

***OPERATING PROCEDURE***

***MANUAL***

**DC Tie Desk**

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# 1. Introduction

## 1.1 Purpose

The ERCOT DC Tie Operator is responsible for energy transactions into and out of the ERCOT Control Area across the asynchronous DC Ties.  These transactions will be implemented in accordance with the North American Electric Reliability Corporation (NERC) Standard and the ERCOT Protocols and operating policies.  The ERCOT Operator will perform schedule confirmation with the applicable interconnected non-ERCOT Control Areas and will coordinate the approval process for NERC E-tags as both the ERCOT Control Area and on behalf of ERCOT TOs.  The ERCOT Operator will also confirm interconnected non-ERCOT Control Area schedule profiles with the DC Tie Operators, who will control the DC Tie to the schedules agreed to by both the designated Reliability Coordinator for the interconnected non-ERCOT Control Area and ERCOT.

The ERCOT DC Tie Operator performs his/her job function from the alternate control center and is also responsible for performing the loss of primary control center functionality procedure.

## 1.2 Scope

The instructions contained in this procedure are limited to those required for the ERCOT DC Tie 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 Tasks

## 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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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 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 ensure compliance with the ERCOT Protocols and Operating Guides on identified transfer limits. The SO receives all specified notifications for the MPs regarding energy transactions (Balanced Schedules), AGC control modes, routine adjustments, and equipment limitations and outages.

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, AAN’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.

The SPP DC-Tie processes, procedures, or plans that support or affect SPP shall be reviewed at least once every 3 years and updated if needed. These would include any DC-Tie procedures, inadvertent energy procedures, and emergency procedures.

## 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**  **R5, R7** |  |  |  |

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| **Version: 1** | **Revision: 6** | **Effective Date: December 31, 2021** |

| **Step** | **Action** |
| --- | --- |
| 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, ensure one TO/QSE repeats back the message.  **IF:**   * Time and circumstances allow;   **THEN:**   * Review the Consortium hotline attendance report to verify all TOs/QSEs were in attendance * Contact the TO/QSE 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. |
| **LOG** | Log all actions. |
| 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 NXT Notification Requirements

**Procedure Purpose:** To ensure the operator stays current using the system and to ensure system is tested.

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

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

| **Step** | **Action** |
| --- | --- |
| **Beginning**  **of each**  **Shift** | * Log into the Taylor NXT Communicator Emergency Notification System (ENS) at the beginning of each shift, UNLESS:   + TaylorENS is unavailable   + Notified by Telecommunications/Help Desk/Shift Supervisor of maintenance, etc.   + Testing Non-Routinely used Telecommunications * Refer to Desktop Guide Common to Multiple Desks Section 2.8, * Notify Help Desk immediately if unable to log into the NXT Communicator and request immediate assistance. |
| **NXT**  **Test** | On the first weekend of each month, between the hours of 0800-2200:   * Coordinate the actual test time with the Shift Supervisor if he instructs you to proceed, * Test NXT Communicator by activating the “SO ENS Test” scenario, * If any issues are found, open help ticket and cc: “shiftsupv”, * Make log entry. |

## 2.4 Suspected Sabotage or Sabotage Events

**Procedure Purpose:** To be aware of cyber intrusions and communicate concerning activity and any unusual occurrences.

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

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| **Version: 1** | **Revision: 0** | **Effective Date: March 1, 2022** |

| **Step** | **Action** |
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| **ERCOT**  **Event** | **Refer to Cyber Intrusion Guide and Cyber Security Incident Response Plan located in procedure binder.**  **IF:**   * Unusual system behavior is observed;   **THEN:**   * Notify Shift Supervisor |
| **Entity**  **Event** | **IF:**   * A TO or QSE reports an act of suspected sabotage or a sabotage event, including cyber;   **THEN:**   * Notify Shift Supervisor |

# 3. DC Tie Procedures

## 3.1 Approve E-Tags for the SPP DC Ties

**Procedure Purpose:** An E-Tag received in the OATI WebTrans regarding DC Tie flows into or out of ERCOT will be validated for accuracy.

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| **Protocol Reference** | **4.4.4** | **4.4.4.1** | **4.4.4.2** |  |
| **Guide Reference** | **2.1(4)(e)** |  |  |  |
| **NERC Standard** | **INT-006-5**  **R1, R1.1, R2, R4, R5, R5.1, R5.2, R5.3, R5.4, R5.5** | **INT-009-3**  **R3** |  |  |

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| **Version: 1** | **Revision: 33** | **Effective Date: December 30, 2022** |

| **Step** | | **Action** | |
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| **NOTE** | | * AEP TOP located in Ohio is the DC Tie Operator (AEP DC TIE) for the DC\_E (East tie) and DC\_N (North tie) * If either DC Tie is over-scheduled, contact the SPP Operator (SPP RTBM) | |
| **NOTE** | | ERCOT has analyzed the ramping capability of its Interconnection and is capable of ramping at a greater rate than the maximum ramp rate schedule on any of the DC-Ties. | |
| **NOTE** | | Timing requirements can be found in NERC Standard INT-006-5 Attachment 1, the OATI software incorporates these timing requirements into the tool and actions cannot be taken outside the timing requirements. | |
| **1** | | Automatic validation in WebTrans for each new or updated E-Tag will display ‘pass’ or ‘fail’. The criteria used to automatically validate E-Tags is:   * ERCOT Market Information field must have QSE information * TSP (Transmission Service Provider) must have ERCO specified in the Physical Path * Tag Transaction Type must not be a Dynamic Schedule   **IF:**   * Either of the above validations fail;   **THEN:**   * The E-Tag will be automatically denied.   **IF:**   * You feel an E-Tag failed validation erroneously;   **THEN:**  Go to the list of approved ERCOT Registered QSE’s at the following website: <https://wiki.ercot.com/pages/viewpageattachments.action?pageId=186982491>   * Select “View” of the most recent post of “ERCOT QSE DC Tie Scheduling List” to view the ERCOT Registered QSE’s.,   **IF:**   * The QSE name is on the list but was denied by WebTrans;   **THEN:**   * Approve the E-Tag and inform the ERCOT help desk and OATI help desk if needed.   ***WebTrans Reference Display****:*  *Validation > Tag Validation Monitor* | |
| **2** | | When a New or Updated E-Tag is received in WebTrans system:  Manually validate the following:   * Contact Information must be the QSE information and not ERCOT * “ERCO” must not be listed as a PSE in Tag Information * “ERCO” must not be listed as a PSE in the Physical Path * Time Zone should be CS (central standard), CD (central daylight) or CP (central prevailing) during time change * “Transaction type” must be “Energy or Normal” * “ERCOT-E” or “ERCOT-N” must be selected for the correct POR (Point-of-Receipt) or POD (Point of Delivery) in the Physical Path * “ERCOT-E” or “ERCOT-N” must be selected for the correct POR (Point-of-Receipt) or POD (Point of Delivery) on the ERCO TSP Row * Do not allow same tie on the same row for the POR and POD, example: “ERCOTN to “ERCOTN” * There are no losses (MW) in the ERCOT Control Area. This would be either to or from SPP as shown on the “Energy and Transmission Profiles” section, loss accounting may be blank, financial, or in-kind for ERCOT * Tags are permitted to be submitted within the COP time frame (up to seven days in advance), but a separate tag for each day must be submitted and the Start Time and Stop Time MUST NOT cross the midnight hour * If ERCOT is the sink BA, it is our responsibility to ensure FERC is cc’d on the e-Tag. * If Tag comes in with a Late status, deny the Tag (unless it is a curtailment).   **IF:**   * Any of the above information is incorrect;   **THEN:**   * Deny the E-Tag, otherwise proceed below.   **IF:**   * An E-Tag is received for a time period when the DC-Tie will be unavailable;   **THEN:**   * Deny the E-Tag.   **IF:**   * One or more E-Tags are submitted that will cause the DC Tie to be overscheduled;   **THEN:**   * Contact SPP Tariff (SPP Tariff) approximately 30 minutes prior to the schedule start time to ensure they also see the over-schedule; they will take action to correct the over-schedule. If the correction is not in place by 20 minutes before the over-schedule will occur, ERCOT will curtail the E-Tag to zero (0) based on the criteria of “Last in – First out” until the over schedule is alleviated.   **IF:**   * ERCOT curtailsan E-Tag due to an over-schedule that was not corrected in time;   **THEN:**   * Contact the source/sink control area to ensure the curtailment will be implemented as soon as possible.   ***WebTrans Reference Displays:***  *Scheduling>Interchange>BTF Checkout* | |
| **NOTE** | | If verification needs to be made in the current day HRUC will be used unless it is a current hour tag. If verification needs to be made for the next day DRUC will be used. | |
| **NOTE** | | Webtrans and MMS (MOI) utilize a different sign convention (positive and negative numbers) between the two systems.  OATI:   * (-) Imports * (+) Exports   MMS:   * (+) Imports * (-) Exports | |
| **COP E-Tags** | | **REVIEW REFERENCE DISPLAY:**  Market Operation>Reliability Unit Commitment> HRUC Displays> DSI Displays> DSI Data Processes> DSI DC Tie Schedule  Market Operation>Reliability Unit Commitment> HRUC Displays> DSI Displays> External Input Data> MI COP  Verify that E-tags are being imported into the MMS by going to the MI COP display and filter ‘ERCOT’ as the QSE name. | |
| 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 Transmission desk operator | |
| **LOG** | Log all actions. | |

## 3.2 Import and Export Limits for the CENACE DC Ties

**Procedure Purpose:** To confirm the import and export limits of the CENACE DC Ties to ensure Reliability of the ERCOT Interconnection.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 17** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
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| **NOTE** | Studies are required to set import/export limits between CENACE and ERCOT based on system conditions for commercial and emergency operations. ERCOT will conduct studies in different time horizons including but not limited to seasonal (winter and summer peaks), Day-Ahead and real-time as needed. Operations Support group will calculate daily import/export transfer advisory limits for the Railroad and Laredo VFT.  Revised Day-Ahead import and export advisory limits for the Railroad and Laredo VFT will be posted on the “Transmission Limits to Be Monitored” on the ERCOT Website at approximately 1700 in the Day-Ahead.  ERCOT Website>Data Products>GRID>Transmission>Generic Transmission Limits  If the limits are not posted, notify the Operations Support Engineer. |
| **Adjustment Period** | The Adjustment Period is for each Operating Hour, the time between 1800 in the Day-Ahead up to the start of the hour before that Operating Hour. |
| **1** | Once the DC-Tie revised limits for next day are received and prior to the start of the 1800 Day-Ahead Adjustment Period, check the sum of the E-Tags to ensure the export limits are not exceeded on any of the CENACE DC-Tie.  **IF:**   * The sum of the E Tags exceeds the revised import or export limit on any CENACE DC Tie,   **THEN:**   * Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website. * ERCOT will curtail the E-Tag based on the criteria of “Last in – First out” in real time as needed to maintain reliability. |
| **2** | **IF:**   * A new E-Tag is received in the Adjustment Period or Operating Hour which creates an exceedance of the physical capacity on any CENACE DC-Tie,   **THEN:**   * Deny the E-Tag. |

## 3.3 Approve E-Tags for the CENACE DC Ties

**Procedure Purpose:** An E-Tag received in the OATI WebTrans regarding DC Tie flows into or out of ERCOT will be validated for accuracy.

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| **Protocol Reference** | **4.4.4** | **4.4.4.1** | **4.4.4.2(1)** |  |
| **Guide Reference** | **2.1(4)(e)** |  |  |  |
| **NERC Standard** | **INT-006-5 R1, R1.1, R2, R4, R5, R5.1, R5.2, R5.3, R5.4, R5.5** | **INT-009-3**  **R3** |  |  |

