proceed with work. |
| **Protective**  **Relay**  **or**  **Equipment**  **Failure** | When notified by a QSE or TO that a protective relay or equipment failure reduces system reliability:   * Ask the QSE or TO how it reduces system reliability and what corrective actions have been taken, * Ask the QSE or TO if notifications have been made to any other affected TOs, * Notify the Operations Support Engineer to verify that system reliability has been affected. If so, a corrective action must be taken within 30 minutes. Corrective action could include, re-dispatching as studies dictate, possible reconfiguration, or firm Load shed, * Determine if other TOs are affected by this failure and make notification by phone. |
| **Forced**  **Outage** | **IF:**   * Notified that a primary relay has been removed from service (forced);   **THEN:**   * Ask if the secondary/back up relay is functional;   **IF:**   * There is no secondary/back up relay;   **THEN:**   * The equipment will need to be removed from service since it is no longer protected. |
| **LOG** | Log all actions. |

# 6. General Voltage Guidelines

## 6.1 Voltage Control

**Procedure Purpose:** Ensure adequate voltage levels are maintained throughout the ERCOT grid to prevent a potential voltage collapse.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.15.1(3)** | **6.5.7.1.10(3)(h)** | **6.5.7.7(2)** | **6.5.7.7(6)** |
| **Guide Reference** | **2.2.5(1)** | **2.2.6(2)** | **2.2.10** | **2.7.2** |
| **2.7.3** | **2.7.4** |  |  |
| **NERC Standand** | **IRO-001-4**  **R1** | **IRO-002-5**  **R5** | **IRO-008-2**  **R5, R6** | **NUC-001-3**  **R4, R4.1, R4.2, R9, R9.2, R9.2.1, R9.4, R9.4.1, R9.4.2** |
| **PRC-001-1.1(ii)**  **R1** | **TOP-001-4**  **R1, R7, R10, R10.1, R10.3, R10.6, R14** | **VAR-001-5**  **R2, R3, R5, R5.2** |  |
|  |  |  |  |

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| **Version: 1** | **Revision: 35** | **Effective Date: December 28, 2018** |

| **Step** | **Action** |
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| **NOTE** | The intent of this procedure is to verify and take corrective action for voltage issues. Although the steps within the procedure are numbered, the numbering is for indexing purposes and are not sequential in nature. The system operator will determine the sequence of steps, or any additional actions required to prevent voltage collapse. |
| **NOTE** | ERCOT posts the "Seasonal Voltage Profiles" desired voltage for each generation interconnection. The current profiles for generators may be found in the  ERCOT Market Information System (MIS) Secure site.  Select: Grid> Transmission>Voltage and Dynamic Ratings>Voltage Profiles  Select “Voltage Profiles” Open the current file>Open the xls file. |
| **NOTE** | **All Operating Instructions shall be in a clear, concise, and definitive manner. Ensure the recipient of the Operating Instruction repeats the information back correctly. Acknowledge the response as correct or repeat the original statement to resolve any misunderstandings.** |
| Voltage Issues at Nuclear Power Plants | |
| **NOTE** | ERCOT and TOs shall maintain the switchyard voltage at each operating nuclear power plant at a value that does **not** violate its licensing basis with the Nuclear Regulatory Commission. |
| **Comanche**  **Peak**  **Voltage**  **Table** | **For Comanche Peak:**   |  |  |  | | --- | --- | --- | | **System** | **345 kV** | **138kV** | | Nominal Voltage | 352 kV | 141 kV | | Tolerance | +2.56% or -3.40% | +2.13% or -4.26% | | Maximum Voltage | 361 kV | 144 kV | | Minimum Voltage | 340 kV | 135 kV |   Decordova and Wolf Hollow are points at which generation voltage adjustments can be expected to impact control of Comanche Peak voltage. |
| **STP**  **Voltage**  **Table** | **For South Texas Project:**   |  |  |  | | --- | --- | --- | | **Plant Configuration** | **Maximum kV** | **Minimum kV** | | Normal line up | 362.25 | 339 | | Alternate line up | 362.25 | 339 |   The STP Switchyard Facilities’ steady state voltage, should be maintained within the ranges above. This could become more difficult with both STP units off-line.  Calaveras (Spruce), Braunig (Von Rosenberg), DOW, and WAP are points at which generation voltage adjustments can be expected to impact control of STP voltage.  **Note:** It is the STP QSEs responsibility to notify ERCOT when STP is in an alternate line up. |
| **1** | **IF:**   * Voltage levels exceed the limits as stated above in the voltage tables;   **THEN:**   * Notify the appropriate Nuclear Plant’s QSE   + Give an explanation of the event and an estimate of when voltage is expected to return to normal, to the extent possible * Notify CenterPoint if related to STP * Coordinate the appropriate voltage control action with the affected TO and QSE. |
| **2** | **WHEN:**   * Voltage is back to normal range;   **THEN:**   * Notify the appropriate Nuclear Plant QSE, and * Notify the affected TO and CenterPoint (if related to STP) |
| Real-Time Voltage Issues | |
| **NOTE** | * Post-Contingency low voltage alarms beyond the emergency operating low voltage limit could trigger Automatic Under-Voltage Load Shedding if the contingency were to occur. Detailed information on the amount of load on Automatic Under-Voltage Load Shedding Schemes (UVLS) can be found in Desktop Guide Transmission Section 2.9. * ERCOT, shall instruct QSEs having Generation Resources required to provide Voltage Support Service (VSS), to make adjustments for voltage support within the Unit Reactive Limit (URL) provided by the QSE to ERCOT. * Generation Resources required to provide VSS may not reduce high reactive loading on individual units during abnormal conditions without the consent of ERCOT unless equipment damage is imminent. * Major transmission lines shall be kept in service during Light Load as much as possible. Lines should only be removed after all applicable reactive controls are implemented and studies are performed showing that reliability will not be degraded. |
| **NOTE** | ERCOT Nominal Voltage Levels are 345kV, 138kV, and 69kV.  The general voltage guidelines are as follows (listed in kV):   |  |  |  |  | | --- | --- | --- | --- | | Nominal Voltage | Normal Operating Limits | Emergency Operating Limits | Ideal Voltage Range | | 345 | 327.75 – 362.25 | 310.5 – 379.5 | 345 – 359 | | 138 | 131.1 – 144.9 | 124.2 – 151.8 | 138 – 144 | | 69 | 65.55 – 72.45 | 62.1 – 75.9 | 69 – 71.5 |   Some TOs utilize different Normal (Basecase) and Emergency (Post-Contingency) voltage operating limits than the general voltage guidelines. These limits can be seen under the Network Limits display. |
| **1** | **Monitor the voltage contingency violations and Basecase voltage violation displays in RTCA**  **WHEN:**   * Indicated by SCADA alarms, RTCA or by a TO of voltage concerns;   **THEN:**   * Determine if the SCADA is of similar magnitude to the pre-contingency value.   + Example: Review nearby kV measurements   + Review “Voltage Tracking Issues Spreadsheet” on SharePoint to ensure the Basecase/contingency is not listed   + If listed, no further action needed.   **IF:**   * Inaccurate;   **THEN:**   * Notify the Shift Supervisor and Operations Support Engineer to investigate. * Log in “Voltage Tracking Issues” on SharePoint * Make log entry. |
| **2** | **IF:**   * Accurate;   **THEN:**   * Discuss the voltage concern with the appropriate TO   + Has the TO utilized all static reactive power resources? (capacitors, reactors, change transformer taps)   **Typical Script to appropriate TO:**  “This is ERCOT Operator [first and last name]. At [xx:xx], ERCOT is instructing [TO] to [Raise/Lower] voltage at [specify bus] by [Closing/Opening/Adjusting] [Cap/Reactor/Transformer Tap] to resolve a [Basecase Voltage Violation/RTCA Voltage Contingency Violation]. [TO] please repeat this instruction back to me.”  If repeat back is **CORRECT**, “That is correct, thank you.”  If **INCORRECT**, repeat the process until the repeat back is correct.  **IF:**   * Additional reactive support or coordination is needed to clear the violation;   **THEN:**   * Discuss with the appropriate TO and come to an agreement as to the proper action. This could be transmission switching, adjusting voltage at a nearby Generation Resource, bringing on an additional Resource, returning a planned outage, or development of an CMP   **IF:**   * The TO needs assistance from ERCOT to get voltage adjusted at a Resource;   **THEN:**   * Instruct the appropriate QSE to raise or lower bus voltage, * The QSE should complete the requested in no more than five minutes.   **Typical Script to appropriate QSE:**  “This is ERCOT Operator [first and last name]. At [xx:xx], ERCOT is instructing [QSE] to [raise or lower] voltage at [specify bus] by [+1 or 2kV or -1 or 2kV] for a target of [target kV]. [QSE] please repeat this instruction back to me.”  If repeat back is **CORRECT**, “That is correct, thank you.”  If **INCORRECT**, repeat the process until the repeat back is correct. |
| **3** | When voltage issue has been resolved notify the impacted TO. |
| East HVDC Tie Voltage Limits | |
| **NOTE** | The East HVDC tie has voltage limits depending on the tie condition.  See **Desktop Guide Transmission Desk** 2.19 |
| **1** | **WHEN:**   * Notified by AEP TOP that Reactors have been placed in/out of service on the East DC tie   **THEN:**   * Notify the DC tie desk operator |
| **LOG** | Log all actions. |
| Future Voltage Issues | |
|  | **WHEN:**   * Notified by the Reliability Risk desk or RUC Operator of future voltage violations;   **THEN:**   * Review the “Voltage Tracking Issues” on SharePoint. If it is reoccurring, the solution may be listed on the “Resolutions” tab   **IF:**   * Any capacitors or reactors are **AVAILABLE** that can address the violation;   **THEN:**   * Ensure the capacitor or reactor clears the violation   **IF:**   * Additional reactive support or coordination is needed to address the violation;   **THEN:**   * Discuss the identified future voltage violations with the appropriate TO and come to an agreement as to the proper action. This could be transmission switching, development of a CMP, making reactive devices available, or commitment of additional generation   **IF:**   * An Off-Line Resource is needed to resolve the voltage violation;   **THEN:**   * Instruct RUC Operator to commit the Resource |
| **LOG** | Log all actions. |
| ERCOT requesting Resource to operate beyond URL | |
| **Exceeding**  **URL or**  **Reducing**  **Output** | If ERCOT determines that a Generation Resource should be instructed to provide additional MVAr beyond its URL or that a Generation Resource’s real power output should be decreased to allow the Generation Resource to provide additional Reactive Power beyond the URL, ERCOT shall issue a Resource-specific a Dispatch Instruction / Operating Instruction requiring any change in Reactive Power and/or real power output, except that ERCOT may not require a Generation Resource to exceed its excitation limits.  **IF:**   * A QSE communicates that an ERCOT or TO voltage instruction requires the Generation Resource to exceed its Unit Reactive Limit (URL) or the Resource has to reduce MW;   **THEN:**   * Request the QSE to follow the instruction and inform them that Operations Analysis will make the verification and either an electronic Dispatch Instruction for settlements will be issued or a call with an explanation will be followed up on the next business day * Send e-mail to Operations Analysis and shiftsupv with the following information:   + - Resource name     - Specific voltage set point.     - Start time     - End time |
| **QSE**  **Performance** | Maintain a log of QSEs acknowledgements of Dispatch Instructions / Operating Instructions concerning scheduled voltage or scheduled Reactive output requests. QSEs responding in less than two minutes from the time of issuance shall be deemed satisfactory. |
| Voltage Security Assessment Tool (VSAT) | |
| **NOTE** | VSAT and RUC perform full AC analysis of all contingencies. |
| **1** | **IF:**   * Any of the monitored VSAT scenario results approaches the Reliability margins listed in the table below;   **THEN:**   * Manually rerun the entire sequence of RTNET, RTCA, and RTDCP (VSA) * Confirm VSAT indicates either “Normal” or “Pending”  |  |  | | --- | --- | | **Reliability Margin Table** | | | **Scenario Name** | **Margin** | | LAREDO | 25MW | | ***N-H\_G*** | 200MW | | ***N-H\_L*** | 200MW | | PNHNDL | 50MW | | O-VAL\_L | 100MW |   **For *N-H\_G* and *N\_H\_L*:**  Refer to section 4.4 North-Houston Voltage Stability Limit of this procedure. |
| **2** | **IF:**   * VSAT indicates that a Reliability Margin may be exceeded;   **THEN:**   * Determine if the current Reliability Margin pre-contingency value is less than the Margin on the table in the previous step. * If no, no further action is required. * If yes, go to Step 3. |
| **3** | Determine the contingency status in RTCA (solved/unsolved).  **IF:**   * **Solved,** * Have Operations Support Engineer verify if the problem is real, * If real, request information on weak bus, * Request the TO in the affected area turn on capacitor banks and turn off reactors near the weak busses. * If not real, no further action is required. * **Unsolved,** * Notify Shift Supervisor and Operations Support Engineer * Manually dispatch fast ramp generators to increase generation in weak bus area. * If all online units are at maximum capacity * Instruct RUC Operator to commit additional resources in the weak bus area that are available. |
| **4** | **WHEN:**   * Capacitor banks are placed in service;   **THEN:**   * Rerun VSAT with new topology. |
| **5** | Determine if the current Reliability Margin pre-contingency value is greater than the Margin Value from the table above.  **IF:**   * The current Reliability Margin pre-contingency value is greater than the Margin;   **THEN:**   * No further action is required.   **OR**  **IF:**   * The current Reliability Margin pre-contingency value is less than the Margin;   **THEN:**   * Determine if there are more units available in the affected area, AND * Repeat the process starting with Step 3.   If no additional generation is available, continue. |
| **6** | **IF:**   * No additional generation is available;   **THEN:**   * Notify Operations Support Engineer to create a Mitigation Plan. |
| Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR) | |
| **NOTE** | Each QSE’s Generation Resource providing VSS shall operate with the unit’s Automatic Voltage Regulator (AVR) in the voltage control mode unless specifically instructed to operate in manual mode by ERCOT. |
| **NOTE** | The current status of each PSS and AVR can be viewed at EMP applications>SCADA>Unit AVR/PSS Summary EMS Display. |
| **1** | Monitor each QSE’s Generation Resource AVR status.  **WHEN:**   * A discrepancy is identified;   **THEN:**   * Verify the discrepancy with the QSE or TO   **IF:**   * Determine if the AVR is in manual or in Power Factor Mode;   **THEN:**   * Instruct the QSE or TO to manually adjust VAR output as required to maintain voltage set-point until the AVR is back in service,   **NOTIFY:**   * The appropriate TO of the status, if not already done so by QSE, * Enter the status change information into the ERCOT Logs,   + Log type of “AVR”.   + Include the company name, the name of the person spoken with, and reason (if device is being placed in or taken out of service).   + Include that the TO has been notified of change in status   + Copy and paste the log entry into an e-mail and send to     - “Operations Analysis”     - “OPS Support Engineering”     - “OPS Advanced Network Applications”     - “1 ERCOT System Operators” |
| **2** | **WHEN:**   * Notified by a QSE or TO of a PSS or AVR in manual or in Power Factor Mode;   **THEN:**   * Instruct the QSE or TO to manually adjust VAR output as required to maintain voltage set-point until the AVR is back in service,   **NOTIFY:**   * The appropriate TO of the status, if not already done so by QSE, * Enter the status change information into the ERCOT Logs,   + Log type of either “PSS” or “AVR”.   + Include the company name, the name of the person spoken with, and reason (if device is being placed in or taken out of service).   + Include that the TO has been notified of change in status   + Copy and paste the log entry into an e-mail and send to     - “Operations Analysis”     - “OPS Support Engineering”     - “OPS Advanced Network Applications”     - “1 ERCOT System Operators” |
| **3** | **WHEN:**   * Notified by a QSE that the PSS or AVR is in Auto and back in service;   **NOTIFY:**   * The appropriate TO of the status, if not already done so by QSE, * Enter the status change information into the ERCOT Logs,   + Log type of either “PSS” or “AVR”.   + Include the company name, the name of the person spoken with, and reason (if device is being placed in or taken out of service).   + Include that the TO has been notified of change in status   + Copy and paste the log entry into an e-mail and send to     - “Operations Analysis”     - “OPS Support Engineering”     - “OPS Advanced Network Applications”     - “1 ERCOT System Operators” |
| **LOG** | Log all actions. |
| Generator Voltage Set Points | |
| **NOTE** | TOs may change Voltage Set Points for Generators different than in the seasonal Voltage Profiles as necessary. TOs are required to telemeter Voltage Set Point targets and measurements at the POI for each Generation Resource. Generation Resources (greater than 20 MVA) are required to maintain the voltage at the POI within +/– 2% of the target. |
| **NOTE** | The current status of each Voltage Set Point target and measurement can be viewed at EMP applications>SCADA> Voltage Set Point Display. Additionally, after going to Unit Voltage Set Point Display (Voltage Set Point tab), >Related Displays>Voltage Set Point Communication Display. |
| **NOTE** | When a Voltage Set Point target is entered outside of a reasonability range (.95 to 1.05 pu), the EMS will hold the last good target and identify the target as “Unreasonable”. |
| **1** | **IF:**   * A Generation Resource is not maintaining voltage at the POI within +/– 2% (checked as “Violated”).   **THEN:**   * Instruct the TO to coordinate with the resources to make adjustments to maintain the voltage at the POI at the Voltage Set Point target (within + or – 2%). |
| **2** | **IF:**   * A Voltage Set Point Target is checked as “Unreasonable”;   **THEN:**   * Contact the appropriate TO, * State that ERCOT has received an unreasonable Voltage Set Point target (outside of .95 to 1.05 pu), * Instruct TO to enter the correct Voltage Set Point target. |
| **LOG** | Log all actions. |