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| **Version: 1** | **Revision: 37** | **Effective Date: December 30, 2022** |

| **Step** | **Action** |
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| **NOTE** | * AEP TO in Corpus Christi is the DC Tie Operator (AEP TO) for the DC\_L (Laredo VFT) * ONCOR TO in Dallas is the DC Tie Operator (ONCOR DC TIE) for the DC\_R (Railroad DC Tie) * All communications will be with the DC-Tie Operator, and they will communicate with CENACE |
| **NOTE** | ERCOT will not allow an E-Tag to flow from CENACE to SPP or from SPP to CENACE. This will require two separate E-Tags. E-Tags are not calculated in our ACE equation, DC Tie schedules are seen by our EMMS as a generator (import) or load (export). |
| **NOTE** | * ERCOT has analyzed the ramping capability of its Interconnection and is capable of ramping at a greater rate than the maximum ramp rate schedule on any of the DC Ties * The Railroad DC Tie has a 15 MW minimum flow requirement when E-Tags are scheduled * Approximately one hour before start of schedule, notify the ERCOT Transmission & Security Operator with scheduled MW, Tie and direction of flow and duration. |
| **NOTE** | Timing requirements can be found in NERC Standard INT-006-5 Attachment 1, the OATI software incorporates these timing requirements into the tool and actions cannot be taken outside the timing requirements. |
| **1** | Automatic validation in WebTrans for each new or updated E-Tag will display ‘pass’ or ‘fail’. The criteria ERCOT uses to validate E-Tags is:   * ERCOT Market Information fields must have QSE information * TSP (Transmission Service Provider) must have ERCO, and CEN specified in the Physical Path * Tag Transaction Type must not be a Dynamic Schedule   If either of the above validations fail, the E-Tag will be automatically denied.    If you believe an E-Tag failed validation erroneously, the list of approved ERCOT Registered QSE’s can be found at the following website:  <https://wiki.ercot.com/pages/viewpageattachments.action?pageId=186982491>  Select “View” of the most recent post of “ERCOT QSE DC Tie Scheduling List” to view the ERCOT Registered QSE’s. If the QSE name is on the list but was denied by WebTrans, approve the E-Tag, and inform the ERCOT help desk and OATI help desk if needed.  Another point of reference is to view the “QSE Contracts” in WebTrans. Each QSE is associated with each DC-Tie individually.    ***WebTrans Reference Display****:*  *Tag Validation Summary*  *Data>QSE Contracts* |
| **2** | When a New or Updated E-Tag is received in the WebTrans system:  Manually validate the following:   * PSE Contact Information must be the QSE information and not ERCOT * “ERCO” must not be listed as a PSE in the Tag Information * “ERCO” must not be listed as a PSE in the Physical Path * Time Zone should be CS (central standard), CD (central daylight) or CP (central prevailing) during time change * “Transaction type” must be “Energy or Normal” * ERCO, AEPT and CEN must be included as the TSP (Transmission Service Provider) in the Physical Path and ERCO as a Scheduling Entity on the AEPT TSP row in the Physical Path for DC\_L * ERCO, ONC and CEN must be included as the TSP in the Physical Path and ERCO as a Scheduling Entity on the ONC TSP row in the Physical Path for the DC\_R * ERCOT and CFE/CEN must be listed as the Source and Sink under POR (Point-of-Receipt) and POD (Point of Delivery). * There are no losses (MW) in the ERCOT Control Area. This should be to or from AEPT or ONC as shown on the “Energy and Transmission Profiles” section, loss accounting may be blank, financial, or in-kind for ERCOT * A separate tag for each day must be submitted and the Start Time and Stop Time MUST NOT cross the midnight hour * If Tag comes in with a Late status, deny the Tag (unless it is a curtailment) * The sum of E-Tags is submitted that will cause the DC Tie to exceed the physical capacity for the tie * The Railroad DC Tie has a 15 MW minimum flow requirement. Ensure the net of the E-Tags are not less than 15 MW * Only ERCO and CEN are allowed as BA in the Physical Path,   **IF:**   * Any of the above information is incorrect on the E-Tag;   **THEN:**   * Deny the E-Tag.   **IF:**   * An E-Tag is denied due to another entity other than ERCO or CEN as BA in the Physical Path;   **THEN:**   * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website and   + Use the canned message, * Send email to SysOpsMgrs to coordinate a Market Notice.   ***WebTrans Reference Displays:***  *Scheduling>Interchange>BTF Checkout* |
| **3** | The ramp rate for DC\_R will be 50 MW per minute due to reactive issues on the CENACE side. DC\_L has no ramp limitations.   * Ramp Duration should be filled out on DC\_R E-Tags only   + Deny any Railroad DC-Tie E-Tag that does not have a ramp duration entered.   + DC\_L ramp duration can remain blank which is the default for a 10-minute ramp. |
| **NOTE** | Webtrans and MMS (MOI) utilize a different sign convention (positive and negative numbers) between the two systems.  **WebTrans:**   * (-) Imports * (+) Exports   **MMS:**   * (+) Imports * (-) Exports |
| **COP E-Tags** | **REVIEW REFERENCE DISPLAY:**  Market Operation>Reliability Unit Commitment> HRUC Displays> DSI Displays> DSI Data Processes> DSI DC Tie Schedule  Market Operation>Reliability Unit Commitment> HRUC Displays> DSI Displays> External Input Data> MI COP   * Verify that E-tags are being imported into the MMS by going to the MI COP display and filter ‘ERCOT’ as the QSE name |

## 3.4 Adjustment of SPP DC Ties

**Procedure Purpose:** The process to approve or deny adjustments to E-Tags.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **2.8** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 6** | **Effective Date: April 29, 2016** |

| **Step** | **Action** |
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| **NOTE** | E-Tag adjustments must be in an “Approved” or “Implemented” status to be calculated into the net scheduled interchange. |
| **1** | **IF:**   * The net schedule interchange value changes intra-hour, and * Requested by SPP;   **THEN:**   * Checkout the net scheduled interchange value for each SPP DC Tie (DC\_E/DC\_N) affected by E-Tag adjustments.   ***WebTrans Reference Display:***  *Realtime Summary* |

## 3.5 Curtailment for the SPP DC Ties

**Procedure Purpose:** The process to curtail E-Tags for the SPP DC Ties for reliability purposes or DC-Tie trips.

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| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **INT-006-5**  **R3, R3.1** | **IRO-006-5**  **R1** |  |  |

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| **Version: 1** | **Revision: 9** | **Effective Date: March 1, 2022** |

| **Step** | **Action** |
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| **NOTE** | * Curtailments are customarily scheduled for *one hour* at a time. Therefore, a curtailment that occurs several hours in a row may require that this procedure be repeated hourly * If a system operator in a non-ERCOT Control Area requests curtailment of a DC Tie Schedule due to an actual or anticipated emergency in its Control Area, ERCOT may curtail the DC Tie Schedule. If the DC Tie Schedule is curtailed, ERCOT shall post a DC Tie Curtailment Notice to the ERCOT Website as soon as practicable * SPP may make curtailments for Transmission Loading Relief (TLR) on their system. |
| **1** | **IF:**   * A curtailment alarm is received in WebTrans, AND complying with the request will NOT put ERCOT in an unreliable state (such as EEA or IROL exceedance);   **THEN:**   * Approve the E-Tag curtailment.   **IF:**   * A curtailment alarm is received in WebTrans, AND complying with the request WILL put ERCOT in an unreliable state (such as EEA or IROL exceedance);   **THEN:**   * Deny the E-Tag, stating the reason on the tag, AND * Call SPP RC and provide reliability reason for denying the request within 10 minutes.   ***Webtrans Reference Displays:***  *Tag Validation Summary*  *Tag Approval Monitor* |
| **2** | **IF:**   * A QSE or SPP requests ERCOT to make an E-Tag change for them, either a curtailment or adjustment,   **THEN:**   * Curtail the E-Tag to 0 (zero). |
| **NOTE** | E-Tag curtailments must be in an “Approved” or “Implemented” status to be calculated into the net scheduled interchange. |
| **3** | **IF:**   * The net schedule interchange value changes intra-hour, and * Requested by the SPP Operator,   **THEN:**   * Checkout the net scheduled interchange value for each SPP DC Tie affected by E-Tag curtailments.   ***WebTrans Reference Display:***  *Realtime Summary* |

## 3.6 Adjustment of CENACE DC Ties

**Procedure Purpose:** The process to approve or deny adjustments to E-Tags.

|  |  |  |  |  |
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| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** | **2.8** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 14** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
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| Imports | |
| **NOTE** | E-Tag adjustments must be in an “Approved” or “Implemented” status to be calculated into the net scheduled interchange. |
| **NOTE** | If a system operator in a non-ERCOT Control Area requests curtailment of a DC Tie Schedule due to an actual or anticipated emergency in its Control Area, ERCOT may curtail the DC Tie Schedule. If the DC Tie Schedule is curtailed, ERCOT shall post a DC Tie Curtailment Notice to the ERCOT Website as soon as practicable. |
| **1** | IF requested by either DC Tie Operator, AEP TO or ONCOR TO (ONCOR DC TIE), checkout the net scheduled interchange value for each CENACE DC Tie affected by E-Tag adjustments.  ***WebTrans Reference Display:***  *Realtime Summary* |
| Exports | |
| **1** | **IF:**   * The adjustment causes the sum of the E-Tags to exceed the physical capacity export limit on any CENACE DC-Tie,   **THEN:**   * Deny the E-Tag adjustment. |
| **2** | Notify the ERCOT Transmission & Security Operator when E-Tag Net Export adjustments are greater than 100 MW during the Adjustment Period. |
| **NOTE** | E-Tag adjustments must be in an “Approved” or “Implemented” status to be calculated into the net scheduled interchange. |
| **NOTE** | If a system operator in a non-ERCOT Control Area requests curtailment of a DC Tie Schedule due to an actual or anticipated emergency in its Control Area, ERCOT may curtail the DC Tie Schedule. If the DC Tie Schedule is curtailed, ERCOT shall post a DC Tie Curtailment Notice to the ERCOT Website as soon as practicable. |
| **3** | IF requested by either DC Tie Operator, AEP TO or ONCOR DC Tie, checkout the net scheduled interchange value for each CENACE DC Tie affected by E-Tag adjustments.  ***WebTrans Reference Display:***  *Realtime Summary* |
| Post-Contingency Overloads | |
| **NOTE** | DC Tie Load shall neither be curtailed during the Adjustment Period, nor for more than one hour at a time, except for the purpose of maintaining reliability. |
| **1** | **IF:**   * If requested by the Transmission Operator to curtail a South DC-Tie to a specific MW amount to resolve a post-contingency overload.   **THEN:**   * Notify the appropriate DC Tie Operator, AEP TO or ONCOR DC TIE to ramp the Tie to the specific MW amount given from the Transmission Operator. * Curtail the appropriate South DC Tie to the requested MW amount given from the Transmission Operator.   + ERCOT will curtail the E-Tag based on the criteria of “Last in – First out”. * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website and   + Use the canned message, |
| **Cancel**  **Message** | **WHEN:**   * A South DC-Tie specific MW amount to resolve a post-contingency overload is no longer needed;   **THEN:**   * Cancel DCTCN ERCOT Website posting message |

## 3.7 DC Tie Trips or Derates

**Procedure Purpose:** The process when a DC Ties trip or is de-rated.

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| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** | **10.1(2)** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 18** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
| --- | --- |
| CENACE DC Ties | |
| **1** | **IF:**   * Any of the CENACE DC Ties trip,   **THEN:**   * ERCOT will have the responsibility to curtail the E-Tags. * Curtail the E-Tags for the Tie that tripped (see Desktop Guide DC Tie Desk Section 2.3 or 2.4). * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website   + Use the canned message |
| **2** | Once the DC Tie that tripped is operational, re-load the curtailed E-Tag(s), if applicable:   * Re-load curtailed E-Tag(s) (see Desktop Guide DC Tie Desk Section 2.5), * Cancel DCTCN ERCOT Website posting message * Notify the appropriate DC Tie Operator. |
| **3** | **IF:**   * The re-loaded E-Tag(s) go passive deny because CENACE or DC Tie Operator did not approve the E-Tag(s) in the allotted time;   **THEN:**   * Re-load the E-Tag(s) again, AND * Notify the appropriate DC Tie Operator.   *If reload fails, the second time stop trying and keep tag curtailed.* |
| **Post**  **Message** | **WHEN:**   * The Railroad or Laredo DC Tie trips;   **THEN:**   * Post message on the ERCOT Website,   + Use the canned message,   + End time will be unknown, put through the end of the day |
| **Cancel**  **Message** | **WHEN:**   * The DC Tie returns to service;   **THEN:**   * Cancel message |
| CENACE DC Tie Derates | |
| **Post**  **Message** | **IF:**   * Notified that any of the CENACE DC Ties are temporally derated;   **THEN:**   * Post message on the ERCOT Website;   + Select Create Freeform Notice,   + Operational Information,   + Low priority,   + Public.   **Typical ERCOT Website Posting:**  “ERCOT has been notified that the [TIE] DC Tie has been derated to [AMOUNT] MW Import/Export due to [REASON] until further notice.” |
| **Cancel**  **Message** | **WHEN:**   * Tie returned to normal service;   **THEN:**   * Cancel DCTCN ERCOT Website posting message |
| SPP DC TIES | |
| **1** | **IF:**   * Any of the SPP DC Ties trip,   **THEN:**   * SPP has the responsibility to curtail the E-Tags. |
| **Post**  **Message** | **WHEN:**   * The East or North DC Tie trips;   **THEN:**   * Post message on the ERCOT Website,   + Use the canned message,   + End time will be unknown, put through the end of the day |
| **Cancel**  **Message** | **WHEN:**   * Tie returned to service;   **THEN:**   * Cancel message |
| SPP DC Tie Derates | |
| **Post**  **Message** | **IF:**   * Notified that any of the SPP DC Ties are temporally derated;   **THEN:**   * Post message on the ERCOT Website;   + Select Create Freeform Notice,   + Operational Information,   + Low priority,   + Public.   **Typical ERCOT Website Posting:**  “ERCOT has been notified that the [TIE] DC Tie has been derated to [AMOUNT] MW Import/Export due to [REASON] until further notice.” |
| **Cancel**  **Message** | **WHEN:**   * Tie returned to normal service;   **THEN:**   * Cancel message |

## 3.8 Managing Daily Inadvertent Energy for the SPP DC Ties

**Procedure Purpose:** To track any difference between the schedule net interchange and the actual net interchange.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **6.5.4(1)** |  |  |  |
| **Guide Reference** | **2.2.1(3)(c)(i)** | **2.8(1) & (3)** |  |  |
| **NERC Standard** |  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 17** | **Effective Date: April 1, 2021** |

| **Step** | **Action** |
| --- | --- |
| **Monitor** | Monitor the flows on the DC-Ties to ensure the Ties are ramping appropriately and match the net schedules. |
| **NOTE** | If the proper information is not listed when an E-Tag is created and submitted, the E-Tag may not be displayed correctly in all WebTrans displays. Examples include but are not limited to a PSE not using the proper POR/POD in the Physical Path (ERCOT-E or ERCOT-N). |
| **NOTE** | Due to the DC\_N deadband issue, if the net schedule on the North DC Tie is less than 22 MW, the DC Tie will go to 0. The DC-Tie will ramp back up when scheduled above 22 MW. |
| **1** | Before the start of the hour, confirm the net-scheduled value for each DC Tie with the SPP Operator (SPP RTBM). If there is a discrepancy, go over each.  E-Tag ID and MW amount for the affected DC Tie(s).   * If an E-Tag cannot be seen in WebTrans **OR** by the DC Tie Operator, work to resolve the problem OR ensure the E-Tag is curtailed to zero (0).   ***WebTrans Reference Displays****:*  *Scheduling>QSE Summary*  *Scheduling>Interchange>BTF Display* |
| **2** | Check out the Actual SCADA data values for the previous hour with the SPP Operator (SPP RTBM) for each DC Tie:   * If ERCOTs actual values are different from SPPs actual values by less than 10MWH, override the actual value in the WebTrans system. * If ERCOTs actual values are different from SPPs actual values by 10MWH or more and the reason is known (database load, loss of ICCP, etc.), override the actual value in the WebTrans system. Log the appropriate information. * If ERCOTs actual values are different from SPPs actual values by 10MWH or more and the reason is unknown; contact the DC Tie Operator and have them investigation.   + Log the appropriate information   + Open Help Desk for GMS Support to investigate.   ***WebTrans Reference Displays:***  *Scheduling>Inadvertent>Tie Data*  *Scheduling>Interchange>ATF Checkout* |
| **3** | After midnight, each day, check out the total scheduled and actual values for each DC Tie with the SPP Operator (SPP RTBM):  **IF:**   * Both parties agree on the Scheduled In and Out values and on the Actual In and Out values;   **THEN:**   * Prepare report for both the DC\_E and DC\_N   + Select “[Tie name]” on the CA/UDI Interface   + Select “Schedule” on the “Checkout” dropdown   + Check the bottom box on the totals row in Column SC   + Click the “Apply Checkout” button   + Proceed to Step 5.   ***WebTrans Reference Display:***  *Scheduling>Interchange>ATF* |
| **4** | If there is a disagreement on the total scheduled and/or actual values with the SPP Operator, verify the values for each hour as necessary to find the discrepancy. An effort should be made to work out all discrepancies  If the discrepancy is with the scheduled values, email an Excel copy of the WebTrans Interchange Report display to check their information against ERCOT’s.   * Check the box in Column SC for each hour that ERCOT is in agreement with the SPP Operator for the scheduled value. * Leave the box unchecked in Column SC for each hour where there is a discrepancy with a scheduled value, and it cannot be worked out with the SPP Operator * Click the “Apply Checkout” button. * If asked to change a scheduled value, log the appropriate information, and send email to [shiftsupv@ercot.com](mailto:shiftsupv@ercot.com). * If the discrepancy is with an actual value, change it to the SPPs value.   ***WebTrans Reference Displays:***  *Scheduling>Interchange>ATF*  *Scheduling>Inadvertent>Tie Data* |
| **5** | **IF:**   * Inadvertent is > 22 MW in either direction and the deadband is not the reason;   **THEN:**   * Make a log entry explaining the issue. |
| **6** | Create an Excel file (Export As Shown) for each the DC\_N and DC\_E and email it to the following (see Desktop Guide DC Tie Desk Section 2.9):   * SPP DC-Tie Inadvertent |

## 3.9 Managing Daily Inadvertent Energy for the Laredo VFT

**Procedure Purpose:** To track any difference between the schedule net interchange and the actual net interchange.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** | **2.2.1(3)(c)(i)** | **2.8(1) & (3)** |  |  |
| **NERC Standard** |  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 15** | **Effective Date: April 1, 2021** |

| **Step** | **Action** |
| --- | --- |
| **Monitor** | Monitor the flows on the DC-Ties to ensure the Ties are ramping appropriately and match the net schedules. |
| **NOTE** | If the proper information is not listed when an E-Tag is created and submitted, the E-Tag may not be displayed correctly in all WebTrans displays. Examples include but are not limited to a PSE not using the proper POR/POD in the Physical Path (LAR\_VFT). |
| **1** | Before the start of the hour, confirm the net-scheduled value for each DC Tie with the DC Tie Operator (AEP TO). If there is a discrepancy, go over each E-Tag ID and MW amount for the affected DC Tie(s).   * If an E-Tag cannot be seen in WebTrans **OR** by the DC Tie Operator, work to resolve the problem OR ensure the E-Tag is curtailed to zero (0).   ***WebTrans Reference Displays****:*  *Scheduling>QSE Summary*  *Scheduling>BTF Display* |
| **2** | Check out the Actual SCADA data values for the previous hour with the DC Tie Operator (AEP TO) for each DC Tie.   * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by less than 10 MWH, overwrite the actual value in the WebTrans system with a whole number. * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by 10 MWH or more and the reason is known (database load, loss of ICCP, etc.), overwrite the actual value in the WebTrans system. Log the appropriate information. * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by 10 MWH or more and the reason is unknown; ERCOT and the DC Tie Operator will initiate an investigation. Log the appropriate information (time, date, total MW difference, DC Tie, name of the DC Tie Operator and any other relevant information). Open an ERCOT Help Desk ticket for GMS Support to investigate problems with the meter information and notify Shift Supervisor.   ***WebTrans Reference Displays:***  *Scheduling>Inadvertent>Tie Data*  *Scheduling>Interchange>ATF Checkout* |
| **3** | After midnight, each day, check out the total scheduled and actual values for each DC Tie with the DC Tie Operator, AEP TO:  **IF:**   * Both parties agree on the Scheduled In and Out values and on the Actual In and Out values;   **THEN:**   * Prepare report for the DC\_L   + Select “[Tie name]” on the CA/UDI Interface   + Select “Schedule” on the “Checkout” dropdown   + Check the bottom box on the totals row in Column SC   + Click the “Apply Checkout” button   + Proceed to Step 5.   ***WebTrans Reference Display:***  *Scheduling>Interchange>ATF Checkout* |
| **4** | If there is a disagreement on the total scheduled and/or actual values with the DC Tie Operator, verify the values for each hour as necessary to find the discrepancy. An effort should be made to work out all discrepancies.  If the discrepancy is with the scheduled values:   * Check the box in Column SC for each hour that ERCOT is in agreement with the DC Tie Operator for the scheduled value. * Leave the box unchecked in Column SC for each hour where there is a discrepancy with a scheduled value, and it cannot be worked out with the DC Tie Operator. * Click the “Apply Checkout” button. * Log the appropriate information and send email to [shiftsupv@ercot.com](mailto:shiftsupv@ercot.com).   If the discrepancy is with an actual value, change the ERCOT value to match the DC Tie Operator’s value.  ***WebTrans Reference Displays:***  *Scheduling>Interchange>ATF Checkout*  *Scheduling>Inadvertent>Tie Data* |
| **5** | Create an Excel file (Export As Shown) for the DC\_L DC Tie and email to the following (see Desktop Guide DC Tie Desk Section 2.9):   * CFE DC-Tie Inadvertent |

## 3.10 Managing Daily Inadvertent Energy for the Railroad Tie

**Procedure Purpose:** To track any difference between the schedule net interchange and the actual net interchange.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** | **2.2.1(3)(c)(i)** | **2.8(1) & (3)** |  |  |
| **NERC Standard** |  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 10** | **Effective Date: April 1, 2021** |

| **Step** | **Action** |
| --- | --- |
| **Monitor** | Monitor the flows on the DC-Ties to ensure the Ties are ramping appropriately and match the net schedules. |
| **NOTE** | If the proper information is not listed when an E-Tag is created and submitted, the E-Tag may not be displayed correctly in all WebTrans displays. Examples include but are not limited to a PSE not using the proper POR/POD in the Physical Path (ROAD\_DC). |
| **1** | Before the start of the hour, confirm the net-scheduled value for the DC Tie with the DC Tie Operator, ONCOR DC TIE. If there is a discrepancy, go over each E-Tag ID and MW amount.   * If an E-Tag cannot be seen in WebTrans **OR** by the DC Tie Operator, work to resolve the problem OR ensure the E-Tag is curtailed to zero (0). * Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website.   + Use the canned message   ***WebTrans Reference Displays****:*  *Scheduling>QSE Summary*  *Scheduling>BTF Display* |
| **2** | Check out the Actual SCADA data values for the previous hour with the DC Tie Operator, ONCOR DC TIE for the Railroad DC Tie.   * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by less than 10 MWH, overwrite the actual value in the WebTrans system with a whole number. * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by 10 MWH or more and the reason is known (database load, loss of ICCP, etc.), overwrite the actual value in the WebTrans system. Log the appropriate information. * If ERCOT’s actual values are different from the DC Tie Operator’s actual values by 10 MWH or more and the reason is unknown; ERCOT and the DC Tie Operator will initiate an investigation. Log the appropriate information (time, date, total MW difference, DC Tie, name of the DC Tie Operator and any other relevant information). Open an ERCOT Help Desk ticket for GMS Support to investigate problems with the meter information and notify Shift Supervisor.   ***WebTrans Reference Displays:***  *Scheduling>Inadvertent>Tie Data*  *Scheduling>Interchange>ATF Checkout* |
| **3** | After midnight, each day, check out the total scheduled and actual values for the Railroad DC Tie with the DC Tie Operator, ONCOR DC TIE:  **IF:**   * Both parties agree on the Scheduled In and Out values and on the Actual In and Out values;   **THEN:**   * Prepare report for the DC\_R   + Select “[Tie name]” on the CA/UDI Interface   + Select “Schedule” on the “Checkout” dropdown   + Check the bottom box on the totals row in Column SC   + Click the “Apply Checkout” button   + Proceed to Step 5.   ***WebTrans Reference Display:***  *Scheduling>Interchange>ATF Checkout* |
| **4** | If there is a disagreement on the total scheduled and/or actual values with the DC Tie Operator, verify the values for each hour as necessary to find the discrepancy. An effort should be made to work out all discrepancies.  If the discrepancy is with the scheduled values:   * Check the box in Column SC for each hour that ERCOT is in agreement with the DC Tie Operator for the scheduled value. * Leave the box unchecked in Column SC for each hour where there is a discrepancy with a scheduled value, and it cannot be worked out with the DC Tie Operator. * Click the “Apply Checkout” button. * Log the appropriate information and send email to [shiftsupv@ercot.com](mailto:shiftsupv@ercot.com).   If the discrepancy is with an actual value, change the ERCOT value to match the DC Tie Operator’s value.  ***WebTrans Reference Displays:***  *Scheduling>Interchange>ATF Checkout*  *Scheduling>Inadvertent>Tie Data* |
| **5** | Create an Excel file (Export As Shown) for the DC-R Tie and email to the following (see Desktop Guide DC Tie Desk Section 2.9):   * CENACE DC-Tie Inadvertent |

## 3.11 Managing Inadvertent Energy Payback

**Procedure Purpose:** To provide communication contacts and information prior to starting and ending inadvertent payback.

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| --- | --- | --- | --- | --- |
| **Protocol Reference** |  |  |  |  |
| **Guide Reference** | **2.8 (3)** |  |  |  |
| **NERC Standard** |  |  |  |  |

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| --- | --- | --- |
| **Version: 1** | **Revision: 7** | **Effective Date: January 1, 2020** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | Payback will only be planned when there is room on the DC Tie(s). Energy schedules of market participants will supersede any inadvertent payback. |
| **NOTE** | When inadvertent needs to be paid back in either direction, the ERCOT Operator will receive the payback plan information from the Director Control Room Operations and/or Designee. |
| **CENACE**  **DC-Ties** | * Prior to the start of the payback plan, call the appropriate DC Tie Operator and confirm the start time, hourly MW amount, and direction of the payback. * If payback is planned across the DC\_L, verify the transmission path (230kV or 138kV) * Prior to the Payback plan stopping, call the appropriate entity and confirm the agreed upon stop time. |
| **SPP**  **DC-Ties** | * Prior to the start of the payback plan, call the SPP Operator (SPP Tariff) and confirm the start time, hourly MW amount and direction of the payback |

## 3.12 Loss of E-Tagging

**Procedure Purpose:** Contingency plan for loss of E-tagging capability.

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

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| --- | --- | --- |
| **Version: 1** | **Revision: 11** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
| --- | --- |
| Loss of ERCOT E-Tagging | |
| **1** | If the WebTrans system goes down for an unknown reason (i.e., maintenance), contact the ERCOT Operator at the primary control center to check on their connectivity. If their system is also down, contact the ERCOT help desk (ERCOT HELPDESK) to see if the issue is on our end. If issue is ***not*** on the ERCOT end, contact the OATI help desk (OATI HELPDESK) to see if the issue is on their end. |
| **2** | Determine the estimated down time, if longer than 30 minutes, notify SPP (SPP Tariff), AEP Corpus (AEP TO), and ONCOR (ONCOR DC TIE). |
| **3** | Post message on the ERCOT Website:  **Typical ERCOT Website Posting:**  “The [ERCOT/OATI] E-tagging system is down, and no new schedules will be accepted across the DC Ties at this time”. |
| **4** | No new E-tags will be accepted, only curtailments:   * Coordinate with SPP (SPP Tariff) and the appropriate DC Tie Operator * Notify Real-Time Operator to determine if SCED needs to be manually executed for curtailments |
| **NOTE** | Before-the-fact and after-the-fact check outs will not be available |
| **5** | Once the WebTrans system is available, confirm SPP (SPP Tariff), AEP Corpus (AEP TO), and ONCOR (ONCOR DC TIE) have availability. If available for all parties:   * Update the ERCOT Website posting by sending a “Notice Cancellation” * If curtailments were made while the WebTrans system was down, ensure E-tags are updated |
| Loss of DC Tie Operator E-Tagging | |
| |  |  | | --- | --- | | **1** | If the E-Tagging system is down for SPP, AEP Corpus or ONCOR DC Tie and not ERCOT, no new schedule can be accepted. | | **2** | Post message on the ERCOT Website:  **Typical ERCOT Website Posting:**  “The E-tagging system is down for the [state DC Tie Operator] and no new schedules will be accepted across the [state DC Tie(s)] at this time”. | | **3** | Once E-tagging system is operational, cancel message. | | |