# 7. Emergency Operations

## 7.1 Market Notifications

**Procedure Purpose:** Guidelines for issuing Emergency Conditions and the four possible levels: Operating Condition Notices (OCN), Advisories, Watches, and Emergency Notices.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.1.4.6** | **6.5.9.3** | **6.5.9.3.1** | **6.5.9.3.2** |
| **6.5.9.3.3** | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.1** | **4.2.2** | **4.2.3** | **4.2.4** |
| **NERC Standard** | **TOP-001-4**  **R8** |  |  |  |

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| **Version: 1** | **Revision: 30** | **Effective Date: November 1, 2019** |

| **Step** | **Action** |
| --- | --- |
| OCN | |
| **NOTE** | Consider the severity of the potential Emergency Condition. The severity of the Emergency Condition could be limited to an isolated local area, or the condition might cover large areas affecting several entities, or the condition might be an ERCOT-wide condition potentially affecting the entire ERCOT System. |
| **1** | As instructed by the Shift Supervisor or when appropriate, issue an Operating Condition Notice (OCN). The OCN can be issued for any of the following reasons or to obtain additional information from TOs or QSEs.   * There is a projected reserve capacity shortage that could affect reliability and may require more Resources * When extreme cold weather is forecasted approximately 5 days away * When extreme hot weather is forecasted approximately 5 days away * When an approaching Hurricane / Tropical Storm is approximately 5 days away * Unplanned transmission Outages that may impact reliability * When adverse weather conditions are expected, ERCOT may confer with TOs and QSEs regarding the potential for adverse reliability impacts and contingency preparedness |
| Advisory | |
| **1** | As instructed by the Shift Supervisor or when appropriate, issue an Advisory. The Advisory can be issued for any of the following reasons or to obtain additional information from TOs or QSEs.   * When an approaching Hurricane / Tropical Storm is approximately 3 days away * When extreme cold weather is forecasted approximately 3 days away * When extreme hot weather is forecasted approximately 1 to 3 days away * When conditions are developing or have changed and more Ancillary Services will be needed to maintain current or near-term reliability * ERCOT may exercise its authority to increase Ancillary Service requirements above the quantities originally specified in the Day-Ahead Market in accordance with ERCOT procedures * When extreme weather or conditions require more lead-time than the normal Day-Ahead Market allows * Transmission system conditions are such that operations within security criteria are not likely or possible due to Forced Outages or other conditions unless a CMP exists * Loss of communications or control condition is anticipated or significantly limited * ERCOT may require information from QSEs representing Resources regarding the Resources’ fuel capabilities. Requests for this type of information shall be for a time period of no more than seven days from the date of the request |
| Watch | |
| **1** | As instructed by the Shift Supervisor or when appropriate, issue a Watch. The Watch can be issued for any of the following reasons or to obtain additional information from TOs or QSEs.   * A projected reserve capacity shortage is projected with no market solution available that could affect reliability. * When an approaching Hurricane / Tropical Storm is approximately 1 day away * When extreme cold weather is projected for next day or current day. * When extreme hot weather is projected for next day or current day * Conditions have developed such that additional Ancillary Services are needed in the Operating Period * Insufficient Ancillary Services or Energy Offers in the DAM * Market-based congestion management techniques embedded in SCED will not be adequate to resolve transmission security violations * Forced Outages or other abnormal operating conditions have occurred, or may occur that would require ERCOT to operate with active violations of security criteria as defined in the Operating Guides unless a CMP exists * ERCOT varies from timing requirements or omits one or more Day-Ahead or Adjustment Period and Real-Time procedures. * ERCOT varies from timing requirements or omits one or more scheduling procedures in the Real-Time process. * The SCED process fails to reach a solution, whether or not ERCOT is using one of the measures in Failure of the SCED Process. * The need to immediately procure Ancillary Services from existing offers * ERCOT may instruct TOs to reconfigure transmission elements as necessary to improve the reliability of the system * ERCOT may require information from QSEs representing Resources regarding the Resources’ fuel capabilities. Requests for this type of information shall be for a time period of no more than seven days from the date of the request |
| Emergency Notice | |
| **1** | As instructed by the Shift Supervisor or when appropriate, issue an Emergency Notice. The Emergency Notice can be issued for any of the following reasons or to obtain additional information from TOs or QSEs.   * Loss of Primary Control Center Functionality * Load Resource deployment for North-Houston voltage stability * ERCOT cannot maintain minimum reliability standards (for reasons including fuel shortages) during the Operating Period using every Resource practically obtainable from the market * Immediate action cannot be taken to avoid or relieve a Transmission Element operating above its Emergency Rating * ERCOT forecasts an inability to meet applicable Reliability Standards and it has exercised all other reasonable options * A transmission condition has been identified that requires emergency energy from any of the DC-Ties or curtailment of schedules * The Transmission Grid is such that a violation of security criteria as defined in the Operating Guides presents the threat of uncontrolled separation or cascading outages, large-scale service disruption to load (other than Load being served from a radial transmission line) and/or overload of Transmission Elements, and no timely solution is obtainable through SCED or CMPs * When extreme cold weather is beginning to have an adverse impact on the System * When extreme hot weather is beginning to have an adverse impact of the System * When Hurricane / Tropical Storm is in the ERCOT Region and is beginning to have an adverse impact on the System |
| Operating Condition Scripts | |
| **Hotline** | Communications must specify the severity of the situation, the area affected, the areas potentially affected, and the anticipated duration of the Emergency Condition.  **T#37 –Typical Hotline Script for Operating Condition [OCN/Advisory/Watch/Emergency]** |
| **Post** | All notices must be posted on the MIS Public using Notice Builder.   * For “free form” messages, the “Notice priority” will be specified as follows: * Operational Information/OCN type messages – low priority * Advisory/Watch type messages – medium priority * Emergency type messages – high priority |
| **Hotline Cancellation** | **T#38 – Typical Hotline Script to Cancel Operating Condition [OCN/Advisory/Watch/Emergency]** |
| **Log** | Log all actions. |
| Specific Scripts for QSE’s | |
| **NOTE** | At times, the Real-Time, Resource or RUC operator takes the lead on the issuance of Hotline calls for specific procedures they have. The following scripts are to help guide you when specific procedures don’t exist for the T/S operator. |
| **SCED**  **Or**  **RLC**  **Failure** | Note: RLC can fail independently of AGC; this same script will also be used for a RLC failure. If RLC is failed, SCED will have invalid results.  **T#41 - Typical Hotline Script for Watch for SCED/RLC Failure**  **T#42 - Typical Hotline Script to Cancel Watch for SCED/RLC Failure** |
| **EMMS**  **(LFC and RLC/SCED)**  **Failure** | **T#43 - Typical Hotline Script for Emergency Notice for LFC/EMS and SCED Failure**  **T#44 - Typical Hotline Script to Cancel Emergency Notice for LFC/EMS Functioning, SCED valid** |
| **Increasing Amount of Ancillary Services** | **T#45 - Typical Hotline Script for Watch to Increase Ancillary Services and Open SASM**  **T#46 - Typical Hotline Script to Cancel Watch to Increase Ancillary Services** |
| **A/S Insufficiency**  **Offers in DAM** | **T#47 - Typical Hotline Script for Watch for Insufficient AS Offers in DAM**  **T#48 - Typical Hotline Script to Cancel Watch for Insufficient A/S Offers in DAM** |
| **A/S Insufficiency**  **from DAM** | **T#49 - Typical Hotline Script for A/S insufficiency in DAM**  **T#50 - Typical Hotline Script Cancellation** |
| **REG/**  **RRS - RUC Committed Shortages** | **T#51 - Typical Hotline Script for Watch for Insufficient A/S Offers**  **T#52 - Typical Hotline Script to Cancel Watch for Insufficient A/S Offers** |
| **DAM Timeline**  **Deviation** | **T#53 - Typical Hotline Script for Advisory for DAM Timeline Deviation**  **T#54 - Typical Hotline Script to Cancel Advisory for DAM Timeline Deviation** |
| **DAM Failure** | **T#55 - Typical Hotline Script for Watch for DAM Failure**  **T#56 - Typical Hotline Script to Cancel Watch for DAM Failure** |
| **DRUC Delay or Timeline Deviation** | **T#57 - Typical Hotline Script for Advisory for DRUC Timeline Deviation**  **T#58 - Typical Hotline Script to Cancel Advisory for DRUC Timeline Deviation** |
| **DRUC Timeline not Met** | **T#59 - Typical Hotline Script for Watch for DRUC not completing by 18:00**  **T#60 - Typical Hotline Script to Cancel Watch for DRUC not completing by 18:00** |
| **HRUC Failure or Timeline Deviation** | **T#61 - Typical Hotline Script for Watch for HRUC Failure / Timeline Deviation**  **T#62 - Typical Hotline Script to Cancel Watch for HRUC Failure/Timeline/Deviation** |
| **DRUC**  **Committed**  **For Capacity**  **Shortage** | **T#63 - Typical Hotline Script for OCN for Projected Reserve Capacity Shortage**  **T#64 - Typical Hotline Script to Cancel OCN for Projected Reserve Capacity Shortage** |
| **Excess Generation** | **T#65 - Typical Hotline Script for OCN for Projected Excess Reserve Capacity**  **T#66 - Typical Hotline Script to Cancel OCN for Projected Excess Reserve Capacity** |
| **Projected Reserve Capacity Shortage with no market solution** | **T#67 - Typical Hotline Script for Watch for Projected Reserve Capacity Shortage with No Market Solution**  **T#68 - Typical Hotline Script to Cancel Watch for Projected Reserve Capacity Shortage with No Market Solution** |
| **RMR Projected Reserve Capacity Shortage** | **T#69 - Typical Hotline Script for Watch for Projected Reserve Capacity Shortage with No Market Solution, RMR recommended**  **T#70 - Typical Hotline Script to Cancel Watch for Projected Reserve Capacity Shortage with No Market Solution, RMR recommended** |
| **Execute a SASM** | **T#86 - Typical Hotline Script to Execute a SASM for Failure to Provide/Infeasibility** |
| **BAAL Firm Load Shed** | **T#8 EEA3 Firm Load Shed:**  **T#10 EEA3/BAAL Restore All Firm Load:** |

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| **Unannounced Constant Frequency Control Test** | **T#99 QSE on Constant Frequency Control for Unannounced Constant Frequency Control Test**  **T#100 Cancel QSE on Constant Frequency Control for Unannounced Constant Frequency Control Test** |

## 7.2 Congestion Management during EEA Levels

**Procedure Purpose:** To provide a mechanism to manage constraints in EEA 2 or 3 to higher Facility ratings when applicable for those constraints identified as limiting generation output; and reconsiders use of double-circuit contingencies.