# 4. Emergency Operation

## 4.1 Implement EEA Levels

**Procedure Purpose:** Steps to perform when ERCOT declares Energy Emergency Alert (EEA).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Protocol Reference** | **4.4.4** | **6.5.9.4.2** | **6.5.9.4.3** |  |
| **Guide Reference** | **2.1(3)(f)** | **4.5.3(2)** | **4.5.3.3** |  |
| **NERC Standard** | **EOP-011-2**  **R2, R2.1, R2.2, R2.2.3, R2.2.3.1, R2.2.7** | **INT-006-5**  **R1, R2, R3** | **IRO-001-4**  **R1** | **TOP-001-5**  **R2** |

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| --- | --- | --- |
| **Version: 1** | **Revision: 30** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
| --- | --- |
| **Turret**  **Phone** | * The DC Tie Operator for the Laredo DC Tie can be reached using the Turret phone button labeled (AEP TO), page 4 * The DC Tie Operator for the Railroad DC Tie can be reached using the Turret phone button labeled (ONCOR DC TIE), page 14 * AEP un-regulated QSE is responsible for assets associated with unregulated retail operations (SQ2, SQ3, and SQ4 sub-QSEs). The electronic Dispatch Instruction for emergency energy to and from CENACE will be given to this QSE. They can be reached using the Turret phone button labeled (AEP UNREG QSE)**,** page 4 |
| **EEA** | When notified by Hotline that ERCOT has implemented EEA 1, proceed with this procedure. See Desktop Guide DC Tie Desk Section 2.8 for flow diagram. |
| DC-Ties with Centro Nacional de Control de Energia (CENACE) | |
| **1** | **This applies to the Laredo VFT:**  **IF:**   * There are export schedules, OR * Export inadvertent payback flowing;   **THEN:**   * Stop the export inadvertent payback * Curtail the export schedules (see Desktop Guide DC Tie Desk Section 2.3 or 2.4) * Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website.   + Use the canned message   **CONTACT:**   * The DC-Tie Operator (AEP TO)   **Typical script (use what is applicable):**  This is ERCOT operator [first and last name]. Due to ERCOTs EEA status:   * We have curtailed E-Tag(s) [tag number(s)] on the [DC Tie name] and request ramping the Tie(s) accordingly * We request the inadvertent payback on [DC-Tie] be ramped to zero * We request you inquire about the availability of emergency energy from CENACE.   Please repeat this back to me. That is correct. Thank you.” |
| **2** | **This applies to the Railroad DC-Tie:**  **IF:**   * There are export schedules, OR * Export inadvertent payback flowing;   **THEN:**   * Stop the export inadvertent payback * Curtail the export schedules (see Desktop Guide DC Tie Desk Section 2.3 or 2.4) * Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website.   + Use the canned message   **CONTACT:**   * The DC-Tie Operator (ONCOR DC TIE)   **Typical script (use what is applicable):**  This is ERCOT Operator [first and last name]. Due to ERCOTs EEA status:   * We have curtailed E-Tag(s) [tag number(s)] and request ramping the Tie accordingly * We request the inadvertent payback be ramped to zero * We request you inquire about the availability of emergency energy from CENACE.   Please repeat this back to me. That is correct. Thank you.” |
| **Electronic**  **Dispatch**  **Instruction** | **IF:**   * AEP TO and/or ONCOR DC Tie notifies ERCOT of available emergency energy;   **THEN:**   * Accept all available emergency energy * Notify the Shift Supervisor * Issue the electronic Dispatch Instruction as time permits   **Verbal Dispatch Instructions [Emergency] MOI display**  AEP un-regulated QSE (AEP UNREG QSE):   * Choose DC Tie tab * Choose QAEPS2 for Participant Name * Choose DC Tie Name * Enter Up-To MW value * Choose PROVIDE EMERGENCY POWER FROM DC TIE – Import for Instruction Type * State “Emergency Energy to ERCOT on [DC Tie(s)] in Other Information, Completion Time can be left blank, if unknown and inserted when completion time is known.(back office will take care of the rest) * Click “Send” (do not “Commit to Database”)   Notify AEP un-regulated QSE (AEP UNREG QSE) that the electronic Dispatch Instruction has been issued.  When issuing a VDI or confirmation, ensure the use of three-part communication. |
| **3** | **This applies to the Laredo DC Tie:**  **WHEN:**   * EEA has ended;   **THEN:**   * Notify the DC-Tie Operator (AEP TO)   **Typical script (use what is applicable):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT has ended EEA 1. Thank you.”  **CONTACT:**   * The DC-Tie Operator (AEP TO) for the following as appropriate: * End emergency energy * Verify Completion Time from the Verbal Dispatch Instructions [Emergency] MOI display has a Completion Time entered for the appropriate DC Tie. * Reload any E-Tag (see Desktop Guide DC Tie Section 2.5) * Cancel DCTCN ERCOT Website posting message * Re-start inadvertent payback |
| **4** | **This applies to the Railroad DC-Tie:**  **WHEN:**   * EEA has ended;   **THEN:**   * Notify the DC-Tie Operator (ONCOR DC TIE)   **Typical script (use what is applicable):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT has ended EEA 1. Thank you.”  **CONTACT:**   * The DC-Tie Operator (ONCOR DC TIE) for the following as appropriate: * End emergency energy * Verify Completion Time from the Verbal Dispatch Instructions [Emergency] MOI display has a Completion Time entered for the DC-R Tie. * Reload any E-Tag (see Desktop Guide DC Tie Section 2.5) * Cancel DCTCN ERCOT Website posting message * Re-start inadvertent payback |
| **LOG** | Log all actions taken. |
| DC-Ties with Southwest Power Pool (SPP) | |
| **Turret**  **Phone** | * SPP Reliability Coordinator can be reached using the Turret phone button labeled (SPP RC**),** page 2 * AEP regulated QSE is responsible for assets associated with regulated retail operations (Main and SQ1sub-QSE). The electronic Dispatch Instruction for emergency energy from SPP will be given to this QSE. They can be reached using the Turret phone button labeled (AEP REG QSE)**,** page 4 |
| **NOTE** | For any EEA level, only hourly non-firm transmission service is available for the North and East DC Ties. Keep AEP informed so they can make the proper submittals hour to hour. |
| **NOTE** | If an e-Tag cannot be timely submitted during an Emergency Condition, and energy is available. The DC Tie Operator may start the flow after approval from the RC’s.  An e-Tag must be submitted after the schedule has physically started for tag approval. |
| **1** | **NOTIFY:**   * SPP Reliability Coordinator (SPP RC) of ERCOT’s EEA 1 status:   **Typical Script to SPP Reliability Coordinator (SPP RC):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT declared EEA 1”. |
| **2** | **IF:**   * There are export E-tags across the DC Ties **(does not apply to DC\_N schedules which are identified by “OKLA” in the Physical Path on the tag), OR** * Export inadvertent payback flowing, OR * DC\_N deadband is active and exporting;   **CONTACT:**   * The SPP Tariff Operator (SPP Tariff)   **Typical script (use what is applicable):**  This is ERCOT Operator [first and last name]. ERCOT is in EEA [level]:   * We are curtailing E-Tag(s) [tag number(s)] and request that you ramp the Tie accordingly * We request the inadvertent payback be ramped to zero * If applicable, request the deadband on the North Tie be turned into ERCOT.   Please repeat this back to me. That is correct. Thank you.”  **IF:**   * SPP provides a reliability reason for NOT approving the curtailing of the E-Tag(s);   **THEN:**   * Do not proceed with curtailments * Notify the Shift Supervisor * Make a log entry   **IF:**   * SPP approves;   **THEN:**   * Curtail the export schedules (usually done one hour at a time) (see Desktop Guide DC Tie Desk Section 2.3 or 2.4) * During an emergency condition if an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website.   + Use the canned message |
| **3** | **IF:**   * The SPP DC Ties are not at maximum import into ERCOT;   **THEN:**   * Notify the AEP regulated QSE (AEP REG QSE) to request emergency energy.   **Typical Script to AEP (AEP REG QSE):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT declared EEA [state level]. Can AEP assist ERCOT with transmission service and energy on either available DC Tie?”  **NOTE: AEP will have to request the transmission service and energy first before they will know if it is available. SPP will approve if both services are available.**  **IF:**   * Not approved;   **THEN:**   * Do NOT proceed and make log entry * Notify Shift Supervisor |
| **Electronic**  **Dispatch**  **Instruction** | **IF:**   * AEP notifies ERCOT of available emergency energy   **THEN:**   * Accept all available emergency energy * Notify the Shift Supervisor * Approve the E-Tag * Issue electronic Dispatch Instruction as time permits   **Verbal Dispatch Instructions [Emergency] MOI display**  AEP REG QSE:   * Choose DC Tie tab * Choose QAEPSC for Participant Name * Choose DC Tie Name * Enter Up-To MW value * Choose PROVIDE EMERGENCY POWER FROM DC TIE - Import for Instruction Type * State “Emergency into ERCOT” and which DC Tie(s) in Other Information * Completion Time can be left blank, if unknown and inserted when completion time is known (back office will take care of the rest) * Click “Send” (do not “Commit to Database”)   Notify AEP regulated QSE (AEP REG QSE) that the electronic Dispatch Instruction has been issued.  When issuing a VDI or confirmation, ensure the use of three-part communication. |
| **4** | **WHEN:**   * EEA status changes;   **THEN:**   * Notify SPP Reliability Coordinator (SPP RC)   **Typical Script to SPP Reliability Coordinator (SPP RC):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT moved from EEA 1 to EEA 2. Thank you”.  *If moved to EEA 2 or 3 continue process above but with new levels.* |
| **5** | **WHEN:**   * EEA has ended;   **THEN:**   * Notify SPP Reliability Coordinator (SPP RC)   **Typical Script to SPP Reliability Coordinator (SPP RC):**  “This is ERCOT Operator [first and last name]. At [time], ERCOT has ended EEA 1. Thank you.”  **CONTACT:**   * The SPP Tariff Operator (SPP Tariff) for the following as appropriate: * End emergency energy * Verify Completion Time from the Verbal Dispatch Instructions [Emergency] MOI display has a Completion Time entered for the appropriate DC Tie * Reload any E-Tag (see Desktop Guide DC Tie Section 2.5) * Cancel DCTCN ERCOT Website posting message * Re-start inadvertent payback * If applicable, have deadband turned back into SPP |
| **LOG** | Log all actions taken. |

## 4.2 Emergency Energy to CENACE

**Procedure Purpose:** Provide Emergency Energy to CENACE across the DC Ties.

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| **Protocol Reference** | **4.4.4** |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** |  |  |  |  |

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| **Version: 1** | **Revision: 25** | **Effective Date: December 31, 2020** |

| **Step** | **Action** |
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| **NOTE** | If CENACE requests emergency energy, no emergency notification needs to be declared by ERCOT. See Desktop Guide DC Tie Desk Section 2.8 for flow diagram. |
| **1** | If notified by the ERCOT Transmission & Security Operator or a DC Tie Operator(AEP TO or ONCOR DC TIE) of a request from CENACE for emergency energy across a specific DC-Tie:  **IF:**   * There are import schedules, OR * Import inadvertent payback flowing;   **THEN:**   * Curtail the import schedules (see Desktop Guide DC Tie Section 2.3 or 2.4) * Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website.   + Use the canned message   **CONTACT:**   * The DC-Tie Operator (AEP TO or ONCOR DC Tie)   **Typical script to appropriate DC Tie Operator (use what is applicable):**  This is ERCOT Operator [first and last name]. Due to CENACEs emergency status:   * We have curtailed E-Tag(s) [tag number(s)] on the [DC tie name] * We request the inadvertent payback on [DC Tie] be ramped to zero * We [are able/not able] to send emergency energy on [DC Tie   + If sending emergency energy, request the DC Tie be ramped to the agreed amount   Please repeat this back to me. That is correct. Thank you.” |
| **Electronic**  **Dispatch**  **Instruction** | **Verbal Dispatch Instructions [Emergency] MOI display**  Issue to AEP un-regulated QSE (AEP UNREG QSE):   * Choose DC Tie tab * Choose QAEPS2 for Participant Name * Choose DC Tie Name * Enter Up-To MW value * Choose PROVIDE EMERGENCY POWER FROM DC TIE - Export for Instruction Type * State “Emergency Energy to CENACE” and which DC Ties in “Other Information” * Completion Time can be left blank, if unknown and inserted when completion time is known * Click “Send” (do not “Commit to Database”)   Notify AEP un-regulated QSE (AEP UNREG QSE) that electronic Dispatch Instruction has been issued.  When issuing a VDI or confirmation, ensure the use of three-part communication. |
| **2** | **WHEN:**   * Notified that CENACEs emergency has ended;   **THEN:**   * Perform/verify the following, if appropriate:   + End emergency energy   + Verify Completion Time from the Verbal Dispatch Instructions [Emergency] MOI display has a Completion Time entered for the appropriate DC Tie.   + Re-load E-Tag(s) (see Desktop Guide DC Tie Section 2.5)   + Cancel DCTCN ERCOT Website posting message   + Restart import inadvertent payback |
| **Log** | Log all actions taken. |

## 4.3 Emergency Condition in the Areas of the CENACE DC Ties

**Procedure Purpose:** The process to curtail E-Tags for the CENACE Ties and request emergency energy, if needed.

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| **Protocol Reference** | **4.4.4** | **6.5.9.3.4** |  |  |
| **Guide Reference** | **2.8(2)** |  |  |  |
| **NERC Standard** | **EOP-011-2 R1, R1.1, R1.2, R1.2.4** |  |  |  |

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| **Version: 1** | **Revision: 32** | **Effective Date: December 31, 2021** |

| **Step** | **Action** |
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| **Turret Phone** | * The DC Tie Operator for the Laredo DC Tie can be reached using the Turret phone button labeled (AEP TO), page 4 * The DC Tie Operator for the Railroad DC Tie can be reached using the Turret Phone button labeled (ONCOR DC TIE), page 14 * AEP un-regulated is the QSE receiving the VDI for emergency energy is issued to and from CENACE. They can be reached using the Turret phone button labeled (AEP UNREG QSE), page 4 |
| **NOTE** | DC Tie Load shall neither be curtailed during the Adjustment Period, nor for more than one hour at a time, except for the purpose of maintaining reliability. |
| **NOTE** | When ERCOT curtails an E-Tag whether to zero (0) or a specific MW amount, only CENACE needs to approve the change. Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website. See Desktop Guide DC Tie Desk Section 2.8 for flow diagram. |
| Post-Contingency Overloads on the South DC Ties | |
| **1** | When post contingency overloads on the south DC Tie(s) (DC\_L and/or DC\_R), it may be necessary to curtail export E-Tags using the Last-in-First-Out (LIFO).  **IF:**   * There is a need to curtail (which includes reductions) exports on a specific DC Tie;   **THEN:**   * Coordinate with the Transmission & Security Operator * Verify the MW amount the E-tag needs to be curtailed * Curtail the appropriate E-Tag to the MW amount needed (see Desktop Guide DC Tie Section 2.3 or 2.4) * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website   + Use the canned message * Notify the appropriate DC Tie Operator with curtailment information and instruct them to ramp the DC Tie and to notify CENACE * Notify PSE with curtailment information and reason.   **Typical script to appropriate DC Tie Operator:**  This is ERCOT Operator [first and last name]. ERCOT has curtailed E-Tag(s) [tag number(s)] on the [DC Tie name] to [state MW amount] starting at [xx:xx] due to a Transmission Watch issued for the South DC Tie(s) post contingency loss of [constraint name]. Please ramp the Tie accordingly and notify CENACE. Please repeat this back to me. That is correct. Thank you.” |
| Transmission Watch Issued for the Rio Grande Valley Import | |
| **NOTE** | When ERCOT curtails an E-Tag whether to zero (0) or a specific MW amount, only CENACE needs to approve the change. Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website. |
| **1** | When ERCOT has issued a Transmission Watch for the Rio Grande Valley Import, it may be necessary to curtail export E-Tags using the Last-in-First-Out (LIFO).  **IF:**  There is a need to curtail (which includes reductions) exports on a specific DC Tie  **THEN:**   * Coordinate with the Transmission & Security operator * Verify the MW amount the E-tag needs to be curtailed * Curtail the appropriate E-Tag to the MW amount needed (see Desktop Guide DC Tie Section 2.3 or 2.4) * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website   + Use the canned message * Notify the appropriate DC Tie Operator with curtailment information and instruct them to ramp the DC Tie and to notify CENACE * Notify PSE with curtailment information and reason.   **Typical script to appropriate DC Tie Operator:**  This is ERCOT Operator [first and last name]. ERCOT has curtailed E-Tag(s) [tag number(s)] on the [DC Tie name] to [state MW amount] starting at [xx:xx] due to a Transmission Watch issued for the Rio Grande Valley Import. Please ramp the Tie accordingly and notify CENACE. Please repeat this back to me. That is correct. Thank you.” |
| Emergency Condition within ERCOT | |
| **NOTE** | When ERCOT curtails an E-Tag whether to zero (0) or a specific MW amount, only CENACE needs to approve the change. Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website. |
| **1** | When ERCOT is in an emergency, it may be necessary to curtail export E-Tags using the Last-in-First-Out (LIFO).  **IF:**   * If there is a need to curtail (which includes reductions) exports on a specific DC Tie;   **THEN:**   * Coordinate with the Transmission & Security Operator * Verify the MW amount the E-tag needs to be curtailed * Curtail the appropriate E-Tag to the MW amount needed (see Desktop Guide DC Tie Section 2.3 or 2.4) * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website   + Use the canned message * Notify the appropriate DC Tie Operator with curtailment information and instruct them to ramp the DC Tie and to notify CENACE * Notify PSE with curtailment information and reason.   **Typical script to appropriate DC Tie Operator:**  This is ERCOT Operator [first and last name]. ERCOT has curtailed E-Tag(s) [tag number(s)] on the [DC Tie name] to [state MW amount] starting at [xx:xx] due to an Emergency condition within ERCOT. Please ramp the Tie accordingly and notify CENACE. Please repeat this back to me. That is correct. Thank you.” |
| **2** | Coordinate with the Transmission & Security Operator when the E-Tags can be re-loaded:   * Notify PSE with reload information * Re-load curtailed E-Tag(s) (see Desktop Guide DC Tie Section 2.5) * Cancel DCTCN ERCOT Website posting message * Notify the appropriate DC Tie Operator to approve the re-loaded E-Tag and instruct them to notify CENACE.   **Typical script to appropriate DC Tie Operator:**  This is ERCOT Operator [first and last name]. At [xx:xx], the Emergency conditions within ERCOT has ended and the E-Tag(s) [tag number(s)] have been re-loaded for [xx:xx]. Please notify CENACE to approve re-load. Please repeat this back to me. That is correct. Thank you.” |
| **3** | **IF:**   * The re-loaded E-Tag(s) go passive deny because DC Tie Operator or CENACE did not approve the E-Tag(s) in the allotted time;   **THEN:**   * Re-load the E-Tag(s) again, AND * Notify appropriate DC Tie Operator.   *If reload fails, the second time stop trying and keep tag curtailed.* |
| **4** | **IF:**   * There is need for emergency energy across a specific DC Tie;   **THEN:**   * Coordinate with the Transmission & Security Operator * Request the appropriate DC-Tie Operator to inquire about the availability of emergency energy on [name DC Tie(s)]   **Typical Script to appropriate DC Tie Operator:**  “This is ERCOT Operator [first and last name] At [xx:xx] ERCOT declared an Emergency, we are requesting you to contact CENACE to inquire about the availability of emergency energy into ERCOT on [name DC Tie(s)]  **IF:**   * Emergency energy is available;   **THEN:**   * Request the appropriate DC Tie Operator to ramp the appropriate DC Tie(s) with the amount of emergency energy that CENACE can send, * Issue electronic Dispatch Instruction   **IF:**   * Emergency energy is not available;   **THEN:**   * Notify ERCOT Transmission & Security Operator |
| **5** | **Verbal Dispatch Instructions [Emergency] MOI display**  Issue VDI to AEP un-regulated QSE (AEP UNREG QSE) for the emergency energy:   * Choose DC Tie tab * Choose QAEPS2 for Participant Name * Choose DC Tie Name * Enter Up-To MW value * Choose PROVIDE EMERGENCY POWER FROM DC TIE - Import for Instruction Type * State “Emergency Energy to ERCOT on [DC Tie(s)] in Other Information * Completion time can be left blank, if unknown and inserted when completion time is known (back office will take care of rest) * Click “Send” (do not “Commit to Database”)   Notify AEP un-regulated QSE (AEP UNREG QSE) that the electronic Dispatch Instruction has been issued.  When issuing a VDI or confirmation, ensure the use of three-part communication. |
| **LOG** | Log all actions taken. |
| Emergency Condition within CENACE | |
| **NOTE** | On the CENACE side of the Railroad DC Tie, there is an automatic runback scheme that runs back the DC Tie under CENACE contingency conditions. When this occurs, and notification is made by the DC Tie Operator; follow the procedure below. |
| **NOTE** | When ERCOT curtails an E-Tag whether to zero (0) or a specific MW amount, only CENACE needs to approve the change. Anytime an approved E-Tag is curtailed or adjusted by ERCOT a DC Tie Curtailment Notice (DCTCN) must be posted on the ERCOT Website. |
| **1** | Due to reliability issues within CENACE it may be necessary to curtail import E-Tag(s) for them.  **IF:**   * CENACE, communicated by one of the DC Tie Operators needs to curtail an import on a specific CENACE DC Ties;   **THEN:**   * Coordinate with the Transmission & Security Operator * Verify the MW amount and time of the curtailment * Curtail the appropriate E-Tag to the MW amount needed (see Desktop Guide DC Tie Section 2.3 or 2.4), * Post the appropriate Preformatted DCTCN Notice to the ERCOT Website   + Use the canned message * Contact the appropriate DC Tie Operator when curtailment is complete and instruct them to ramp the DC Tie and make notification to CENACE * Notify PSE with curtailment information and reason.   **Typical script to appropriate DC Tie Operator:**  This is ERCOT Operator [first and last name]. At [xx:xx] ERCOT has curtailed E-Tag [tag number] on the [DC Tie name] to [state MW amount] due to reliability issues within CENACE. Please ramp the Tie accordingly and notify CENACE. Please repeat this back to me. That is correct. Thank you.” |
| **2** | Once notified that CENACEs reliability issue has been resolved and E-Tags can be re-loaded:   * Coordinate with the Transmission & Security Operator * Notify PSE with reload information * Re-load curtailed E-Tag(s) (see Desktop Guide DC Tie Desk Section 2.5), * Cancel DCTCN ERCOT Website posting message * Notify the appropriate DC Tie Operator to approve the re-loaded E-Tag and to notify CENACE. |
| **3** | **IF:**   * The re-loaded E-Tag goes passive deny because a DC Tie Operator or CENACE did not approve the E-Tag in the allotted time;   **THEN:**   * Re-load the E-Tag again, AND * Notify the appropriate DC Tie Operator.   *If reload fails, the second time stop trying and keep tag curtailed.* |
| **4** | **IF:**   * There is a need for emergency energy;   **THEN:**   * Proceed and follow step 1 in section 4.2, Emergency Energy to CENACE. |
| **LOG** | Log all actions taken. |

## 4.4 Loss of Primary Control Center Functionality

**Procedure Purpose:** Provide instructions for responding to conditions that cause the primary control center to become inoperable or uninhabitable while continuing to meet its obligations with regard to the reliable operations of the ERCOT system and ensuring the safety of control center personnel.

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| **Protocol Reference** |  |  |  |  |
| **Guide Reference** |  |  |  |  |
| **NERC Standard** | **EOP-008-2**  **R1, R1.2, R1.2.1, R1.4 R1.6, R1.6.1, R1.6.2, 1.6.3, R4** | **TOP-001-5**  **R9** |  |  |

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| **Version: 1** | **Revision: 35** | **Effective Date: December 30, 2022** |