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| **Protocol Reference** | **6.5.9.3.2(5)** | **6.5.9.4** |  |  |
| **Guide Reference** | **4.2.2** | **4.5.2** | **4.5.3** |  |
| **NERC Standard** | **EOP-011-1**  **R2, R2.1, R2.2, R2.2.2** |  |  |  |

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| **Version: 1** | **Revision: 1** | **Effective Date: October 1, 2015** |

| **Step** | | **Action** |
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| When in an Advisory and system conditions expected to deteriorate into an EEA 2 or 3 | | |
| **Evaluate**  **Constraints** | **IF:**   * PRC is expected to continue to drop to the progression of an EEA 2;   **THEN:**   * Evaluate constraints active in SCED and determine which constraints are limiting generation output.   **IF:**   * Such a constraint is identified, work with Operations Support Engineering and coordinate with the TO that operates the overloaded facility associated with the constraint   **THEN:**   * Determine if any of the following can be done in the expected time frame of the EEA event:   + Transmission element restored   + Reconfigure the transmission system   + Make adjustments to phase angle regulator tap positions   **IF:**   * The above options are not viable;   **THEN:**   * Continue to the next step | |
| **15-Minute**  **Rating**  **Available** | **IF:**   * ERCOT and the TO agree to use a 15-minute Rating if an EEA 2 is entered;   **THEN:**   * Ensure post-contingency actions can be taken within 15 minutes to return the flow to within the Emergency Rating, or * Post-contingency loading of the transmission facility is expected to be at or below the Normal Rating within two hours. | |
| **Double-**  **Circuit**  **Contingency** | **IF:**   * ERCOT and the TO determine that there is a low risk of the double-circuit contingency occurring due to system conditions, which may include severe weather forecasted in the vicinity of the double-circuit, weather conditions that indicate a high risk of insulator flashover on the double-circuit, repeated Forced Outages of the individual circuits that are part of the double-circuit in the preceding 48 hours, or fire in progress in the right of way of the double-circuit;   **THEN:**   * ERCOT will de-activate the appropriate double-circuit contingency and constrain on the single-circuit contingency to make more generation available as required if an EEA 2 is entered. | |
| Returning to Normal Operations | | |
| **Emergency**  **Rating/**  **Double-**  **Circuits** | **When:**   * PRC is restored to 3,000 MW or the EEA has ended;   **THEN:**   * Restore control to the post-contingency flow to within the Emergency Rating for those constraints that utilized the 15-Minute Rating * Enforce double-circuit contingencies | |
| **LOG** | Log all actions. | |

## 7.3 Implement EEA Levels

**Procedure Purpose:** To provide for maximum possible continuity of service while maintaining the integrity of the ERCOT system to reduce the chance of cascading outages.

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| **Protocol Reference** | **6.5.9.3.4(6)** | **6.5.9.4** | **6.5.9.4.2** |  |
| **Guide Reference** | **4.5.3** | **4.5.3.1** | **4.5.3.2** | **4.5.3.3** |
| **4.5.3.4** |  |  |  |
| **NERC Standard** | **EOP-011-1**  **R2, R2.1, R2.2, R2.2.2, R2.2.4, R2.2.7, R2.2.8** | **IRO-001-4**  **R1** | **TOP-001-4**  **R1, R8** |  |

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| **Version: 1** | **Revision: 29** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
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| **NOTE** | * **IF** steady state system frequency falls below 59.91 Hz, ERCOT **CAN** immediately implement EEA 3. * **IF** steady state system frequency falls below 59.5 Hz, ERCOT **SHALL** immediately implement EEA 3. |
| **NOTE** | Confidentiality requirements regarding transmission operations and system capacity information will be lifted, as needed to restore reliability. |
| **Media**  **Appeal** | When an ERCOT-wide appeal through the public news media for voluntary energy conservation is made. Notify the TOs by hotline.  **T#39 - Typical Hotline Script for Media Appeal** |
| Implement EEA Level 1 | |
| **1** | **IF:**   * PRC < 2300 MW and is not projected to be recovered above 2300 MW within 30 minutes without the use of EEA Level 1;   **THEN:**   * Using the Hotline, notify all TOs to implement **EEA 1**.   **T#5 - Typical Hotline Script for EEA1**  After the repeat, give TOs an update of system conditions, including chances of proceeding into an EEA 2. |
| **LOG** | Log all actions. |
| Implement EEA Level 2 | |
| **Note** | ERCOT may declare an EEA Level 2 when the clock-minute average system frequency falls below 59.91 Hz for 15 consecutive minutes. |
| **1** | **IF:**   * PRC < 1750 MW or unable to maintain system frequency at 59.91 Hz and is not projected to be recovered above 1750 MW within 30 minutes without the use of EEA Level 2;   **THEN:**   * Using the Hotline, notify all TOs to implement **EEA 2** and any measures associated with EEA 1, if not already implemented. * If the energy conservation call has not been made previously, it can be combined with this call. * Reduce Customer Load by using distribution voltage reduction measures, if deemed beneficial. * Implement any available Load management plans to reduce Customer Load.   **T#7 - Typical Hotline Script for EEA2 Media Appeal and Voltage Reduction**  After the repeat, give TOs an update of system conditions, including chances of proceeding into an EEA 3. |
| **NOTE** | The Load Management Program step below is only to be considered on weekdays (except holidays) during the summer months (June to September) between 1330 and 1900 hours due to restrictions in TO Load Management Program contracts. |
| **Load**  **Management**  **Program** | Monitor predicted load increase over the next hour and into the peak hours as indicated in the prevailing ERCOT Load Forecast.  \* Only applies June through September  **IF:**   * The current time is AT LEAST 13:30 BUT NOT AFTER 16:00;   **THEN:**   * Using the Hotline, contact all TOs with Load Management Programs, requesting implementation of their Load Management Programs.   **T#6 - Typical Hotline Script to Deploy Load Management Program** |
| **LOG** | Log all actions. |

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| Implement EEA Level 3 | |
| **Note** | ERCOT may declare an EEA Level 3 when the clock-minute average system frequency falls below 59.91 Hz for 20 consecutive minutes. |
| **1** | ERCOT will declare an EEA Level 3 when PRC cannot be maintained above 1,430 MW.  Using the Hotline, notify all TOs to implement EEA 3WithoutFirm Load Shedand any measures associated with EEA 1 and 2, if not already implemented.  **T#88 - Typical Hotline Script for EEA3 PRC <1430 MW Without Firm Load Shed**  After the repeat, give TOs an update of system conditions, including chances of proceeding into an EEA 3 Firm Load Shed. |
| **2** | **IF:**   * PRC < 1000 MW and is not projected to be recovered above 1,000 MW within 30 minutes, or when the clock-minute average frequency falls below 59.91 Hz for 25 consecutive minutes;   **THEN:**   * Using the Hotline, notify all TOs to implement EEA 3Firm Load Shedand any measures associated with EEA 1 and 2, if not already implemented * \*Request deployment of Load Management Programs   \* Only applies June through September in EEA 2 if not already deployed, EEA 2 and EEA3 implements any available Load management plan to reduce Customer Load.  **T#8 - Typical Hotline Script for EEA3 Firm Load Shed** |
| **LOG** | Log all actions. |

## 7.4 Restore EEA Levels

**Procedure Purpose:** To restore the ERCOT grid to normal state as system conditions warrant while recovering from an EEA event.

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| **Protocol Reference** | **6.5.9.4.1** | **6.5.9.4(3)(g)** | **6.5.9.4.3** |  |
| **Guide Reference** | **4.5.3.5** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 20** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
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| Restore Firm Load | |
| **RESERVES** | 1430 MW of PRC must be restored within 90 minutes. |
| **1** | **IF:**   * Sufficient Regulation Service exist to control to 60 Hz, **AND** * PRC – Regulation Up Responsibility is ≥ 1430 MW for the last 15 minutes;   **THEN:**   * Using the Hotline, notify all TOs of firm load restoration.   **T#9 - Typical Hotline Script EEA3 Restore a Portion of the Firm Load**  **OR**  **T#10 - Typical Hotline Script EEA3/BAAL Restore All Firm Load** |
| **LOG** | Log all actions. |
| Move from EEA Level 3 to EEA Level 2 | |
| **1** | **IF:**   * Sufficient Regulation Service exist to control to 60 Hz, **AND** * PRC is ≥ 1750 MW, **AND** * All firm load has been instructed to be restored;   **THEN:**   * Using the Hotline, notify all TOs of the reduction from **EEA 3 to EEA 2:** * Notify the TOs that Load Resources are being restored   **T#11 - Typical Hotline Script to move from EEA3 to EEA2** |
| **LOG** | Log all actions. |
| Move from EEA Level 2 to EEA Level 1 | |
| **1** | **IF:**   * The System can maintain PRC ≥ 2300 MW **AND** * All Load Resources have been instructed to be restored;   **THEN:**   * Using the Hotline, notify all TOs of the reduction from **EEA 2 to EEA 1** and ERS Resources have been instructed to restore, * If distribution voltage reduction measures were used, restore * If BLTs were implemented, restore * \*If Load Management Programs were deployed, restore   **T#12 - Typical Hotline Script to move from EEA2 to EEA1** |
| Move from EEA Level 1 to EEA 0 | |
| **1** | **IF:**   * The System can maintain PRC ≥ 2300 MW, **AND** * All committed units secured in EEA can be released, **AND** * Emergency energy from the DC Ties is no longer needed;   **THEN:**   * Using the hotline, notify all TOs of the termination of **EEA**.   **T#13 - Typical Hotline Script Terminate EEA1** |
| Cancel Watch | |
| **1** | **WHEN:**   * Requested by the Real-Time Operator;   **THEN:**   * Cancel Watch   **T#14 - Typical Hotline Script to cancel Watch for PRC <2500 MW** |

## 7.5 Block Load Transfer

**Procedure Purpose:** To transfer loads, located in ERCOT to a Non-ERCOT system or from a Non-ERCOT system to ERCOT during emergency conditions.

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| **Protocol Reference** | **6.5.9.5** | **6.5.9.5.1** | **6.5.9.5.2** |  |
| **Guide Reference** | **4.4** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 15** | **Effective Date: November 1, 2018** |

| **Step** | **Action** |
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| **NOTE** | * Restoration of service to outage customers using BLT’s will be accomplished as quickly as possible if the transfers will not jeopardize the reliability of the ERCOT Interconnection. * BLTs that are comprised of looped systems may be tied to the non-ERCOT Control Area’s electrical system(s) through multiple interconnection points at the same time. Transfers of looped configurations are permitted only if all interconnection points are registered and netted under a single Electric Service Identifier (ESI ID) and represented by a single TSP or DSP or netted behind Non-Opt-in Entity (NOIE) metering points. * Notify Shift Supervisor for coordination on transfer of ERCOT Control Area load and non-ERCOT Control Area load. * Determine if BLT is for an Emergency or Non-Emergency condition with non-ERCOT Control Area. |
| ERCOT picks up Load for Non-ERCOT System | |
| **1** | **IF:**   * ERCOT is requested to pick up load for CENACE, MISO or SPP;   **THEN:**   * Consult with Operations Support Engineer to ensure the load pick up will not create a reliability concern,   **IF:**   * No reliability concern exists   **THEN:**   * Grant the approval |
| **Electronic**  **Dispatch**  **Instruction**  **Confirmation Non-Emergency** | **IF:**   * The BLT is registered (refer to Desktop Guide Common to Multiple Desks Section 2.5):   + Issue electronic Dispatch Instruction confirmation to the QSE listed   + Determine the amount of load being transferred into ERCOT   + From Verbal Dispatch Instructions [Transmission Desk]   + Choose QSE level tab   + Choose [Proper QSE from Desktop Guide] for Participant Name   + Choose “OTHER For QSE” for Instruction Type   + In text, state “BLT - ERCOT picks up load from [SPP, MISO or CENACE], non-emergency”   When issuing a VDI or the confirmation, ensure the use of three-part communication:   * + Issue the Operating Instruction   + Receive a correct repeat back   + Give an acknowledgement |
| **E-mail** | **SEND:**   * E-mail to the “BLT” distribution list   **INCLUDE:**   * The following information: * RC Notified * TO area * Was BLT registered or not * Was an electronic Dispatch Instruction confirmation sent * Was BLT modeled * Non-Emergency BLT |
| **Electronic**  **Dispatch**  **Instruction**  **Confirmation Emergency** | **IF:**   * The BLT is registered (refer to Desktop Guide Common to Multiple Desks Section 2.5):   + Issue electronic Dispatch Instruction confirmation to the QSE listed   + Determine the amount of load being transferred into ERCOT   + From Verbal Dispatch Instructions [Emergency]   + Choose BLT tab   + Choose [Proper QSE from Desktop Guide] for Participant Name   + Choose appropriate BLT for BLT Name   + Enter the amount of load being transferred to ERCOT in Up-To MW   + Choose IMPLEMENT BLT DURING EMERGENCY - LOAD TO ERCOT as Instruction Type   When issuing a VDI or the confirmation, ensure the use of three-part communication:   * + Issue the Operating Instruction   + Receive a correct repeat back   + Give an acknowledgement |
| **E-mail** | **SEND:**   * E-mail to the “BLT” distribution list   **INCLUDE:**   * The following information: * RC Notified * TO area * Was BLT registered or not * Was an electronic Dispatch Instruction confirmation sent * Was BLT modeled * Emergency BLT |
| **2** | For BLTs that are done in an emergency situation and are not modeled in the Network Operations Model, the responsible TO will notify ERCOT as soon as practicable after the event. |
| **3** | **IF:**   * Congestion issues arise from switching variations due to the BLT;   **THEN:**   * Employ congestion management procedures,   **IF:**   * Congestion management cannot maintain the reliability of the system,   **THEN:**   * Terminate the BLT. |
| Non-ERCOT System picks up Load for ERCOT | |
| **1** | **IF:**   * CENACE, MISO or SPP picks up load for ERCOT;   **THEN:**   * Ensure the RC in the other grid has given approval for the load to be transferred to them |
| **Electronic**  **Dispatch**  **Instruction**  **Confirmation Non-Emergency** | **IF:**   * The BLT is registered (refer to Desktop Guide Common to Multiple Desks Section 2.5):   + Issue electronic Dispatch Instruction confirmation to the QSE listed   + Determine the amount of load being transferred out of ERCOT   + From Verbal Dispatch Instructions [Transmission Desk]   + Choose QSE level tab   + Choose [Proper QSE from Desktop Guide] for Participant Name   + Choose “OTHER For QSE” for Instruction Type   + In text, state “BLT – [SPP, MISO or CENACE] picks up load for ERCOT, non-emergency”   When issuing a VDI or the confirmation, ensure the use of three-part communication:   * + Issue the Operating Instruction   + Receive a correct repeat back   + Give an acknowledgement |
| **E-mail** | **SEND:**   * E-mail to the “BLT” distribution list   **INCLUDE:**   * The following information: * RC Notified * TO area * Was BLT registered or not * Was an electronic Dispatch Instruction confirmation sent * Was BLT modeled * Non-Emergency BLT |
| **Electronic**  **Dispatch**  **Instruction**  **Confirmation Emergency** | **IF:**   * The BLT is registered (refer to Desktop Guide Common to Multiple Desks Section 2.5):   + Issue electronic Dispatch Instruction confirmation to the QSE listed   + Determine the amount of load being transferred from ERCOT   + From Verbal Dispatch Instructions [Emergency]   + Choose BLT tab   + Choose [Proper QSE from Desktop Guide] for Participant Name   + Choose appropriate BLT for BLT Name   + Enter the amount of load being transferred from ERCOT in Up-To MW   + Choose IMPLEMENT BLT DURING EMERGENCY - GEN TO ERCOT as Instruction Type   When issuing a VDI or the confirmation, ensure the use of three-part communication:   * + Issue the Operating Instruction   + Receive a correct repeat back   + Give an acknowledgement |
| **E-mail** | **SEND:**   * E-mail to the “BLT” distribution list   **INCLUDE:**   * The following information: * RC Notified * TO area * Was BLT registered or not * Was an electronic Dispatch Instruction confirmation sent * Was BLT modeled * Emergency BLT |
| **2** | For BLTs that are done in an emergency and are not modeled in the Network Operations Model, the responsible TO will notify ERCOT as soon as practicable after the event. |
| **3** | **IF:**   * Congestion management issues that arise from switching variations due to the BLT;   **THEN:**   * Employ congestion management procedures,   **IF:**   * Congestion management cannot maintain the reliability of the System,   **THEN:**   * Terminate the BLT. |
| **NOTE** | If the Alamito Creek (ALMC) to Presidio (PRES) 69 kV transmission line trips, CENACE will automatically pick up approximately 2 MW of load on the Presidio/Gonzales BLT. When AEP TO has informed you that this happened, follow step 1 above. |

## 7.6 Restoration of Primary Control Center Functionality

**Procedure Purpose:** To be performed once Transmission and Security Operator has arrived at ACC.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 10** | **Effective Date: March 31, 2017** |

| **Step** | **Action** |
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| **NOTE** | Before normal operation can be restored, be sure to communicate with the other desks to determine the current state of the grid and any communications that may have taken place with TOs. |
| **Congestion Management** | Continue with congestion management either manually or with systems. Check with other Operators to determine if any VDIs were issued. |
| **Return to**  **Normal**  **TO**  **Notification** | When ready to resume normal operation, place the following Hotline call to the TOs:  **T#71 - Typical Hotline Script to Cancel Emergency Notice and Restore Primary Control Center** |
| **Nuclear**  **Plants** | Notify the appropriate Nuclear Plant’s QSE and inform them that they should notify the plants that ERCOT has canceled the Emergency Notice and RTCA and State Estimator are now functional. |
| **Log** | Log all actions. |

# 8. Weather Events

## 8.1 Hurricane / Tropical Storm

**Procedure Purpose:** To ensure ERCOT is prepared for an approaching

Hurricane / Tropical Storm

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| **Protocol Reference** | **3.1.4.6** | **6.3.2(3)(a)(ii)** | **6.5.9.3.1** | **6.5.9.3.2(3)** |
|  | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.1** | **4.2.2** | **4.2.3** | **4.2.4** |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.2, R1.2.6, R2, R2.1, R2.2, R2.2.9** | **TOP-001-4**  **R8** |  |  |

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| **Version: 1** | **Revision: 11** | **Effective Date: December 31, 2015** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | Hurricane / Tropical Storm notifications are called when there is a probability of landfall in the ERCOT Region (<http://www.nhc.noaa.gov>) |
| **NOTE** | Operations Support and Outage Coordination will analyze the situation and make recommendations as to Resource requirements and transmission topology. |
| **OCN** | When an approaching Hurricane / Tropical Storm is approximately 5 days away. Coordinate with Outage Coordination for the review of planned and existing outages to be rejected and/or restored.  Using the Hotline, issue an OCN to all TOs:  **T#72 - Typical Hotline Script for OCN for Hurricane/Tropical Storm** |
| **Advisory** | When an approaching Hurricane / Tropical Storm is approximately 3 days away.  Using the Hotline, issue an Advisory to all TOs:  **T#73 - Typical Hotline Script for Advisory for Hurricane/Tropical Storm** |
| **Watch** | When approaching Hurricane / Tropical Storm is 1 day away.  Using the Hotline, issue a Watch to all TOs:  **T#74 - Typical Script for Watch for Hurricane/Tropical Storm** |
| **Emergency** | When Hurricane/Tropical Storm is in the ERCOT Region and is beginning to have an adverse impact on the ERCOT System.  Using the Hotline, issue an Emergency Notice to all TOs:  **T#75 - Typical Hotline Script for Emergency for Hurricane/Tropical Storm:** |
| **Post** | Coordinate with the Real-Time Operator for the posting of the notices on MIS Public. |
| **Cancel**  **Posting** | Coordinate with the Real-Time Operator for the cancelation of the postings on MIS Public. |
| **Log** | Log all actions. |

## 8.2 Extreme Cold Weather

**Procedure Purpose:** To ensure ERCOT and TOs are prepared for extreme cold weather operations.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.1.4.6** | **6.3.2(3)(a)(ii)** | **6.5.9.3.1** | **6.5.9.3.2(4)** |
|  | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.1** | **4.2.2** | **4.2.3** | **4.2.4** |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.2, R1.2.6, R2, R2.1, R2.2, R2.2.9** | **TOP-001-4**  **R8** |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 12** | **Effective Date: March 31, 2017** |

| **Step** | | **Action** |
| --- | --- | --- |
| **NOTE** | | * Extreme cold weather notifications will be issued when temperatures or wind chill is expected to be below freezing for sustained periods and may abnormally impact load levels or generation availability * For such events, additional reserves may be necessary |
| **OCN** | | When approaching extreme cold weather is approximately 5 days away, using the Hotline issue an OCN to all TOs:  **T#76 - Typical Hotline Script for OCN for Extreme Cold Weather** |
| **Advisory** | | When approaching extreme cold weather is approximately 3 days away, using the Hotline issue an Advisory to all TOs:  **T#77 - Typical Hotline Script for Advisory for Extreme Cold Weather** |
| **Watch** | | When approaching extreme cold weather is approximately 1 day away and concerns existed to escalate the notice, using the Hotline issue a Watch to all TOs:  **T#78 - Typical Hotline Script for Watch for Extreme Cold Weather** |
| **Emergency**  **Notice** | When extreme cold weather has arrived and is beginning to have an adverse impact on the system, using the Hotline issue an Emergency Notice to all TOs:  **T#79 - Typical Hotline Script for Emergency for Extreme Cold Weather** | |
| **Post** | Coordinate with the Real-Time Operator for the posting of the notices on MIS Public. | |
| **Cancel**  **Posting** | Coordinate with the Real-Time Operator for the cancelation of the postings on MIS Public. | |
| **Log** | Log all actions. | |

## 8.3 Extreme Hot Weather

**Procedure Purpose:** To ensure ERCOT and TOs are prepared for Extreme Hot weather operations.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.1.4.6** | **6.3.2(3)(a)(ii)** | **6.5.9.3.1** | **6.5.9.3.2(4)** |
|  | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.1** | **4.2.2** | **4.2.3** | **4.2.4** |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.2, R1.2.6, R2, R2.1, R2.2, R2.2.9** | **TOP-001-4**  **R8** |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 11** | **Effective Date: March 31, 2017** |

| **Step** | | **Action** |
| --- | --- | --- |
| **NOTE** | | Extreme Hot weather notifications are issued when:  Temperatures are forecasted to be 103°F or above in the North Central and South Central weather zones.  – OR –  Temperatures are forecasted to be 94°F or above in the North Central and South Central weather zones during the following months (October – May). |
| **NOTE** | | Operations Support and Outage Coordination will analyze the situation and make recommendations as to Resource requirements and transmission topology. |
| **OCN** | | When extreme hot weather is forecasted approximately 5 days away, using the Hotline issue an OCN to all TOs:  **T#80 - Typical Hotline Script for OCN for Extreme Hot Weather** |
| **Advisory** | | When extreme hot weather is forecasted approximately 1 to 3 days away, using the Hotline issue an Advisory to all TOs:  **T#81 - Typical Hotline Script for Advisory for Extreme Hot Weather** |
| **Watch** | | When extreme hot weather is projected for next day or current day and ERCOT has reliability concerns, using the Hotline issue a Watch to all TOs:  **T#82 - Typical Hotline Script for Watch Extreme Hot Weather:** |
| **Emergency**  **Notice** | When extreme hot weather has arrived and is beginning to have an adverse impact on the ERCOT System, using the Hotline issue an Emergency Notice to all TOs:  **T#83 - Typical Hotline Script for Emergency for Extreme Hot Weather** | |
| **Post** | Coordinate with the Real-Time Operator for the posting of the notices on MIS Public. | |
| **Cancel**  **Posting** | Coordinate with the Real-Time Operator for the cancelation of the postings on MIS Public. | |
| **Log** | Log all actions. | |

## 8.4 Other Significant Weather Events

**Procedure Purpose**: Monitor severe weather conditions for the ERCOT Region and adjacent NERC regions which can arise with little or no warning that can have an impact on the ERCOT grid.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** | **3.1.4.6** | **6.3.2(3)(a)(ii)** | **6.5.9.3.1** | **6.5.9.3.2(4)** |
|  | **6.5.9.3.4** |  |  |
| **Guide Reference** | **4.2.1** | **4.2.2** | **4.2.3** | **4.2.4** |
| **NERC Standard** | **EOP-011-1**  **R1, R1.1, R1.2, R1.2.2, R1.2.6, R2, R2.1, R2.2, R2.2.9** | **TOP-001-4**  **R8** |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 11** | **Effective Date: December 31, 2015** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | Significant weather events can consist of, but are not limited to the following:   * Tornados * Strong straight line winds * Hail * Severe lightning * Flooding * Freezing precipitation * Hard freeze |
| **OCN/**  **Advisory/**  **Watch** | When a significant weather event that could or does impact the ERCOT Region, make the proper notification.  Using the Hotline, issue a notification to all TOs:  **T#84 - Typical Hotline Script for OCN/Advisory/Watch for other Weather Events:** |
| **Post** | Coordinate with the Real-Time Operator for the posting of the notices on MIS Public. |
| **Cancel**  **Posting** | Coordinate with the Real-Time Operator for the cancelation of the postings on MIS Public. |
| **Log** | Log all actions. |