| **Step** | **Action** |
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| **Contact Security** | **IF:**   * Unable to reach any Operator at the PCC (also trying Alternative Interpersonal Communication capability);   **THEN:**   * Check the control center video camera to determine the status of the PCC and personnel, * Contact Security at the ACC   + Notify them of the situation **AND**   + Have them attempt to make contact with Security at PCC.   + Have them contact you with information acquired **OR**   **IF:**   * Notified by the PCC that they are evacuating and/or transferring sites **OR** * control center video and Security confirms evacuation;   **THEN:**   * Continue with procedure. |
| **North – Houston Import IROL** | The North – Houston VSAT voltage stability limit is an IROL; the actual flow ***MUST NOT*** exceed its limit.  If necessary, the System Operator has the authority to direct load shedding before this IROL has been exceeded. |
| **Valley Import IROL** | The Valley Import stability limit is an IROL; the actual flow ***MUST NOT*** exceed its limit.  If necessary, the System Operator has the authority to direct load shedding before this IROL has been exceeded. |
| **West Texas Export IROL** | The West Texas Export stability limit is an IROL; the actual flow ***MUST NOT*** exceed its limit.  If necessary, the System Operator has the authority to instruct removing generation before this IROL has been exceeded. |
| **Panhandle Export IROL** | The Panhandle Export stability limit is an IROL; the actual flow ***MUST NOT*** exceed its limit.  If necessary, the System Operator has the authority to instruct removing generation before this IROL has been exceeded. |
| **McCamey**  **Export**  **IROL** | The McCamey Export stability limit is an IROL; the actual flow ***MUST NOT*** exceed its limit.  If necessary, the System Operator has the authority to instruct removing generation before this IROL has been exceeded. |
| **3-Part** | When issuing an Operating Instruction, follow three-part communication:   * Issue the Operating Instruction * Receive a correct repeat back * Give an acknowledgement |
| Systems are Functional | |
| **Call in Additional Operators** | Activate the NXT scenario to call in additional shift personnel, which includes a Shift Supervisor.  **SELECT:**   * SO Loss of Control Room at Taylor, OR; * SO Loss of Control Room at Bastrop.   An email will be received after 10 minutes with a report of who has responded along with their estimated time of arrival. |
| **QSE**  **Hotline**  **Call** | **Q#106 - Typical Hotline Script** Emergency Notice Loss of Primary Control Center (Systems are Functional) |
| **TO**  **Hotline**  **Call** | **T#91 - Typical Hotline Script** Emergency Notice Loss of Primary Control Center (Systems are Functional) |
| **Additional Notifications** | The Director Control Room Operations and/or Designee will notify the following:   * Help Desk (to notify GMS Support and IT Infrastructure (Telecommunications and Data Center) * Engineering Support   These phone numbers are also programmed into the control room cell phone. |
| **ERCOT Website**  **Posting** | As time permits, post the Emergency Notice on the ERCOT Website.  **Typical Posting Script:**  ERCOT has issued an Emergency Notice for the loss of the primary control center, all systems are functioning. |
| **Respond to QSEs** | Monitor frequency and re-run SCED/use (manual offset) as needed.  **IF:**   * QSEs call in with questions about operational timelines or non real-time issues;   **THEN:**   * Notify the QSE that timelines and non real-time issues will be addressed when additional staff arrive, * Document QSE calls to pass along to the appropriate Operators as they arrive. |
| **Real-time Contingency Analysis (RTCA)** | **Operations Support will assist in monitoring the RTCA functionality including results and may communicate suggested actions as needed.** |
| **Respond to TOs Thermal/ Voltage Limits Reached** (**SOL**) | **IF:**   * Thermal limits have reached their continuous rating, OR * Notified by Operations Support or a TO that thermal limits have reached their continuous rating;   **THEN:**   * Activate associated constraint, OR * Seek a recommendation from Operations Support or the appropriate TO as to what actions will alleviate the situation, * Issue unit specific Operating Instructions as necessary to QSE. (Follow-up with electronic Dispatch Instruction confirmation as time permits), * Continue to monitor to determine the effect of the plan.   ERCOT Nominal Voltage Levels are 345kV, 230kV, 138kV, 115kV 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 | | 230 | 218.5 – 241.5 | 207 – 253 | 230 – 240 | | 138 | 131.1 – 144.9 | 124.2 – 151.8 | 138 – 144 | | 115 | 109.25 – 120.75 | 103.5 – 126.5 | 115 – 120 | | 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.  **WHEN:**   * Indicated by SCADA alarms, OR * Notified by Operations Support or a TO of voltage concerns;   **THEN:**   * Initiate a solution in collaboration with Operations Support and the appropriate TO and QSE in the area.   **WHEN:**   * TOs have utilized all Static Reactive Power Resources (capacitors, reactors, change in transformer taps) and a voltage issue still remains;   **THEN:**   * Instruct a QSE to raise or lower bus voltage, * The QSE should complete the requested in no more than five minutes.   **Typical Script:**  “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. That is correct, thank you.” |
| **GTCs** | **IF:**   * Any of the GTCs is approaching 85%, OR * Notified by Operations Support or a TO that a GTC (this includes the IROL) is approaching 85%;   **THEN:**   * Activate the associated “BASECASE” constraint in TCM   + Update RTMONI with new limit each time it changes |
| **DC Tie Tags** | Make every attempt to handle all DC Tie tags.  If the workload makes it impossible to keep up with, the tags will be passively denied. |
| **Log** | Make log entry of events. |
| Systems are not Functional | |
| **NOTE** | Market Participants must be notified of unplanned outages of **30 minutes or more,** of telemetering, monitoring and assessment capabilities, and associated communication channels between affected entities. |
| **Monitor Frequency** | The ability to view an adequate Frequency source may be limited during a site-failover, database load, or if AGC is temporarily unavailable. To view the System Frequency during these conditions you may monitor the following sources.   * **ERCOT control room digital wall frequency displays** * **PI ProcessBook → ERCOT → TrueTime Frequency (Taylor) and/or** * **PI ProcessBook → ERCOT → TrueTime Frequency (Bastrop)**   It may be necessary to reload the PI ProcessBook “ERCOT Main Summary” display to show the historical data. |
| **Constant**  **Frequency** | **IF:**   * The loss of PCC involves the loss of EMS (LFC and RLC);   **THEN:**    * Instruct a QSE to go on Constant Frequency   + Q#114 – Typical Script to Instruct a QSE on Constant Frequency for LRC/SCED Failure   + Refer to Real-time desk procedure section 3.3, EMMS (LFC and RLC/SCED) Failure |
| **Call in Additional Operators** | Activate the NXT scenario to call in additional shift personnel, which includes a Shift Supervisor.  **SELECT:**   * SO Loss of Control Room at Taylor, OR; * SO Loss of Control Room at Bastrop.   An email will be received after 10 minutes with a report of who has responded along with their estimated time of arrival. |
| **QSE**  **Hotline**  **Call** | **Q#107 - Typical Hotline Script** Emergency Notice Loss of Primary Control Center (Systems are NOT Functional)  If either Hotlines are inoperable, phone numbers can be found on SharePoint under OPX & LD Numbers. |
| **TO**  **Hotline**  **Call** | **T#92 - Typical Hotline Script** Emergency Notice Loss of Primary Control Center (Systems are NOT Functional)  If either Hotlines are inoperable, phone numbers can be found on SharePoint under OPX & LD Numbers. |
| **ERCOT Website**  **Posting** | As time permits, post the Emergency Notice on the ERCOT Website.  **Typical Posting Script:**  ERCOT has issued an Emergency Notice for the loss of the primary control center, systems are not functioning. |
| **Additional Notifications** | The Director Control Room Operations and/or Designee will notify the following:   * Help Desk (to notify GMS Support and IT Infrastructure (Telecommunications and Data Center) * Engineering Support   These phone numbers are also programmed into the control room cell phone. |
| **Respond to QSEs** | **IF:**   * The QSE that is put on constant frequency needs assistance controlling frequency;   **THEN:**   * Issue a unit specific Operating Instruction to another QSE to help with Regulation. (Follow-up with electronic Dispatch Instruction as time permits)   **OR**   * Put a different QSE on constant frequency (Remember to take the first QSE off constant frequency). |
| **Real-time Contingency Analysis (RTCA)** | **Operations Support will be responsible for the State Estimator and RTCA functionality and ensuring an RTA is performed at least every 30 minutes. They will communicate results and any suggested actions as needed.** |
| **Respond to TOs Thermal/ Voltage Limits Reached** (**SOL**) | **IF:**   * Notified by Operations Support or a TO that thermal limits have reached their continuous rating;   **THEN:**   * Seek a recommendation from Operations Support or the appropriate TO as to what actions will alleviate the situation, and issue unit specific Operating Instructions to appropriate QSE.   + Continue to monitor to determine the effect of the plan.   ERCOT Nominal Voltage Levels are 345kV, 230kV, 138kV, 115kV 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 | | 230 | 218.5 – 241.5 | 207 – 253 | 230 – 240 | | 138 | 131.1 – 144.9 | 124.2 – 151.8 | 138 – 144 | | 115 | 109.25 – 120.75 | 103.5 – 126.5 | 115 – 120 | | 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.  **WHEN:**   * Notified by Operations Support or a TO of voltage concerns;   **THEN:**   * Initiate a solution in collaboration with Operations Support and the appropriate TO and QSE in the area.   **WHEN:**   * TOs have utilized all Static Reactive Power Resources (capacitors, reactors, change in transformer taps) and a voltage issue still remains;   **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:**  “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. That is correct, thank you.” |
| **GTCs** | **IF:**   * Notified by Operations Support or a TO that a GTCs (which includes the IROL) is approaching 85% and is continuing to trend upward;   **THEN:**   * Seek a recommendation from Operations Support or the appropriate TO as to what actions will alleviate the situation, * Issue unit specific Operating Instructions as necessary to QSE, (Follow-up with electronic Dispatch Instructions as time permits). * Continue to monitor to determine the effect of the plan. |
| **Thermal Limits Reached** (**SOL**) | **IF:**   * Notified by Operations Support or a TO that thermal limits have reached their emergency rating and are continuing to trend upward,   **THEN:**   * Seek a recommendation from Operations Support or the appropriate TO as to what actions will alleviate the situation, and issue unit specific Operating Instructions as necessary (Follow-up with electronic Dispatch Instruction as time permits) * Continue to monitor to determine the effect of the plan. |
| **DC Tie Tags** | Make every attempt to handle all DC Tie tags.  If the workload makes it impossible to keep up with, the tags will be passively denied. |
| **Electronic**  **Dispatch**  **Instruction** | Follow-up with electronic Dispatch Instructions where appropriate when systems are functional or as time permits (See Desktop Guide Common to Multiple Desks section 2.3).  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 |
| **Log** | Make log entry of events. |

## 4.5 Restoration of Primary Control Center Functionality

**Procedure Purpose:** To be performed once additional staff has reported to the alternate Control Center and Grid can return to normal operations.

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

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 3** | **Effective Date: March 1, 2014** |

| **Step** | **Action** |
| --- | --- |
| **NOTE:** | As additional Operators arrive, communicate any pertinent information that will assist them in getting their specific functions ready for normal operation. |
| Additional  Operators | When a Real-Time Operator has arrived, turn over frequency control to that Operator and assist with other needs such as approve any E-Tags waiting. |
| Notification of Additional Operators | **WHEN:**   * Fully staffed;   **THEN:**   * Make notification using the NXT - SO Loss of CC Operations Resumed. |
| Help  Desk | Make notification to Help Desk that the Control Room is now back to normal operations from the alternate. |
| Contact Security | Notify Security that the transition of Operations to the ACC has been completed. |
| Log | Make log entries as needed. |

## 4.6 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** | **6.3.3** | **6.3.3** | **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** |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Version: 1** | **Revision: 21** | **Effective Date: December 31, 2021** |

| **Step** | **Action** |
| --- | --- |
| **NOTE** | * ERCOT is in an Emergency Condition whenever ERCOT Transmission Grid status is such that a violation of security criteria presents the threat of uncontrolled separation or cascading Outages and/or large-scale service disruption to Load (other than Load being served from a radial transmission line) and/or overload of a Transmission Element, and no timely solution is obtainable through SCED or CMPs. * Consider the severity of the potential Emergency Condition prior to the issuance of a notification. 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. * The sequence of notifications issued may vary due to changing system conditions or other operational issues and it may be necessary to skip certain notifications due to the severity of the situation. |
| Operating Condition Notice (OCN) | |
| **NOTE** | OCN’s are used to inform Market Participants of a possible future need for more Resources due to conditions that could affect ERCOT System reliability. OCNs are for informational purposes only and may solicit additional information to determine whether the issuance of an Advisory, Watch, or Emergency Notice is warranted. OCNs serve as a reminder to QSEs and TSPs that some attention to the changing conditions may be warranted. |
| **1** | As directed by the Shift Supervisor or when appropriate, issue an OCN. The OCN can be issued for any of the following reasons:   * Insufficient Resources to meet forecasted condition * There is a projected reserve capacity shortage In DRUC that could affect reliability and may require more Resources * When extreme cold weather is developing and forecasted to impact the ERCOT Region * When extreme hot weather is forecasted to impact the ERCOT Region * When a Hurricane or Tropical Storm is developing and forecasted to impact the ERCOT Region * Unplanned transmission Outages that may impact System reliability   When anticipated adverse weather conditions are forecasted, ERCOT may confer with TOs and QSEs regarding the potential for adverse reliability impacts and contingency preparedness. |
| **Advance Action Notice (AAN)** | |
| **NOTE** | Outage Adjustment Evaluation (OAE)  Outage Schedule Adjustment (OSA)  An AAN is a type of OCN, ERCOT may issue an AAN in anticipation of a possible Emergency Condition. An AAN will identify actions ERCOT expects to take to address the condition unless the need for ERCOT action is alleviated by QSE and/or TSP actions or by other system developments. |
| **1** | As instructed by the Shift Supervisor and in coordination with Outage Coordination and Operations Support, issue an AAN. The AAN can be issued for any of the following reasons:   * Insufficient Resources to meet forecasted conditions * There is a projected reserve capacity shortage in DRUC that could affect reliability and may require more Resources * When extreme cold weather is developing and forecasted to impact the ERCOT Region * When extreme hot weather is forecasted to impact the ERCOT Region * When a Hurricane or Tropical Storm is developing and forecasted to impact the ERCOT Region * Unplanned transmission Outages that may impact reliability   When anticipated adverse weather conditions are forecasted, ERCOT may confer with TOs and QSEs regarding the potential for adverse reliability impacts and contingency preparedness. |
| Advisory | |
| **1** | As directed by the Shift Supervisor or when appropriate, issue an Advisory. The Advisory can be issued for any of the following reasons:   * When the probability of an approaching Hurricane or Tropical Storm impacting the ERCOT Region increases, and concerns exit to escalate awareness * When the probability of extreme cold weather impacting the ERCOT Region increases, and concerns exist to escalate awareness * When the probability of extreme hot weather impacting the ERCOT Region increases, and concerns exist to escalate awareness * When conditions are developing or have changed and more Ancillary Services will be needed to maintain current or near-term reliability * ERCOT exercises 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 ERCOT System 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 because of 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 directed by the Shift Supervisor or when appropriate, issue a Watch. The Watch can be issued for any of the following reasons:   * A reserve capacity shortage is projected with no market solution available that could affect reliability * When an approaching Hurricane or Tropical Storm is imminent and anticipated to have an adverse impact on the ERCOT Region * When impacts from extreme cold weather is imminent and anticipated to have an adverse impact on the ERCOT Region * When impacts from extreme hot weather is imminent and anticipated to have an adverse impact on the ERCOT Region * 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 * 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 directed by the Shift Supervisor or when appropriate, issue an Emergency Notice. The Emergency Notice can be issued for any of the following reasons:   * 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 ERCOT System * When extreme hot weather is beginning to have an adverse impact on the ERCOT System * When a Hurricane or Tropical Storm is beginning to have an adverse impact on the System |
| Notifications | |
| **HOTLINE** | Notify QSEs of Notice  **Typical script:**  “This call requires everyone to remain on the line until it is complete. [QSE] I will be asking you for the repeat back. This is ERCOT Operator [first and last name]. At [xx:xx], ERCOT is issuing a [state Notice type] for [state reason]. [QSE] please repeat this back to me. That is correct, thank you.”  Notify TOs of Notice  **Typical script:**  “This call requires everyone to remain on the line until it is complete. [TO] I will be asking you for the repeat back. This is ERCOT Operator [first and last name]. At [xx:xx], ERCOT is issuing a [state Notice type] for [state reason]. [TO] please repeat this back to me. That is correct, thank you.”  **All Operating Instructions shall be in a clear, concise, and definitive manner. Ensure the recipient of the instruction repeats the information back correctly. Acknowledge the response as correct or repeat the original statement to resolve any misunderstandings.** |
| **POST** | * All notices must be posted on the ERCOT Website using Grid Conditions Communications (GCC) Notices. * For “free form” messages, the only option is “public” * 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** | **Typical Hotline Script cancellation:**  “This call requires everyone to remain on the line until it is complete. [QSE] I will be asking you for the repeat back. This is ERCOT operator [first and last name]. At [xx:xx], ERCOT is cancelling the [state Notice type] for [state reason]. [QSE] 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. |
| **LOG** | Make log entry. |