# 9. Communication Testing

## 9.1 Weekly Hotline Test

**Procedure Purpose:** To perform a weekly communications test of the ERCOT Hotline phone system.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **7.1.3 (c)** |  |  |  |
| **NERC Standard** | **COM-001-3**  **R1** |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 10** | **Effective Date: November 1, 2019** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | * In the event of a failure of the Forum Conference Client software, the most recent printout of the Hotline log may be used to perform a manual roll call of the TOs * Ensure all invalid Hotline “Lost Souls” are cleared prior to call * If a Hotline call was made between 0630 and 1100 on Monday, it is not necessary to conduct this test |
| **Advisory**  **Levels** | Confirm with Shift Supervisor the Advisory level, which can be viewed at the following link:  <http://www.dhs.gov/files/programs/ntas.shtm>  The definitions for the Advisory levels are listed in the Security Alert Plan. |
| **1** | Test the ERCOT Hotline:   * Each Monday between 0630 and 1100, AND * When working from the Alternate Control Center during the monthly scheduled dates. |
| **2** | Using the Hotline, notify all TOs of the purpose of the call.   * When TOs have answered the Hotline, **print** Hotline participants.   **T#85 - Typical Hotline Script for Weekly TO Hotline Test:** |
| **3** | **IF:**   * Updates are made to the ERCOT procedures or scripts;   **THEN:**   * Inform the TO during the Hotline call along with the effective date of the changes. |
| **4** | **IF:**   * A TO did not answer;   **THEN:**   * Contact them using their OPX line or LD line to inquire why they were not on the Hotline call; * Open a Help ticket if ERCOT’s Telecommunications department is needed to investigate. |
| **5** | **IF:**   * The TO “Blast dial failed” portion is not included on the printout;   **THEN:**   * Open a Help ticket for ERCOT’s Telecommunications department to investigate. |
| **6** | Place printout in the appropriate folder in the file in the back of the room. |
| **LOG** | Log all actions. |

## 9.2 Monthly Testing of Satellite Phones

**Procedure Purpose:** To ensure ERCOT maintains communication capability via the Satellite Phone System.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **COM-001-3**  **R9** |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 5** | **Effective Date: December 28, 2017** |

| **Step** | **Action** |
| --- | --- |
| Primary Control Center | |
| **NOTE** | When a participant dials into the conference bridge before the moderator dials in, they will hear music and be placed on hold. |
| **NOTE** | On the first weekend of each month, between the hours of 0000 Saturday and 0500 Monday, the **Satellite Phone System Conference Bridge** will be tested with the TOs. As the Shift Supervisor makes the call to the individual TO, they will set a time that the ERCOT Operator will call the **Satellite Phone System Conference Bridge** and establish communication with the appropriate TO. |
| **NOTE** | Use the ERCOT Satellite Phone User Guide (See Desktop Guide Common to Multiple Desks Section 2.7) for a list of the TOs that will be contacted by the ERCOT Operator and instructions on how to place a Satellite Phone System Conference Bridge call. |
| **NOTE** | The numbers for the ERCOT Operator to call into the Conference Bridge are Desk specific.  **Select:**  SATELLITE directory or go to page 41 to view the programmed numbers on the Turret phone for each Bridge:   * BLACKSTRT RUC – RUC Desk * BLACKSTRT RRD -Reliability Risk Desk * BLACKSTRT RES – Resource Desk * BLACKSTRT REAL – Real-Time Desk * BLACKSTRT TS#1 – Transmission Desk (Island Coordination) * BLACKSTRT TS#2 – Transmission Desk |
| **1** | **IF:**   * The preprogrammed number does not function correctly;   **THEN:**   * Refer to the ERCOT Satellite Phone User Guide (See Desktop Guide Common to Multiple Desks Section 2.7.2)for the appropriate conference number and continue with this procedure. |
| **2** | **When prompted:**   * Enter the Moderator Pass Code, * If necessary, allow five minutes for Participants to dial in, * As each Participant connects, record the following:   + Name of Participant   + Company Name   + Any problems identified with the connection process |
| **3** | **IF:**   * One or more of the TOs fails to connect to the Bridge call;   **THEN:**   * Investigate the cause and log the following:   + Reason for inability to connect   + Actions taken by ERCOT   + Establish a time for a retest of the TOs not able to connect in the initial test. |
| **4** | Inform the Shift Supervisor when test is complete indicating any issues identified. |
| **Log** | Log all actions. |
| Alternate Control Center | |
| **1** | When working out of the alternate during the monthly scheduled dates:   * Test the turret Satellite phone on each desk. |
| **2** | Inform the Shift Supervisor when test is complete indicating any issues identified. |
| **Log** | Log all actions. |

# 10. Perform Miscellaneous

## 10.1 Respond to Miscellaneous Issues

**Procedure Purpose:** To record when TO operate from their backup Control Centers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 7** | **Effective Date: March 31, 2017** |

| **Step** | | **Action** | |
| --- | --- | --- | --- |
| Backup/Alternate Control Center Transfer | | | |
| **1** | | When notified by a TO that they will be transferring to or from their backup/alternate control center,   * Identify the [TO] in the email notification * Send e-mail to” 1 ERCOT System Operators” * Make log entry. | |
| **2** | | If experiencing issues with communications, ICCP, etc. contact the Help Desk. | |
| QSE Issues | | | |
| **1** | If a MP is not satisfied with ERCOT Operations responses to their issues, refer them to their Wholesale Client Representative for clarification/resolution. | |
| **2** | If the issue is with ERCOT systems applications (ICCP down, etc.), notify the ERCOT Help Desk. | |
| **3** | If a MP is having an issue with ERCOT system applications (unable to access the portal, outage scheduler, etc.), instruct them to call the ERCOT Help Desk. | |
| **4** | As time permits notify the Shift Supervisor of any actions taken and unresolved issues. | |
| **Log** | Log all actions. | |
| Missing Data from MIS Postings | | |
| **1** | **IF:**   * A call is received about data missing or data being incorrect;   **THEN:**   * Transfer call to the Help Desk, and * Notify the Operations Support Engineer. | |
| **Log** | Log all actions. | |

Document Control

*Preparation*

| **Prepared by** | **Role** | **Date Completed** |
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*Manual Change History*

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedure** | **Ver/**  **Rev** | **Reason for Issue** | **Effective Date** |
| All Sections | 1.0 / 0 | New procedures for all sections for Nodal implementation | November 28, 2010 |
| 3.2  4.1  4.2  4.3  4.4  4.5  4.6  6.1  7.4 | 1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1 | Updated Categories and Priorities  In section “Post-Contingency Overloads”, updated step 5 and QSGR, “Managing Binding and Violated Constraints” step 1, “Reaching Shadow Price Cap” step 1, and ” Managing Congestion during SCED Failure” step 1  Updated steps 1 and 2  Updated steps 2 and 3  Updated step ≤200MW  In section “Special Protection Systems (SPS) (Identified as RAS in EMS)” changed 3rd Note to “Monitor”, changed “Operation” to step 4, changed “Runback” to step 5 and updated  In section “Manual Dispatch Instruction to take a Unit Off-Line” and “Taking One CT of a Combined Cycle Off-line”, Updated step 1 and deleted Manual Dispatch Instruction  In section “Voltage Issues”, Updated 1st Note and Exceed URL, deleted 3rd Note and added QSE Performance  In section “ERCOT picks up Load for Non-ERCOT System” and “Non-ERCOT System picks up Load for ERCOT”, updated step 1 | December 1, 2010 |
| 4.1  4.2  4.3  5.1 | 1.0 / 2  1.0 / 2  1.0 / 2  1.0 / 1 | Deleted 1st Note, updated step Critical Facilities & 2nd Note, step 1 in Evaluate Real-Time Contingency Analysis Results, steps 3-6, 8 & QSGR in Post-contingency Overload, step 2 in Transmission Issues in the Areas of the CFE Ties, changed title & updated all steps in Managing Binding and Violated Constraints, step 1 in Reaching Shadow Price Cap, all steps in QSE Requests to Decommit a Resource, deleted Deploy/Termination of Non-Spin for Congestion, updated step 1 in Managing Congestion during SCED failure  Updated step 1 & 2  Updated step 3  Added Remedial Switching Action section | December 15, 2010 |
| 4.1  4.2  4.3  7.1 | 1.0 / 3  1.0 / 3  1.0 / 3  1.0 / 1 | Updated step 1 in Reaching Shadow Price Cap  Updated step 1 & 2  Updated step 2 & 3 and added step 4 & 5  Updated step 1 in Watch and step Hotline in Scripts | January 5, 2011 |
| 2.3  2.4  3.3  4.1  4.3  4.4  4.5  4.6  4.7  6.1  7.1  7.2  7.3  7.5  8.1  8.2  8.3  9.3 | 1.0 / 0  1.0 / 0  1.0 / 1  1.0 / 4  1.0 / 4  1.0 / 2  1.0 / 2  1.0 / 2  1.0 / 1  1.0 / 2  1.0 / 2  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 1 | Added “Site failovers and Database Loads” as new procedure  Added “Switching Control Center” as new procedure  Updated step 5  Updated scripts, step 1 in “Managing Binding and Exceeding Constraints”, “Reaching Shadow Price Cap” and “Managing Congestion during SCED Failure”  Updated step 2, 3 & 4  Updated scripts  Updated scripts  Added “Manual Commit of a Resource” as new procedure  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Deleted procedure | January 31, 2011 |
| 2.3  4.1  4.6  7.1  7.2 | 1.0 / 1  1.0 / 5  1.0 / 3  1.0 / 3  1.0 / 2 | Updated Site Failovers & added W-N Active step  Added Review Planned Outage Notes, Updated all steps in Transmission Issues in the Areas of the CFE DC-Ties and step 1 of SCED not able to Solve Congestion (Reached Max Shadow Price)  Added Posting Manual Actions  Updated Watch and Emergency Notice  Updated step 2 in Implementation of EEA Level 2A | March 25, 2011 |
| 2.3  3.3  4.1  4.3  4.4  4.5  5.1  6.1  7.1  7.3 | 1.0 / 2  1.0 / 2  1.0 / 6  1.0 / 5  1.0 / 3  1.0 / 3  1.0 / 2  1.0 / 3  1.0 / 4  1.0 / 2 | Added steps and updated whole procedure  Updated step 8  Updated Review Planned Outage Notes  Added 1st Note  Updated 1st Note and step VSAT  Updated step Status Change in SPS  Updated Definition in Remedial Switching Action  Updated “PSS & AVR” 2nd note  Updated step 1 in Watch and Emergency Notice and step Post  Updated “Restore Firm Load” and “Move From EEA Level 3 to EEA Level 2B” step 1 | April 22, 2011 |
| 2.3  3.3  4.1  6.1  7.1  7.2  7.3  7.4  8.1  8.2  8.3  8.4  9.1 | 1.0 / 3  1.0 / 3  1.0 / 7  1.0 / 4  1.0 / 5  1.0 / 3  1.0 / 3  1.0 / 2  1.0 / 2  1.0 / 0  1.0 / 2  1.0 / 2  1.0 / 1 | Added step Site Failover Complete  Updated step 2  Updated Critical Facilities and step 5 in Post-Contingency Overloads, changed Managing Binding and Exceeded Constraints procedure to Managing Constraints in SCED & updated procedure, deleted SCED not able to Solve Congestion procedure  Updated 2nd Note and step 2 in Voltage Issues  Updated all step 1’s  Updated all step 1’s and deleted Note in Implement EEA Level 2A  Updated all step 1’s  Updated all steps  Updated all steps  Added new procedure  Changed section number and updated all steps  Changed section name and updated all steps  Updated 1st Note and steps 2 & 3 | June 14, 2011 |
| 4.1  4.5  6.1  7.2  7.3  7.4  7.5  7.6  10.1 | 1.0 / 8  1.0 / 4  1.0 / 5  1.0 / 4  1.0 / 4  1.0 / 1  1.0 / 3  1.0 / 2  1.0 / 1 | Updated 2nd note & step Phase Shifters in Transmission Congestion Management, steps 3, 5 & 7 in Post-Contingency Overloads, Moved Transmission Issues in the Areas of the CFE DC Ties to 7.4  Updated 1st note, steps SPS Posting and Status Change in Special Protection Systems (SPS) (Identified as RAS in EMS) and Updated all steps in Mitigation Plan (MP)  Updated 2nd note in Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR)  Updated step 1 in Implement EEA Level 1 and 2A  Updated step 1 in Move from EEA Level 1 to EEA 0  Moved procedure from section 4.1  Changed section number from 7.4 to 7.5  Changed section number from 7.5 to 7.6  Added Market Participant Backup Control Center Transfer procedure | July 20, 2011 |
| 4.1  4.4  4.6  6.1  8.4  8.5 | 1.0 / 9  1.0 / 4  1.0 / 4  1.0 / 6  1.0 / 0  1.0 / 3 | Updated step 5 in Post-Contingency Overloads and step Log in Managing Constraints in SCED  Updated monitor section  Updated step 1’s  Updated step 2 and deleted For HHGT\_G-O in Voltage Security Assessment Tool  Added new procedure “Extreme Hot Weather”  Changed section number | August 3, 2011 |
| 2.4  4.1  4.3  4.4  7.1  7.2  7.3  8.4  9.2 | 1.0 / 1  1.0 / 10  1.0 / 6  1.0 / 5  1.0 / 6  1.0 / 5  1.0 / 5  1.0 / 1  1.0 / 1 | Updated step Hotline Call  Updated step 2 in Managing Constraints in SCED  Updated step 2, 4 & 5, added step 3  Added 2nd note  Updated step 1 in Watch  Updated step 2 in Implement EEA Level 1, steps 1 & 2 in Implement EEA Level 2A  Updated the step 1’s  Updated temperature from 102 to 103  Updated 4th Note | September 1, 2011 |
| 3.3  4.2  7.2  7.3  7.4  7.5  9.1 | 1.0 / 4  1.0 / 4  1.0 / 6  1.0 / 6  1.0 / 2  1.0 / 4  1.0 / 2 | Updated Note to ensure compliance with IRO-008-1R2  Added 1st Note, added step 5, updated steps 4 & 6  Combined EEA 2 A and B per NPRR 379  Combined EEA 2 A and B per NPRR 379  Updated step 2 in Transmission Issues within CFE  Updated step 1 in ERCOT picks up Load for Non-ERCOT System and step 1 in Non-ERCOT System picks up Load for ERCOT  Updated step 2 | October 1, 2011 |
| 3.3  4.1  4.3  4.6  9.1 | 1.0 / 5  1.0 / 11  1.0 / 7  1.0 / 5  1.0 / 3 | Updated scripts  Updated step 4 in Post Contingency Overloads & step 3 in Managing Constraints in SCED  Updated step 3  Added Canceling RUC Commitments  Added 3rd Note | November 1, 2011 |
| 2.3  3.1  4.1  4.4  4.5  4.6  6.1  7.1  8.1  8.3 | 1.0 / 4  1.0 / 1  1.0 / 12  1.0 / 6  1.0 / 5  1.0 / 6  1.0 / 7  1.0 / 7  1.0 / 3  1.0 / 3 | Updated step “Site Failover”  Updated step “Review”  Updated step 4 in Post-Contingency Overloads & added new procedure Post-Contingency Overloads on PUNs  Updated 1st Note  Updated step Status Change in SPS, step 1 in Remedial Action Plan (RAP) & Mitigation Plan (MP)  Deleted 1st Note, changed titles to Manual Dispatch to take a Unit Off-line, Manual Dispatch to take a Unit of a CC Off-line, & updated procedure, changed title to Manual Dispatch to bring a Unit of a CC On-Line, & updated procedure  Updated 2nd note and step 1 in Voltage Security Assessment Tool (VSAT)Updated Post in “Scripts”  Added 2nd NOTE  Updated OCN  All procedures in this manual have been reviewed. | December 15, 2011 |
| 1.2  2.1  2.3  3.4  4.1  4.2  7.4  10.1 | 1.0 / 1  1.0 / 1  1.0 / 5  1.0 / 1  1.0 / 13  1.0 / 5  1.0 / 3  1.0 / 2 | Updated Scope  Changed TSP to TO  Updated database load script  Changed insecure state to emergency condition  Updated 1st Note, steps 6 & 8 in Post Contingency Overloads, steps 2 & 3 in Managing Constraints in SCED, added Model Inconsistencies/Updates procedure  Updated Notes 1 & 2, Steps 1 & 2  Changed insecure state to emergency condition  Updated Market Participant Backup Control Center Transfer | January 19, 2012 |
| 2.1  3.1  3.3  4.1  4.2  4.3  4.4  4.5  4.6  4.7  5.1  6.1  7.1  7.2  7.3  7.4  7.5  9.2  10.1 | 1.0 / 2  1.0 / 2  1.0 / 6  1.0 / 14  1.0 / 6  1.0 / 8  1.0 / 7  1.0 / 6  1.0 / 7  1.0 / 2  1.0 / 3  1.0 / 8  1.0 / 8  1.0 / 7  1.0 / 7  1.0 / 4  1.0 / 5  1.0 / 2  1.0 / 3 | Updated paragraph 4  Updated Operations Support Engineer  Updated Operations Support Engineer & Desktop Guide reference  Updated Operations Support Engineer, added 3rd Note, updated step 1 in Review Planned Outage Notes, steps 1, 2, 3, 4, 6, 7, 8, 9 & QSGR in Post Contingency Overloads, step 2, 4 & Log in Managing Constraints in SCED  Updated Operations Support Engineer  Updated Operations Support Engineer & step 1, 2 & 3  Updated Operations Support Engineer  Updated Desktop Guide reference, 2nd Note, step 5 & SPS Posting & deleted step 4 in SPS, all steps in Mitigation Plan & Temporary Outage Action Plan  Updated Desktop Guide reference  Updated step 1 in Watch  Updated TSP to TO, Operations Support Engineer & Desktop Guide reference  Updated Operations Support Engineer, changed TSP to TO, Desktop Guide reference & step 1 of Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR)  Updated step 1 in Watch  Updated step 1 in Implement EEA Level 1 & step 1 in Implement EEA Level 3  Updated script in step 1 in Restore Firm Load  Updated Operations Support Engineer & Desktop Guide reference  Updated Operations Support Engineer & Desktop Guide reference  Updated Desktop Guide reference  Updated all steps in Telemetry Issues that could affect SCED and/or LMPs, step 1 in Backup/Alternate Control Center Transfer & Operations Support Engineer | March1, 2012 |
| 3.1  3.3  4.1  4.3  4.4  4.5  5.1  6.1  7.1  7.2  7.3  7.4  8.1  8.2  8.2  8.3  8.4 | 1.0 / 3  1.0 / 7  1.0 / 15  1.0 / 9  1.0 / 8  1.0 / 7  1.0 / 4  1.0 / 9  1.0 / 9   1. / 8   1.0 / 8  1.0 / 5  1.0 / 4  1.0 / 0  1.0 / 4  1.0 / 2  1.0 / 4 | Updated step Gap Study  Added TSAT  Updated step 4 & deleted step 9 in Post-Contingency Overloads, clarified step 2 & 3 in Managing Constraints in SCED, Added Unsolved Contingencies  Updated for TSAT tool, added Managing W-N during System Failures  Updated step IROL and ‘instructing’ to ‘directing’  Updated step Status Change & ‘instructing’ to ‘directing’, updated step 3, 4 & log in RAP, added step 3 and log in PCAP, update Note, added TO Issue in MP  Updated Opportunity Outage procedure  Added Valley Import to VSAT procedure, deleted step 2 in PSS/AVR section  Updated OCN, Advisory, Watch and Emergency Notice for Cold Weather and Extreme Cold Weather  Added Load Management Programs in Implement EEA  Added Load Management Programs in Restore EEA  Updated for NPRR405  Changed ‘TDSP’ to ‘TO’ & T/S Operator to Real-Time  Deleted Cold Weather  Revised to 8.2 and changed Severe Cold Weather to Extreme Cold Weather  Revised to 8.3, added OCN & Emergency Notice  Revised to 8.4 and changed T/S Operator to Real-Time Operator | May 1, 2012 |
| 2.3  4.1  4.5  6.1  7.2  7.3  7.5 | 1.0 / 6  1.0 / 16  1.0 / 8  1.0 / 10  1.0 / 9  1.0 / 9  1.0 / 6 | Updated Database load with W-N active and Site Failover with W-N steps  Added Constraint SF Cut Off step, updated step 2 & 3 in Managing Constraints in SCED  Updated 2nd Note, added Basecase continuous SPS triggering step in SPS, updated step 1 in RAP, step Note, SCED unable to fully resolve constraint, & **<** 2% Absolute Shift Factors in MP, 1st Note in TOAP  Updated step Valley Import  Updated EILS to ERS per NPRR 451  Updated EILS to ERS per NPRR 451  Updated step 1 in ERCOT picks up Load for Non-ERCOT System and step 1 in Non-ERCOT System picks up Load for ERCOT | June 1, 2012 |
| 1.3  3.3  4.1  4.4  5.1  6.1  7.1  7.2  7.3  8.3  9.2 | 1.0 / 1  1.0 / 8  1.0 / 17  1.0 / 9  1.0 / 5  1.0 / 11  1.0 / 10  1.0 / 10  1.0 / 10  1.0 / 3  1.0 / 3 | Removed ERCOT Shift Supervisor paragraph  Updated step 2  Updated step Constraint SF Cut Off, Managing Congestion during SCED Failure  Updated step ≤300MW  Updated Maintenance Level 2 and 3 outages  Updated STP Voltage Tables  Updated all step 1’s  Updated Load Management Program  Updated step 1  Updated scripts  Updated 4th note | July 16, 2012 |
| 2.3  4.4 | 1.0 / 7  1.0 / 10 | Added Note to step Database Load  Updated step IROL | August 29, 2012 |
| 2.3  2.4  3.3  4.1  4.3  4.4  4.5  4.7  6.1  7.1  7.2  7.3  7.4  7.6  8.1  8.2  8.3  8.4 | 1.0 / 8  1.0 / 2  1.0 / 9  1.0 / 18  1.0 / 10  1.0 / 11  1.0 / 9  1.0 / 3  1.0 / 12  1.0 / 11  1.0 / 11  1.0 / 11  1.0 / 6  1.0 / 3  1.0 / 5  1.0 / 6  1.0 / 4  1.0 / 5 | Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Updated PUN section and added to make call to HHGT  Added Hotline script and to make call to HHGT  Added Hotline script and to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Updated step 1 and added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT  Added to make call to HHGT | September 12, 2012 |