**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 30, 2010 |
| 3.1  3.3  3.12  3.13  3.14  3.16  3.17  4.1 | 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 step 1  Updated step 1  Updated step 1 and added Log  Updated step 4  Updated step 3  Updated step 1 and added Log  Updated step 3  Updated Constant Frequency, Respond to QSE’s, Stability Limits Reached and Thermal Limits Reached | December 1, 2010 |
| 2.3  3.4  4.1  4.2  4.3 | 1.0 / 0  1.0 / 1  1.0 / 2  1.0 / 1  1.0 / 1 | Added new procedure  Updated step 1  Updated steps “Constant Frequency”, “QSE Hotline Call”, “TO Hotline Call”, “Respond to QSEs” “Respond to TOs”, “Stability Limits” and added “Nuclear Plants”  Updated Note and “Additional Operators”  Updated Hotline in “Notifications” | January 31, 2011 |
| 2.3  3.1  3.2  3.3  3.7  4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.8  4.9 | 1.0 / 1  1.0 / 2  1.0 / 1  1.0 / 2  1.0 / 1   1. / 2   1.0 / 2   1. / 2   1.0 / 1  1.0 / 2  1.0 / 2  1.0 / 3   1. / 2   1.0 / 2 | Updated NXT Test  Updated 4th Note and step 1  Updated step 2  Updated 5th note, step 1, deleted step 4 and 6th Note  Updated all sections  Section number changed from 3.12 and updated all steps  Section number changed from 3.13 and updated all steps  Section number changed from 3.14 and updated all steps  Section number changed from 3.15 and updated all steps  Section number changed from 3.16 and updated step 1  Section number changed from 3.17 and updated step 1  Section number changed from 4.1 & updated multiple steps  Section number changed from 4.2 & Note  Section number changed from 4.3 | March 25, 2011 |
| 1.1  2.3  3.1  3.2  3.3  3.4  3.5  3.6  3.7  3.8  3.9  3.10  4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.9 | 1.0 / 1  1.0 / 2  1.0 / 3  1.0 / 2  1.0 / 3  1.0 / 2  1.0 / 1  1.0 / 1   1. / 2   1.0 / 1  1.0 / 1  1.0 / 1  1.0 / 3  1.0 / 3  1.0 / 3  1.0 / 2  1.0 / 3  1.0 / 3  1.0 / 4  1.0 / 3 | Updated text  Updated step “Beginning of each Shift”  Updated 1st & 3rd note and step 1, deleted 2nd note and added 5th note  Updated 1st note and step 2  Updated 1st & 4th note, step 1 & 2, deleted 2nd and added 5th note  Updated 1st & step 1  Updated steps 1, 2 and 3  Updated “Import” step 1 and “Export” steps 1 & 2  Updated all sections  Updated all sections  Updated all sections  Updated 1st & 2nd note and step 1 and 2  Updated 1st note and step 1  Updated 1st note  Updated 1st note  Updated step 3  Updated step 1  Updated step 2  Updated step QSE Hotline Call  Updated step 1 in Watch and Emergency Notice | April 22, 2011 |
| 3.1  3.2  3.3  3.4  3.5  3.6  3.73.8  3.9  3.10  3.11  4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.9 | 1.0 / 4  1.0 / 3  1.0 / 4  1.0 / 3  1.0 / 2  1.0 / 2  1.0 / 31.0 / 2  1.0 / 1  1.0 / 2  1.0 / 1  1.0 / 4  1.0 / 4  1.0 / 3  1.0 / 3  1.0 / 4  1.0 / 4   1. / 5   1.0 / 4 | Updated all steps  Updated all steps  Updated all steps  Updated step 1  Updated step 1, 2, 3 & added 2nd note  Updated step 1 and 2  Updated all steps  Updated all steps  Updated all steps  Updated 3rd note and step 1  Updated all steps  Updated all steps  Updated all steps  Updated all steps  Updated all steps  Updated step 1  Updated steps 2 & 3  Updated steps Call in Additional Operators and Respond to QSEs  Updated all steps | June 8, 2011 |
| 3.1  3.3  3.7  3.9  4.2 | 1.0 / 5  1.0 / 5  1.0 / 4  1.0 / 2  1.0 / 5 | Changed 3rd Note to step 1, updated step 1 & 2  Updated step 1  Updated all steps in DC Tie Trips, step 1 in Transmission Issues within ERCOT & step 1 & 2 in Transmission Issues within CFE  Updated webtrans references  Updated step 1 | June 17, 2011 |
| 3.1  3.3  3.6  3.7  3.9  3.11  4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.8 | 1.0 / 6  1.0 / 6  1.0 / 3  1.0 / 5  1.0 / 3  1.0 / 2  1.0 / 6  1.0 / 4  1.0 / 5  1.0 / 5  1.0 / 5  1.0 / 5  1.0 / 2  1.0 / 5 | Updated 1st Note and step 1 & 2  Updated step 1  Updated all steps  Split procedure out, changed title and moved Transmission Issue within ERCOT to 4.5  Updated step 2  Updated steps 2, 4 and 5  Updated step 1, added steps 2 - 4  Updated all steps, added new step 3  Updated Turret phone label for SPP Tariff and all steps  Changed section number from 4.4 to 4.3 and updated all steps  Changed section number from 4.5 to 4.4 and updated all steps  Changed section number from 4.6 to 4.5, updated all steps and moved Transmission Issues from 3.7 to 4.5  Changed section number from 4.7 to 4.6  Changed section number from 4.8 to 4.7  Changed section number from 4.9 to 4.8 and updated step 1 in Watch | July 20, 2011 |
| 2.3  3.1  3.2  3.3  3.6  3.7  3.8  3.9  3.11  4.1  4.2  4.3  4.5  4.6  4.8 | 1.0 / 3  1.0 / 7  1.0 / 4  1.0 / 7  1.0 / 4  1.0 / 6  1.0 / 3  1.0 / 4  1.0 / 3  1.0 / 7  1.0 / 5  1.0 / 6  1.0 / 6  1.0 / 6  1.0 / 6 | Updated step “Beginning of each Shift”  Updated 1st note  Updated steps 1, 2 & 3  Updated 1st, 4th note and step 1  Updated step 1 “Imports” and step 2 “Exports”  Updated Steps 1, 2 and 4 in “CFE DC-Ties”  Updated 2nd note and steps 1-3  Updated steps 1-3  Updated steps 1 and 2  Updated all steps  Updated all steps  Updated all steps  Updated all steps  Removed reference of Austin Control Room  Added projected reserve capacity shortage and Extreme Hot Weather in Watch | September 1, 2011 |
| 3.1  3.3  4.1  4.2  4.3 | 1.0 / 8  1.0 / 8  1.0 / 8  1.0 / 6  1.0 / 7 | Updated step 2  Updated step 1  Updated Turret Phone, step 3a in Comision Federal de Electricidad (CFE) and step 5b to implement NPRR 379  Updated Turret Phone and step 3a in Comision Federal de Electricidad (CFE)  Updated step 3 | October 1, 2011 |
| 4.6 | 1.0 / 7 | Updated step TO Hotline Call | November 1, 2011 |
| 3.1  3.3  4.6  4.8 | 1. / 9   1.0 / 9  1.0 / 8  1.0 / 7 | Updated step 2  Updated step 1  Added new section and updated all steps  Updated Post in “Notifications”  All procedures in this manual have been reviewed. | December 15, 2011 |
| 1.2  3.1  3.3  4.6 | 1.0 / 1  1.0 / 10  1.0 / 10  1.0 / 9 | Updated Scope  Updated step 2  Updated step 1  Updated Hotline call scripts | January 19, 2012 |
| 2.1  2.3  3.1  3.2  3.7  4.1  4.2  4.3  4.5  4.8 | 1.0 / 1  1.0 / 4  1.0 / 11  1.0 / 5  1.0 / 7  1.0 / 9  1.0 / 7  1.0 / 8  1.0 / 7  1.0 / 8 | Added dispatch instructions paragraph  Updated Desktop Guide reference  Added 3rd Note  Changed Shift Engineer to Operations Support  Updated Desktop Guide references  Updated Desktop Guide references  Updated Desktop Guide references  Updated Desktop Guide references  Updated 2nd Note & all steps 1 – 3  Updated step 1 of Watch | March 1, 2012 |
| 3.1  3.3  3.7  3.8  3.9  4.54.6  4.8 | 1.0 / 12  1.0 / 11  1.0 / 8  1.0 / 4  1.0 / 5  1.0 / 8  1.0 / 10  1.0 / 9 | Updated step 2  Updated 3rd Note and step 1  Added posting and cancelling messages  Updated overview  Updated overview  Updated procedure based on NPRR405  Updated W-N or N-H steps  Updated OCN, Advisory, Watch and Emergency Notice for Cold Weather and Extreme Cold Weather | May 1, 2012 |
| 1.3  3.2  3.8  3.9  4.5  4.6  4.8 | 1.0 / 1  1.0 / 6  1.0 / 5  1.0 / 6  1.0 / 9  1.0 / 11  1.0 / 10 | Removed ERCOT Shift Supervisor paragraph  Updated step 1  Updated step 4  Updated step 4  Added step Turret Phone & 1st Note, updated step 4  Updated several steps based on lessons learned from classroom training and simulation  Updated all step 1’s | July 16, 2012 |
| 3.1 | 1.0 / 13 | Updated step 2 | August 29, 2012 |
| 2.2  3.2  4.5  4.6 | 1.0 / 1  1.0 / 7  1.0 / 10  1.0 / 12 | Added Hotline Call Communication  Updated 1st Note  Updated 1st and 2nd Note  Updated steps West to North & North to Houston(IROL)  All procedures in this manual have been reviewed. | November 1, 2012 |
| 3.1  3.10  4.6 | 1.0 / 14  1.0 / 3  1.0 / 13 | Updated step 2  Updated 2nd note  Updated Additional Notifications on Systems Functional and Systems are not Functional | March 1, 2013 |
| 3.1  3.2  3.7  3.11  4.6 | 1.0 / 15  1.0 / 8  1.0 / 9  1.0 / 4  1.0 / 14 | Updated step 2  Updated step 1, deleted steps 2 & 3  Updated scripts  Updated script  Updated scripts, West to North & step North to Houston | June 1, 2013 |
| 3.6  4.3  4.4  4.5  4.6 | 1.0 / 5  1.0 / 9  1.0 / 6  1.0 / 11  1.0 / 15 | Updated Exports, step 1  Updated step 1 & 3  Updated step 1  Deleted 2nd Note, updated step 1, 2 & 4  Added Monitor Frequency and updated Constant Frequency | July 1, 2013 |
| 3.1  3.3  3.11  4.8 | 1.0 / 16  1.0 / 12  1.0 / 5  1.0 / 11 | Updated step 1  Updated 4th note  Updated step 1  Updated step 1 in Watch & Emergency Notice | July 15, 2013 |
| 3.7  4.6 | 1.0 / 10  1.0 / 16 | Added CFE DC-Tie Derates and AEP DC-Tie Derates  Removed HHGT TO reference | August 30, 2013 |
| 1.1  3.3  3.4  3.5  3.6  3.8  3.9  3.11  4.1  4.2  4.5 | 1.0 / 2  1.0 / 13  1.0 / 4  1.0 / 3  1.0 / 6  1.0 / 6  1.0 / 7  1.0 / 6  1.0 / 10  1.0 / 8  1.0 / 12 | Changed “Security” to “Reliability”  Updated step 2  Updated both steps  Updated last Note and step 3  Updated the Notes and step 1 and 2  Updated step 2  Updated step 2  New Loss of DC-Tie Operator E-tagging  Updated step 6b  Updated step 6b  Added note to Transmission Issues within CFE  All procedures in this manual have been reviewed. | December 13, 2013 |
| 3.8  4.1  4.2  4.3  4.4  4.5  4.8 | 1.0 / 7  1.0 / 11  1.0 / 9  1.0 / 10  1.0 / 7  1.0 / 13  1.0 / 13 | Updated step 2  Updated step Turret Phone, 3a, 6b, Note, & 7b  Updated step Turret Phone, 3a, 6b, Note, & 7b  Updated step 3  Updated step 2  Updated step Turret Phone & 4  Updated all step 1’s | January 29, 2014 |
| 3.3  3.6  3.7  3.9  3.10  3.11  3.12  4.1  4.2  4.3  4.5 | 1.0 / 14  1.0 / 7  1.0 / 11  1.0 / 8  1.0 / 0  1.0 / 4  1.0 / 7  1.0 / 12  1.0 / 10  1.0 / 11  1.0 / 14 | Updated 1st & 4th Note & step 1 to include Sharyland as Tie Operator  Updated steps 1 & 2  Updated steps 1, 2, 3 & Cancel Message  Updated 1st Note, step 2, 3 & 5  New procedure  Updated section number  Updated section number & step 2  Updated Turret Phone, 1st Note, CFE & SPP sections  Updated Turret Phone, 1st Note, CFE & SPP sections  Updated 1st None, steps 1, 2 & 3  Updated to include Sharyland change | February 25, 2014 |