| 2.2  3.1  3.2  3.3  3.4  4.1  4.3  4.4  4.5  5.1  5.2  6.1  7.4  8.3  9.1 | 1.0 / 1  1.0 / 4  1.0 / 2  1.0 / 10  1.0 / 2  1.0 / 19  1.0 / 11  1.0 / 12  1.0 / 10  1.0 / 6  1.0 / 1  1.0 / 13  1.0 / 7  1.0 / 5  1.0 / 4 | Added Hotline Call Communication  Moved protective relay section to 5.2  Updated step 3  Split VSAT/TSAT and SE/RTCA out into separate procedures  Updated steps Immediate Action  Updated step Unknown Operating State, all steps in Evaluate Real-Time Contingency Analysis Results, steps 1, 4 & 6 in Post-Contingency Overloads  Added 1st Note  Added 1st Note, Updated 2nd NOTE & step 0 MW  Updated 2nd Note  Updated Returning from Planned Outage Early  Added new procedure  Updated Exceed URL, Reduce MW, added NOTE & moved step 1 to section 3.3 and renumbered  Added Note  Word smith OCN, Advisory, & Watch  Updated step 1, 2 & 3. Added step 4 and Log  All procedures in this manual have been reviewed. | November 1, 2012 |
| 3.2  3.5  4.1  4.4  4.5  6.1  7.2  7.5 | 1.0 / 3  1.0 / 0  1.0 / 20  1.0 / 13  1.0 / 11  1.0 / 14  1.0 / 12  1.0 / 7 | Updated step 3  Added procedure  Updated Note, Constraint Shift Factor Cut Off, Post-Contingency Overloads steps 4-9 , QSGR & Managing Constraints in SCED step 2 & 4  Updated step VSAT  Updated Special Protection Systems (SPS) (Identified as RAS in EMS) step 2, Remedial Action Plan (RAP) steps 1-5, & step 3 Pre-Contingency Action Plan (PCAP)  Updated 2nd Note and steps 1-3 Voltage Issues  Deleted step 2 per NPRR 480  Updated all step 1’s & added step 3 to clarify 6.5.9.5.2(1) | March1, 2013 |
| 2.3  2.4  3.1  3.3  3.5  4.1  4.2  4.3  4.4  4.5  4.6  4.7  5.1  6.1  7.1  7.2  7.3  7.4  7.6  8.1  8.2  8.3  8.4 | 1.0 / 9  1.0 / 3  1.0 / 5  1.0 / 11  1.0 / 1  1.0 / 21  1.0 / 7  1.0 / 12  1.0 / 14  1.0 / 12  1.0 / 8  1.0 / 4  1.0 / 7  1.0 / 15  1.0 / 12  1.0 / 13  1.0 / 12  1.0 / 8  1.0 / 4  1.0 / 6  1.0 / 6  1.0 / 6  1.0 / 6 | Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts  Updated scripts and steps in Caution, Phase Shifters, Constraint Shift Factor Cut Off, Post Contingency Overloads, deleted Input Displays, added step In Series & Same Element in Managing Constraints in SCED & deleted Managing Congestion during SCED Failure  Updated step 2  Deleted 2nd Note, added GTL and updated scripts  Deleted 2nd Note, added GTL and updated scripts  Deleted Directives, 1st Note in Mitigation Plan, 1st Note in Temporary Outage Action Plan and updated scripts  Updated scripts  Updated all steps and deleted Cancelation  Updated script  Updated script  Added Generic script and Specific scripts  Updated scripts  Updated scripts  Updated scripts  Updated script  Updated scripts  Updated script  Updated script  Correct spelling and updated script | June 1, 2013 |
| 2.3  4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.8  7.1  7.2  7.4  7.5 | 1.0 / 10  1.0 / 22  1.0 / 9  1.0 / 8  1.0 / 13  1.0 / 15  1.0 / 13  1.0 / 9  1.0 / 5  1.0 / 13  1.0 / 14  1.0 / 8  1.0 / 5 | Updated step EMS Changes and added MMS Changes  Updated step Caution  Updated and moved section 7.4 and renamed to 4.2  Changed section #  Updated and changed section #  Changed section #, IROL & updated step 0MW  Changed section # & updated step 4 in RAPs  Changed section #  Changed section #  Updated step 1 in Watch, Emergency Notice & DRUC Timeline not Met  Updated 2nd Note  Changed section # & step 2  Changed section # | July 15, 2013 |
| 2.3  4.1  4.2  4.5  6.1  7.1 | 1.0 / 11  1.0 / 23  1.0 / 10  1.0 / 16  1.0 / 16   1. / 14 | Spelling correction to step MMS Changes  Updated Caution, Constraint Shift Factor Cut Off, step 8 of Post-Contingency Overloads & PUN procedure  Removed the word “load”  Updated step VSAT  Updated 2nd note & step 1 on Voltage Security Assessment Tool (VSAT)  Updated Specific Scripts EMMS (LFC and RLC/SCED)  Failure | August 9, 2013 |
| 2.3  2.4  3.3  3.5  4.1  4.2  4.4  4.5  4.6  4.8  7.1  7.2  7.3  7.5  8.1  8.2  8.3  8.4 | 1. / 12 2. / 4 3. / 12 4. / 2 5. / 24   1.0 / 11  1.0 / 14  1.0 / 17  1.0 / 14  1.0 / 6  1.0 / 15  1.0 / 15  1.0 / 13  1.0 / 6  1.0 / 7  1.0 / 7  1.0 / 7  1.0 / 7 | Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference  Removed HHGT TO reference | August 30, 2013 |
| 4.1  5.1  6.1 | 1.0 / 25  1.0 / 8  1.0 / 17 | Updated step 5 in Post-Contingency Overloads  Updated to reflect SCR770 changes  Updated script and added new script for Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR) | September 27, 2013 |
| 3.3  3.4  3.5  4.1  4.2  4.4  4.5  4.6  4.7  4.8  4.9  5.1  5.2  6.1  7.1  7.2  7.3  7.5  8.1  8.2  8.3  8.4  9.2  10.1 | 1.0 / 13  1.0 / 3  1.0/ 3  1.0 / 26  1.0 / 12  1.0 / 15  1.0 / 18  1.0 / 15  1.0 / 10  1.0 / 7  1.0 / 0  1.0 / 9  1.0 / 1  1.0 / 18  1.0 / 16  1.0 / 16  1.0 / 14  1.0 / 7  1.0 / 8  1.0 / 8  1.0 / 8  1.0 / 8  1.0 / 4  1.0 / 4 | Updated Log steps  Updated Log steps  Updated Log step  Updated step 1 on Review Planned Outage Notes, step 1 for PUNs, Managing Constraints in SCED and Logs  Updated Title, added step 2 and Log steps  Deleted step GTL, updated step 1 and Log  Updated step VSAT, Log and deleted GTL  Updated Log steps  Updated Log steps  Updated Log steps  Added new procedure  Updated steps Definition, Approve Maintenance Outage, Coordinate Maintenance, Coordinate Maintenance Level 2 and 3, Log and step 1 in Simple Transmission Outage  Updated Log steps  Updated VSAT section  Updated Log steps  Updated Log steps  Added step Reserves and Log steps  Updated Log steps  Updated note, OCN, Advisory and Log step  Added note, updated OCN, Advisory, Watch and Log step  Added note, updated OCN, Advisory, Watch and Log step  Updated note and Log step  Updated Log steps  Updated Log steps  All procedures in this manual have been reviewed | December 13, 2013 |
| 4.2  4.4  4.5  4.6  4.7  4.8  4.9  4.10  7.1 | 1.0 / 13  1.0 / 16  1.0 / 19  1.0 / 0  1.0 / 16  1.0 / 11  1.0 / 8  1.0 / 1  1.0 / 17 | Updated 1st Note, step 3, added step 4 & deleted step 5 in Transmission Issues within ERCOT. Added Note to Transmission/Capacity Issues within the CFE Area  Removed posting requirement  Removed posting requirement  New procedure for new GTL  Updated section number  Updated section number  Updated section number  Updated section number & changed Watch to OCN  Updated to incorporate NPRR542 and update scripts | January 1, 2014 |
| 4.1  4.2  4.6  7.3  8.4 | 1.0 / 27  1.0 / 14  1.0 / 1  1.0 / 15  1.0 / 9 | Updated step 3 in Post-Contingency Overloads  Updated step 3, 4 in Transmission Issues within ERCOT and step 1, 2 & 3 in Transmission/Capacity Issues within the CFE Area  Updated step 1 & 2  Updated steps Reserves and 1 in Restore Firm Load  Updated 1st Note | February 25, 2014 |
| 4.1  4.2  4.4  4.5  4.8  6.1  7.2  7.4  9.1 | 1.0 / 28  1.0 / 15  1.0 / 17  1.0 / 20  1.0 / 12  1.0 / 19  1.0 / 17  1.0 / 9  1.0 / 5 | Updated VDI information  Updated steps in Transmission Issues within ERCOT  Updated VDI information  Updated VDI information  Updated Manual commitment process  Updated VDI information  Updated media appeal language & LM Program  Updated VDI information  Updated step 1 & 3, added step 5 | April 4, 2014 |
| 2.2  4.1  4.2  4.4  4.6  4.7  4.9  6.1  7.1  8.1 | 1.0 / 2  1.0 / 29  1.0 / 16  1.0 / 18  1.0 / 2  1.0 / 17  1.0 / 9  1.0 / 20  1.0 / 18  1.0 / 9 | Added VDI to Master QSEs  Updated step 1 in Review Planned Outage Notes, QSGR & Log in Post-Contingency Overloads & PUN steps  Updated section title & step 5, deleted step 3  Updated step 2  Updated step 1 & 2  Updated step 1 in RAP  Deleted Note  Updated Note & Step 1 in Voltage Issues  Added Note, updated Market Notices Advisory & Watch  Updated scripts | June 1, 2014 |
| 4.1  4.2  4.7  7.2 | 1.0 / 30  1.0 / 17  1.0 / 18  1.0 / 18 | Changed WGR to IRR & updated desktop reference  Updated step 4 & 6  Updated 1st Note  Added Media Appeal & updated step 1 script | August 1, 2014 |
| 4.1  5.1  6.1  7.1 | 1.0 / 31  1.0 / 10  1.0 / 21  1.0 / 19 | Updated desktop reference number & step 3 in Post-Contingency Overloads, added step 4 to PUN section  Updated desktop reference number  Updated step 1, 2 & 3 in Real-Time Voltage Issues, added Future Voltage Issues  Updated Generic Script | October 1, 2014 |
| 2.3  2.4  3.3  3.5  4.1  4.2  4.4  4.5  4.6  4.7  4.8  4.9  5.1  6.1  7.1  7.2  10.1 | 1.0 / 13  1.0 / 5  1.0 / 14  1.0 / 4  1.0 / 32  1.0 / 18  1.0 / 21  1.0 / 3  1.0 / 19  1.0 / 13  1.0 / 10  1.0 / 2  1.0 / 11  1.0 / 22  1.0 / 20  1.0 / 19  1.0 / 5 | Removed references to W-N  Updated scripts  Removed references to W-N/TSAT, combined SE/RTCA  Updated for Operating Guide 4.7  Updated Phase Shifters & removed references to TSAT  Removed references to TSAT & added Future Studies  Deleted West to North procedure and re-numbered  Re-numbered  Re-numbered  Re-numbered  Re-numbered  Re-numbered  Updated step 1  Updated step 2 & 3 in Real-Time Voltage Issues, Future Voltage Issues & Requesting Resource to operate beyond URL  Updated Specific Scripts  Updated EEA2 script  Deleted Requests to decommit in Operating Period  All procedures in this manual have been reviewed | December 15, 2014 |
| 2.2  4.1  4.2  4.3  4.4  4.7  4.8  6.1  7.4  8.2 | 1.0 / 3  1.0 / 33  1.0 / 19  1.0 / 9    1.0 / 22  1.0 / 14  1.0 / 11  1.0 / 23  1.0 / 10  1.0 / 9 | Added definitions for Dispatch and VDIs  Updated “Review Planned Outage Notes” and provided a better flow, deleted redundant steps & added Basecase Overloads,  Added step Topology Change  Updated to reflect SOL Methodology and provide a better flow  Updated step <200MW  Updated step 1  Updated script  Updated step Exceeding URL or Reducing Output  Updated all steps for better flow  Updated scripts | March 1, 2015 |
| 3.5  4.2  4.5  4.9  9.1 | 1.0 / 5  1.0 / 20  1.0 / 4  1.0 / 3  1.0 / 6 | Updated GMD process  Updated step 2 of Rio Grande Valley  Renamed to GTC Stability and added Ajo – Zorrillo  Updated to new name Generic Transmission Constraint  Updated scripts | March 30, 2015 |
| 2.3  2.4  3.3  3.5  4.1  4.2  4.3  4.4  4.5  4.6  4.8  4.9  7.1  7.2  7.3  7.4  7.5  7.6  8.1  8.2  8.3  8.4  9.1 | 1.0 / 14  1.0 / 6  1.0 / 15  1.0 / 6  1.0 / 34  1.0 / 21  1.0 / 10  1.0 / 23  1.0 / 5  1.0 / 20  1.0 / 12  1.0 / 4  1.0 / 21  1.0 / 0   1. / 20 2. / 16   1.0 / 11  1.0 / 8   1. / 10 2. / 10 3. / 9 4. / 10   1.0 / 7 | Moved scripts to script procedure  Moved scripts to script procedure  Moved scripts to script procedure & updated GTL to GTC  Moved scripts to script procedure  Updated step 1 QSE Requests to Decommit a Resource, updated GTL to GTC, and moved scripts to script procedure  Moved scripts to script procedure  Moved scripts to script procedure  Moved scripts to script procedure & updated GTL to GTC  Renamed and updated Zorrillo – Ajo table  Moved scripts to script procedure  Updated for implementation of NOGRR135/NPRR642 and moved scripts to script procedure  Moved scripts to script procedure & updated GTL to GTC  Updated 50% Probability Of Down Ramp to 30%, removed 70% Probability Of Up Ramp, added note and moved scripts to script procedure  New process for implementation of NOGRR135/NPRR642  Updated section number and moved scripts to script procedure  Updated section number and moved scripts to script procedure  Updated section number  Updated section number and moved scripts to script procedure  Moved scripts to script procedure Moved scripts to script procedure  Moved scripts to script procedure  Moved scripts to script procedure  Moved scripts to script procedure | May 1, 2015 |
| All Sections  2.3  3.1  3.5  4.4 | 1.0 / 1  1.0 / 15  1.0 / 6  1.0 / 7  1.0 / 24 | Added a “T” for TO scripts  Renamed section to Site Failovers and Database Loads  Updated Gap Study  Updated Procedure Purpose. Updated GMD MIS Posting Scripts to include “until time”  Updated procedure purpose and step ≤500MW | July 15, 2015 |
| 4.1  4.5 | 1.0 / 35  1.0 / 6 | Updated step 1 Post-Contingency Overloads  Replaced East Texas Stability with Panhandle Stability  Added Laredo Import Stability  Removed Zorillo – Ajo Table | September 9, 2015 |
| 4.5  7.2 | 1.0 / 7  1.0 / 1 | Removed Panhandle Stability Step 1, updated Step 2 and Laredo Area Stability  Updated Double-Circuit Contingency actions | October 1, 2015 |
| 2.3  3.3  3.5  4.1  4.2  4.3  4.4  4.5  4.6  4.8  4.9  7.1  7.3  7.4  7.6  8.1  8.2  8.3  8.4  9.1 | 1.0 / 16  1.0 / 16  1.0 / 8  1.0 / 36  1.0 / 22  1.0 / 11  1.0 / 25   1. / 8   1.0 / 21  1.0 / 13  1.0 / 5  1.0 / 22  1.0 / 21  1.0 / 17  1.0 / 9  1.0 / 11  1.0 / 11  1.0 / 10  1.0 / 11  1.0 / 8 | Updated step Site Failover T#17  Updated step Site Failover Complete T#18  Updated State Estimator/RTCA step 3 T#21 & step 7 T#22  Updated Voltage Security Assessment Tool (VSAT) step 2 T#23 & step 6 T#24  Updated step 1 T#25  Updated step K Level Increases/Decreases T#26  Updated step Cancel T#27  Updated Review Planned Outage notes step Cascading Condition  Updated Basecase Overloads step Qualifying Facilities T#28  Updated Rio Grande Valley step 2  Added Rio Grande Valley step Reliability Margin <100 MW  Updated Rio Grande Valley step 3 T#29  Updated step Cascading Condition  Updated Pre-Contingency Load Shedding to avoid Post-Contingency cascading step 3 T#30  Updated step ≤300 T#31  Updated step **≤**100 T#32  Updated step 0MW T#33  Updated Laredo Area Stability step 4 T#29  Updated Zorrillo – Ajo 345kV Stability step 1 & step 2  Added Liston Stability  Added Molina Stability  Updated Special Protective Systems (SPS) step SPS Posting  Updated Mitigation Plan (MP) step Issue Watch T#34  Updated Mitigation Plan (MP) step Cancel Watch T#35  Updated Advisory step Cancel Advisory T#2  Updated Watch step Issue Watch T#3  Updated Watch step Cancel Watch T#4  Updated step GTC T#36  Updated Title Operating Condition Scripts  Updated Operating Condition Scripts step Hotline T#37  Updated Operating Condition Scripts step Hotline Cancellation T#38  Updated Title Specific Scripts for QSE’s  Updated Specific Scripts for QSE’s step 30% Probability Of Down Ramp T#39 & T#40  Updated Specific Scripts for QSE’s step Failure T#41 & T#42  Updated Specific Scripts for QSE’s step EMMS (LFC and RLC/SCED) Failure T#43 & T#44  Updated Specific Scripts for QSE’s step Increasing Amount of Ancillary Services T#45 & T#46  Updated Specific Scripts for QSE’s step A/S Insufficiency Offers in DAM T#47 & T#48  Updated Specific Scripts for QSE’s step REG/RRS – RUC Committed Shortages T#51 & T#52  Updated Specific Scripts for QSE’s step DAM Timeline Deviation T#53 & T#54  Updated Specific Scripts for QSE’s step DAM Failure T#55 & T#56  Updated Specific Scripts for QSE’s step DRUC Delay or Timeline Deviation T#57 & T#58  Updated Specific Scripts for QSE’s step DRUC Timeline not Met T#59 & T#60  Updated Specific Scripts for QSE’s step HRUC Failure or Timeline Deviation T#61 & T#62  Updated Specific Scripts for QSE’s step DRUC Committed for Capacity Shortage T#63 & T#64  Updated Specific Scripts for QSE’s step Excess Generation T#65 & T#66  Updated Specific Scripts for QSE’s step Projected Reserve Capacity Shortage with no market solution T#67 & T#68  Updated Specific Scripts for QSE’s step RMR Projected Reserve Capacity Shortage T#69 & T#70  Update first note, Updated Implement EEA Level 1 step Load Management title T#6  Updated Implement EEA Level 2 step 1 T#7  Updated Implement EEA Level 3 step 1 T#8, and  Implement NPRR708 for EEA  Updated Restore Firm Load step 1 T#9 & T#10  Updated Move from EEA Level 1 to EEA 0 step 1 T#13  Updated step Return to Normal TO Notification T#71  Updated step OCN T#72  Updated step Advisory T#73  Updated step Watch T#74  Updated step Emergency T#75  Updated step OCN T#76  Updated step Advisory T#77  Updated step Watch T#78  Updated step Emergency Notice T#79  Updated step OCN T#80  Updated step Advisory T#81  Updated step Watch T#82  Updated step Emergency Notice T#83  Updated step OCN/Advisory/Watch T#84  Updated step 2 T#85  All procedures in this manual have been reviewed | December 31, 2015 |
| 2.1  4.1  4.3  4.5  4.6  5.1  6.1  7.1  9.1 | 1.0 / 3  1.0 / 37  1.0 / 12  1.0 / 9  1.0 / 22  1.0 / 12  1.0 / 24  1.0 / 23  1.0 / 9 | Updated System Operator Responsibilities and Authority  Updated NERC Standard Reference  Updated NERC Standard Reference  Updated Molina Stability  Updated NERC Standard Reference  Updated NERC Standard Reference  Updated NERC standard Reference  Updated Voltage Security Assessment Tool step 1 table  Updated PSS & AVR step Note  Added Specific Scripts for QSE’s T#86  Updated Specific Scripts for QSE’s T#51  Updated Alert Levels | February 1, 2016  February 10, 2016 |
| 1.3  6.1  7.1 | 1.0 / 2  1.0 / 25  1.0 / 24 | Removed Interchange Coordinator  Updated STP Voltage Table  Updated Execute a SASM script title T#86 |  |
| 3.1  4.1  4.2  4.4  4.5  6.1 | 1.0 / 11  1.0 / 38  1.0 / 23  1.0 / 26  1.0 / 10  1.0 / 26 | Updated step STP Lines  Updated Review Planned Outages Cascading Condition  Updated Reliability Margin  Updated ≤300MW  Updated [Zorrillo – Ajo 345kV Stability](#_Zorrillo_–_Ajo) step 1  Updated step STP Voltage Table, 1 and 2 | April 29, 2016 |
| 2.1  2.2  4.1  4.2  4.3  4.4  4.5  4.6  6.1  7.1  7.4  7.5 | 1.0 / 4  1.0 / 4  1.0 / 39  1.0 / 24  1.0 / 13  1.0 / 27  1.0 / 11  1.0 / 23  1.0 / 27  1.0 / 25  1.0 / 18  1.0 / 12 | Updated for COM-002-4  Updated steps for COM-002-4  Updated steps for NPRR748, NOSCED and COM-002-4  Updated Reliability Margin  Updated steps for COM-002-4  Updated steps for COM-002-4  Updated step for COM-002-4  Updated steps for COM-002-4  Updated steps for COM-002-4  Updated steps for COM-002-4 & added Typical Script T#87 BAAL Firm Load Shed  Updated Restore Firm Load step 1  Updated steps for COM-002-4 | June 30, 2016 |
| 4.2  4.5  6.1  7.1 | 1.0 / 25  1.0 / 12   1. / 28   1.0 / 26 | Updated RUC/Future Studies & Deleted Note  Added Zorillo-Ajo 345 kV Stability note  Replaced step 1 with note  Updated Liston Stability Step 1 & Step 2  Removed Molina Stability  Added Red Tap Stability  Updated Real-Time Voltage Issues note  Updated ERCOT requesting Resource to operate beyond URL Exceeding URL or Reducing Output  Updated Voltage Security Assessment Tool step 1  Updated Specific Scripts for QSE’s T#43 T#44, T#61 & T#62 | September 30, 2016 |
| 4.1  4.5 | 1.0 / 40  1.0 / 13 | Updated Review Planned Outage Notes step Cascading Condition  Added Basecase / Post-Contingency Exceedance of Phase Angle  Added Panhandle Stability step Weighted Short Circuit Ratio and updated step 1  Added Pomelo Stability | November 2, 2016 |
| 3.3  3.6  4.1  4.5  4.6  6.1  10.1 | 1.0 / 17  1.0 / 0  1.0 / 41  1.0 / 14  1.0 / 24  1.0 / 29  1.0 / 6 | Updated Notes and State Estimator/RTCA section  Created a new procedure for resolving Real-time Data Issues per NOGRR162  Updated 2nd Note, step 3 Post-Contingency Overloads  Updated Laredo Area Stability step 1  Updated Special Protection Systems (SPS) to Remedial Action Schemes (RAS)  Updated per STP agreement  Deleted Telemetry Issue that could affect SCED and/or LMPs  All procedures in this manual have been reviewed | December 30, 2016 |
| 1.1  1.3  2.1  2.3  2.4  3.1  3.2  3.3  3.5  3.6  4.1  4.2  4.3  4.5  4.6  4.7  5.2  6.1  7.1  7.3  7.5  7.6  8.2  8.3  10.1 | 1.0 / 3  1.0 / 5  1.0 / 17  1.0 / 7  1.0 / 8  1.0 / 4  1.0 / 18  1.0 / 9  1.0 / 1  1.0 / 42  1.0 / 26  1.0 / 14  1.0 / 15  1.0 / 25  1.0 / 15  1.0 / 2  1.0 / 30  1.0 / 27  1.0 / 22  1.0 / 13  1.0 / 10  1.0 / 12  1.0 / 11  1.0 / 7 | Updated Introduction Purpose  Deleted section 1.3  Updated for IRO-001-4  Updated procedure purpose  Updated procedure purpose  Updated GAP Study  Updated categories to show RAS  Updated Notes  Updated Voltage Security Assessment Tool step 2  Updated procedure purpose  Changed step Situational Awareness to Mitigating Activities  Added step IROL  Deleted step Unknown State  Updated step ONTEST  Updated Reliability Margin  Updated CFE to CENACE  Updated step Note  Updated Zorillo - AJO Stability step 1  Removed Liston Stability  Updated Red Tap Stability step 1  Updated Pomelo Stability step 1  Added Bakersfield Stability  Updated title with AMP  Updated Remedial Action Schemes (RAS) steps  Added Automatic Mitigation Plan (AMP)  Updated Remedial Action Plan (RAP) step 1 & 5  Updated Pre-Contingency Action Plan (PCAP) step 1 & 2  Updated Mitigation Plan (MP) steps fully resolve constraint, <2% Absolute Shift Factors and Contingency Occurs  Updated Note & Manual Dispatch to take a Unit Off-Line  Updated Planned Outage  Updated title to Voltage Issues at Nuclear Power Plants  Added Real-Time Voltage Issues step 3  Updated ERCOT requesting Resource to operate beyond URL steps  Updated heading title, OCN step 1, Advisory step 1, Watch step 1, and Emergency Notice step 1  Implement EEA Level 3 Moved step 1 to step 2 & added step 1  Updated CFE to CENACE  Updated note  Updated Procedure Purpose  Updated Procedure Purpose  Updated Heading title to QSE Issues | March 31, 2017 |
| 3.3  3.6  4.1  4.2  4.4 | 1.0 / 19  1.0 / 2  1.0 / 43  1.0 / 27  1.0 / 28 | Added Section on ICCP Outages  Updated IROL  Added Section Post-Contingency Overloads on the South DC Ties  Updated Model Inconsistencies/Updates step 2  Updated step Reliability Margin, step 1 and added Cancel  Updated step Reliability Margin | April 6, 2017 |
| 3.6  4.1  4.4  4.5  5.2 | 1.0 / 3  1.0 / 44  1.0 / 29  1.0 / 16  1.0 / 3 | Updated step IROL  Updated Post-Contingency Overloads on the South DC Ties step 1  Updated step ≤400MW  Removed Bakersfield Stability  Updated steps | June 1, 2017 |
| 7.1  7.3 | 1.0 / 28  1.0 / 23 | Updated step BAAL Firm Load Shed  Updated Implement EEA Level 3 step 2 | June 30, 2017 |
| 3.3  3.7  4.1  7.3 | 1.0 / 20  1.0 / 0  1.0 / 45  1.0 / 24 | Updated Procedure Purpose  Deleted notes and updated State Estimator/RTCA step 1  Added new section Real-time Assessment (RTA)  Added new procedure Manual Real-time Assessment (RTA)  Added new section Monitoring Sub Synchronous Resonance (SSR)  Added Note to EEA Level 2 and EEA Level 3 | July 28, 2017 |
| 4.5  5.1  7.3 | 1.0 / 17  1.0 / 13  1.0 / 25 | Deleted Laredo Area Stability  Renamed Pomelo to North Edinburg – Lobo & updated  Added Rescheduled High Impact Outage (RO)  Updated 1st note | August 31, 2017 |
| 6.1 | 1.0 / 31 | Added East HVDC Tie Voltage Limits | September 29, 2017 |
| 4.5  6.1 | 1.0 / 18  1.0 / 32 | Renamed Zorillo - Ajo 345kV Stability to Nelson Sharpe – Rio Hondo 345kV Stability  Added new GTC East Texas Stability  Updated Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR) note | October 31, 2017 |
| 4.1  9.2 | 1.0 / 46  1.0 / 5 | All procedures in this manual have been reviewed  Added Operating Instruction and EDI scenario  Unsolved Contingencies  Updated Primary Control Center 4th note | December 28, 2017 |
| 3.3  6.1 | 1.0 / 21  1.0 / 33 | Updated Procedure Purpose, added ICCP Outages to include MIS and outage scheduler  Updated Future Voltage Issues and updated Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR) step 1 | February 28, 2018 |
| 3.6  4.5 | 1.0 / 4  1.0 / 19 | Updated Real-Time Data Issues known by the TO and Real-Time Data Issues that affect Network Security Analysis steps  Added new GTC McCamey Stability | March 30, 2018 |
| 2.2  4.2  4.5  7.1 | 1.0 / 5  1.0 / 28  1.0 / 20  1.0 / 29 | Updated procedure purpose  Updated Rio Grande Valley step Reliability Margin  Added new GTC Treadwell Stability  Added Unannounced Constant Frequency Control Test | May 1, 2018 |
| 4.1  4.2  4.4  4.5  6.1  7.5 | 1.0 / 47  1.0 / 29  1.0 / 30  1.0 / 21  1.0 / 34  1.0 / 14 | Added Phase Shifter  Updated Rio Grande Valley step 2  Updated North – Houston step ≤400MW  Updated Treadwell Stability  Added Generator Voltage Set Points  Updated steps and added Emergency Dispatch Instruction Confirmation Emergency | May 31, 2018 |
| 3.1  4.1  4.2  4.3  4.4  7.4 | 1.0 / 9  1.0 / 48  1.0 / 30  1.0 / 15  1.0 / 31  1.0 / 19 | Updated step STP Lines  Updated note  Updates step 1 for Rio Grande Valley  Updated 1st note and Studies step  Updated step ≤300MW  Clarified step in Move from EEA Level 1 to EEA 0 | August 31, 2018 |
| 4.1  4.2 | 1.0 / 49  1.0 / 31 | Updated Post-Contingency Overloads on the South DC Ties step 1 for NPRR 825  Updated Unsolved Contingencies step 1  Updated SSR Alerts to SSR Alarms  Updated Rio Grande Valley step 1 for NPRR 825 | October 1, 2018 |
| 7.5 | 1.0 / 15 | BLT RC Notification | November 1, 2018 |
| 4.6  6.1 | 1.0 / 26  1.0 / 35 | Added step 6 to Remedial Action Plan (RAP) Added step and renumbered steps to Power System Stabilizers (PSS) & Automatic Voltage Regulators (AVR)  All procedures in this manual have been reviewed | December 28, 2018 |
| 4.2  4.9 | 1.0 / 32  1.0 / 6 | Updated step 1Updated GTC | January 31, 2019 |
| 3.5  4.1  4.5  4.9 | 1.0 / 10  1.0 / 50  1.0 / 22  1.0 / 7 | Updated step Mitigating ActivitiesUpdated step Qualifying Resources Added Raymondville – Rio Hondo Stability  Updated step GTC and added note | March 29, 2019 |
| 4.1 | 1.0 / 51 | Added Note | May 01, 2019 |
| 7.3 | 1.0 / 26 | Moved Load Management Program from EEA1 to EEA2 | May 31, 2019 |
| 4.3  7.3 | 1.0 / 16  1.0 / 27 | Updated step Cascading Condition Updated Implement EEA Level 3 step 2 | August 1, 2019 |
| 3.3  4.1  4.5  4.6  7.1  7.3  9.1 | 1.0 / 22  1.0 / 52  1.0 / 23  1.0 / 27  1.0 / 30  1.0 / 28  1.0 / 10 | Updated State Estimator/RTCA step 1 Updated Title to Monitoring Sub Synchronous Resonance (SSR) and process, Added Monitoring Sub Synchronous Resonance (SSR) without Capacitor Switching action and Added Unresolvable Congestion with EMR Generation available Updated Panhandle Stability steps and updated Raymondville – Rio Hondo Stability step 1 Updated step RAS Status Change  Updated Specific Scripts for QSE’s steps  Added Typical Hotline Script for Media Appeal  Added step 3 and renumbered steps | November 1, 2019 |
| 3.1  4.1  4.5  7.3  7.4 | 1.0 / 10  1.0 / 53  1.0 / 24  1.0 / 29  1.0 / 20 | Updated STP lines  Updated step 3 in Managing Constraints in SCED  Deleted GTC Notes and added Bearkat Stability  Updated MSSC  Updated MSSC  All procedures in this manual have been reviewed | January 1, 2020 |