| 3.1  3.4  3.5  3.7  3.8  3.9  3.10  3.11  3.12  4.1  4.24.3  4.4  4.5  4.6  4.7  4.8 | 1.0 / 17  1.0 / 5  1.0 / 4  1.0 / 12  1.0 / 8  1.0 / 9  1.0 / 1  1.0 / 5   1. / 8 2. / 13 3. / 11   1.0 / 12  1.0 / 7  1.0 / 15  1.0 / 17  1.0 / 3  1.0 / 14 | Updated 1st Note  Updated step 1  Updated steps 2 and 3  Updated step Post Message  Updated steps Note through 5  Updated step 5  Updated step 5  Updated 1st Note, steps 1 to CFE DC-Ties and 2 to SPP DC-Ties  Updated steps 2, 4 & 5 on Loss of ERCOT E-Tagging and step 1 on Loss of DC Tie Operator E-Tagging  Updated steps Turret Phone, Note, 2b, 3b, 4b & 6b on Southwest Power Pool (SPP)  Deleted ERCOT Declares EEA 2 or 3  Re-numbered procedure to 4.2  Delete Emergency Energy to SPP procedures  Re-numbered procedure to 4.3  Re-numbered procedure to 4.4  Re-numbered procedure to 4.5  Re-numbered procedure to 4.6 | March 1, 2014 |
| 3.1  3.2  4.1  4.2  4.3  4.4 | 1.0 / 18  1.0 / 9  1.0 / 14   1. / 13 2. / 16 3. / 18 | Updated step 2  Updated step 1 & 2  Updated VDI information  Updated VDI information  Updated VDI information  Updated VDI information & Updated Guide Reference | April 4, 2014 |
| 2.2  3.1  3.3  3.8  3.9  3.10  4.1  4.6 | 1.0 / 2  1.0 / 19  1.0 / 15  1.0 / 9  1.0 / 10  1.0 / 2  1.0 / 15  1.0 / 15 | Added VDIs to Master QSEs  Updated step 2  Updated step 1  Updated Monitor, deleted step Caution & added step 5  Updated Monitor & deleted step Caution  Updated Monitor & deleted step Caution  Updated title  Added Note, updated Advisory & Watch | June 1, 2014 |
| 3.1  3.3  3.8  4.3 | 1.0 / 20  1.0 / 16  1.0 / 10  1.0 / 17 | Updated step 2  Updated step 1 & 2  Updated 2nd Note  Updated step 4 in Emergency Condition within CFE | August 1, 2014 |
| 3.1  3.3  4.2  4.3  4.6 | 1.0 / 21  1.0 / 17  1.0 / 14  1.0 / 18  1.0 / 16 | Updated step 2  Updated step 1  Spilt step 3 into two steps for clarification  Spilt step 4 into two steps for clarification  Updated Generic Script | October 1, 2014 |
| 3.8  3.9  3.10  4.1  4.2  4.3  4.4 | 1.0 / 11  1.0 / 11  1.0 / 3  1.0 / 16  1.0 / 15  1.0 / 19  1.0 / 19 | Updated step 6  Updated step 5  Updated step 5  Updated step EEA  Updated step Note  Updated step 2nd Note  Updated TO scripts, delete W-Ns & revised GTLs  All procedures in this manual have been reviewed | December 15, 2014 |
| 2.2  3.8  4.1  4.2  4.3  4.4 | 1.0 / 3  1.0 / 12  1.0 / 17  1.0 / 16  1.0 / 20  1.0 / 20 | Added Dispatch and VDI definition  Correction to step 5  Reformatted section  Reformatted section  Corrected VDI/Dispatch Instruction language  Reformatted section | March 1, 2015 |
| 3.8  4.1  4.4 | 1.0 / 13  1.0 / 18  1.0 / 21 | Correction to step 2  Updated step 2 & 4 on DC-Ties with Southwest Power Pool (SPP)  Updated GTL to new term GTC | May 1, 2015 |
| 3.1  3.3 | 1.0 / 22  1.0 / 18 | Updated step 2  Updated 4th Note and step 1 | July 15, 2015 |
| 4.1 | 1.0 / 19 | Added step 3, 4, and Log to DC-Ties with Comisión Federal de Electricidad (CFE)  All procedures in this manual have been reviewed | December 31, 2015 |
| 1.3  2.1 | 1.0 / 2  1.0 / 2 | Removed Interchange Coordinator  Updated System Operator Responsibility and Authority | March 1, 2016 |
| 3.1  3.2  3.3  3.4  3.5 | 1.0 / 23  1.0 / 10  1.0 / 19  1.0 / 6  1.0 / 5 | Added Note 4  Updated steps 1, 2 & 3  Added Note 4, & renumbered steps  Updated step 1  Updated steps 1, 2 & 3, deleted 2nd Note | April 29, 2016 |
| 2.1  2.2  4.1  4.2  4.3  4.4  4.6 | 1.0 / 3  1.0 / 4  1.0 / 20  1.0 / 17  1.0 / 21  1.0 / 22  1.0 / 17 | Updated for COM-002-4  Updated for COM-002-4  Updated for COM-002-4  Updated Step Electronic Dispatch Instruction  Updated for COM-002-4  Updated Step Electronic Dispatch Instruction  Updated for COM-002-4  Updated Step Electronic Dispatch Instruction  Updated for COM-002-4  Updated for COM-002-4 | June 30, 2016 |
| 3.2  3.3  3.6  3.12 | 1.0 / 11  1.0 / 20  1.0 / 8  1.0 / 9 | Updated Note, Step 1 and Step 2.  Removed Step 3  Updated Step 2  Updated Exports Step 1  Moved Exports step 2 to step 3  Added Exports Step 2  Updated Step 3 | September 30, 2016 |
| 3.2  3.3 | 1.0 / 12  1.0 / 21 | Updated Procedure Purpose  Updated step Note  Added step Adjustment Period  Updated step 1 & 2  Updated step 2 | November 2, 2016 |
|  |  | All procedures in this manual have been reviewed | December 30, 2016 |
| 1.3  2.1  2.3  3.2  3.3  3.6  3.7  3.9  3.10  3.11  4.1  4.2  4.3  4.6 | 1.0 / 3  1.0 / 4  1.0 / 5  1.0 / 13  1.0 / 22  1.0 / 9  1.0 / 13  1.0 / 12  1.0 / 4  1.0 / 6  1.0 / 21  1.0 / 18  1.0 / 22  1.0 / 18 | Deleted section 1.3  Updated for IRO-001-4  Updated step NXT  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated CFE to CENACE  Updated heading title and OCN step 1 | March 31, 2017 |
| 4.3 | 1.0 / 23 | Transmission Watch Issued for Post-Contingency Overloads on the South DC Ties  Added section Transmission Watch Issued for the Rio Grande Valley Import | April 6, 2017 |
| 3.2  3.7  3.10  4.2  4.3 | 1.0 / 14  1.0 / 14  1.0 / 5  1.0 / 19  1.0 / 24 | Updated all steps  Updated step 1 & 2  Updated step 1  Updated step 1  Updated second note and step 4 in Emergency Condition within CENACE | June 1,2017 |
| 3.1 | 1.0 / 24 | Added East HVDC Tie Voltage Limits | September 29, 2017 |
| 3.3 | 1.0 / 23 | Moved step 4 to step 2 and deleted step 4 | October 31, 2017 |
|  |  | All procedures in this manual have been reviewed | December 28, 2017 |
| 3.5  4.1 | 1.0 / 6  1.0 / 22 | Updated steps  Added new step #4 and updated step #4 to #5 | February 28, 2018 |
| 3.3 | 1.0 / 24 | Updated for NPRR861 | March 30, 2018 |
| 2.2  3.3  3.8  3.9  3.10 | 1.0 / 5  1.0 / 25  1.0 / 14  1.0 / 13  1.0 / 6 | Updated procedure purpose  Updated step 2  Updated steps 2, 3, 4 & 6  Updated steps 3, 4, & 5  Updated steps 3, 4, & 5 | May 1, 2018 |
| 4.1  4.2  4.3 | 1.0 / 23  1.0 / 20  1.0 / 25 | Updated Electronic Dispatch Instruction steps  Updated Electronic Dispatch Instruction steps  Updated Emergency Condition within ERCOT step 5 | May 31, 2018 |
| 3.1  3.3  4.1  4.2  4.3 | 1.0 / 25  1.0 / 26  1.0 / 24  1.0 / 21  1.0 / 26 | Updated step 1  Updated step 1  Updated steps Electronic Dispatch Instruction  Updated steps Electronic Dispatch Instruction  Updated second note and Updated Emergency Condition within ERCOT step 5 | August 31, 2018 |
| 3.2  3.3  3.5  3.6  3.7  3.10  4.1  4.2  4.3 | 1.0 / 15  1.0 / 27  1.0 / 7  1.0 / 10  1.0 / 15  1.0 / 7  1.0 / 25  1.0 / 22  1.0 / 27 | Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825  Updated for NPRR825 | October 1, 2018 |
| 3.6  3.7  4.1  4.2  4.3 | 1.0 / 11  1.0 / 16  1.0 / 26  1.0 / 23  1.0 / 28 | Added step to cancel message  Added steps to cancel message  Added steps to post and cancel messages  Added step to cancel message  Added steps to post and cancel messages | November 1, 2018 |
|  |  | All procedures in this manual have been reviewed | December 28, 2018 |
| 3.3 | 1.0 / 28 | Updated step 2 | January 31, 2019 |
| 3.3  3.6  3.8  4.4 | 1.0 / 29  1.0 / 12  1.0 / 15  1.0 / 23 | Updated step 2  Added step Note  Updated SPP Interchange to SPP Balancing  Updated step Contact Security | March 29, 2019 |
| 3.3  3.6  3.10  3.12  4.1  4.2  4.3 | 1.0 / 30  1.0 / 13  1.0 / 8  1.0 / 10  1.0 / 27  1.0 / 24  1.0 / 29 | Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR  Updated SHARYLAND to ONCOR | May 16, 2019 |
| 3.1  3.3 | 1.0 / 26  1.0 / 31 | Updated step 1 & 2  Updated step 1 & 2 | May 31, 2019 |
| 4.1  4.4 | 1.0 / 28  1.0 / 24 | Added Note DC-Ties with Southwest Power Pool (SPP)  Moved Typical Hotline Scripts to Scripts | August 1, 2019 |
| 4.4 | 1.0 / 25 | Updated steps | November 1, 2019 |
| 3.11  4.4 | 1.0 / 7  1.0 / 26 | Updated Note  Updated Additional Notifications  All procedures in this manual have been reviewed | January 1, 2020 |
| 2.1  3.2  3.3  3.7  3.9  4.1  4.3  4.4 | 1.0 / 5  1.0 / 16  1.0 / 32  1.0 / 17  1.0 / 14  1.0 / 29  1.0 / 30  1.0 / 27 | Added Advance Action Notice per NPRR930  Deleted Eagle Pass DC\_S due to retirement  Deleted Eagle Pass DC\_S due to retirement  Deleted Eagle Pass DC\_S due to retirement  Deleted Eagle Pass DC\_S due to retirement  Deleted Eagle Pass DC\_S due to retirement  Deleted Eagle Pass DC\_S due to retirement  Updated steps | July 1, 2020 |
| 3.1  4.4 | 1.0 / 27  1.0 / 28 | Updated step 2  Updated with new IROL’s | October 1, 2020 |
| 4.4 | 1.0 / 29 | Updated IROL’s | October 31, 2020 |
| 3.1  3.2  3.3  3.5  3.6  3.7  3.8  3.10  3.12  4.1  4.2  4.3  4.4  4.6 | 1.0 / 28  1.0 / 17  1.0 / 33  1.0 / 8  1.0 / 14  1.0 / 18  1.0 / 16  1.0 / 9  1.0 / 11  1.0 / 30  1.0 / 25  1.0 / 31  1.0 / 30  1.0 / 19 | Updated 1st note contact  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated SPP Balancing to SPP RTBM  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039  Updated for NPRR1039 & added Note  All procedures in this manual have been reviewed | December 31, 2020 |
| 3.1  3.8  3.9  3.10  4.4 | 1.0 / 29  1.0 / 17  1.0 / 15  1.0 / 10  1.0 / 31 | Removed Oklaunion exemption  Organization change  Organization change  Organization change  Organization change | April 1, 2021 |
| 4.6 | 1.0 / 20 | Changed Notice Builder to Grid Conditions Communications (GCC) Notices | May 6, 2021 |
| 3.1  3.3  4.4 | 1.0 / 30  1.0 / 34  1.0 / 32 | Updated Note  Updated Note  Deleted McCamey Export IROL | July 1, 2021 |
| 2.2  4.3  4.4  4.6 | 1.0 / 6  1.0 / 32  1.0 / 33  1.0 / 21 | Updated step 1  Updated steps 1, 2, & 4  Added McCamey Export IROL  Updated all steps  All procedures in this manual have been updated | December 31, 2021 |
| 2.4  3.1  3.3  3.5 | 1.0 / 0  1.0 / 31  1.0 / 35  1.0 / 9 | New procedure section  Updated step 1  Updated step 1  Add TLR note | March 1, 2022 |
| 4.4 | 1.0 / 34 | Added Note | April 7, 2022 |
| 3.1  3.3 | 1.0 / 32  1.0 / 36 | Updated step 1  Updated step 1 | July 29, 2022 |
| 3.1  3.3  4.4 | 1.0 / 33  1.0 / 37  1.0 / 35 | Updated 5th note  Updated 5th note  Updated Voltage tables  All procedure in this manual have been reviewed | December 30, 2022 |
|  |  | All procedures in this manual have been reviewed | December 29, 2023 |