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1.0 PURPOSE

The overall objective of the Reliability Plan for the Tennessee Valley Authority Reliability Coordinator (TVA RC) Area is to ensure and maintain the operational reliability of the TVA Reliability Coordinator Wide Area and the Eastern Interconnection [**SERC Regional Reliability Plan**] and to establish and provide the reliability assessment and emergency operations coordination for the Balancing Authorities (BA) and Transmission Operators (TOP) within the regions and across the regional boundaries.

2.0 SCOPE

This document represents the Reliability Plan for the TVA Reliability Coordinator Area.

The Tennessee Valley Authority serves as the Reliability Coordinator for the TVA Balancing Authority and Transmission Operator. TVA has also entered into Reliability Coordination Agreements (Agreements) with other Balancing Authorities and Transmission Operators (herein referred to as “Members”) to perform the NERC-required Reliability Coordinator function for them. The term “Member” includes TVA Balancing Authority and Transmission Operator functions. The Members operate as Balancing Authorities and/or Transmission Operators in the SERC region. The respective region recognizes TVA as the Reliability Coordinator for the Members. The TVA RC Area consists of the Member’s transmission and generation facilities within the Balancing Authorities’ metered boundaries for the Members listed in Appendix A.

TVA RC is responsible for the TVA RC Area bulk transmission reliability and power supply reliability. Bulk transmission reliability functions include Real-time system loading and stability, reliability analysis, congestion management (which can include re-dispatch of generation and the curtailment of transactions and/or Native Network Load (NNL) and market flow). Power supply reliability entails monitoring system frequency and BA performance and instructing the BAs and TOPs, as necessary, to take actions, including load shed and increasing, decreasing, committing or de-committing generation in situations where an imbalance between generation and load places the system in jeopardy.

TVA RC Reliability Plan is written in accordance with applicable NERC Reliability Standards. Understanding that NERC Reliability Standards are subject to change during the term of this Plan, the TVA RC will comply with all applicable NERC Reliability Standards, whether expressly addressed in this Plan or not.

Review Cadence: This procedure will be reviewed every 3 years with the review documented in the revision Log.

3.0 PROCESS

3.1 Roles and Responsibilities

Various groups within TVA comprise and support the TVA Reliability Coordinator function in its responsibility of ensuring and maintaining the operational reliability of the TVA Reliability Coordinator Wide Area and the Eastern Interconnection.

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3.1.1 Transmission Operations & Power Supply (TOPS) Vice President

The Transmission Operations & Power Supply Vice President has overall responsibility and governance for all aspects of implementation, as well as, executive approval of this procedure.

3.1.2 Manager, Reliability Operations

The Manager, Reliability Operations, is responsible for and has the oversight over the review and technical information contained in this procedure.

3.1.3 TVA Reliability Coordinator

- A. The TVA RC maintains the Real-time operating reliability of the TVA RC Area and, in coordination with its neighboring RCs, the Wide Area view. The Wide Area view includes situational awareness of its neighboring RC Areas. Its scope includes both transmission and balancing operations, and the TVA RC has authority to instruct other functional entities to take certain actions to ensure that its RC Area operates reliably. **[NERC Reliability Functional Model - Version 5]**
- B. The TVA RC acts to address the reliability of its RC Area via direct actions or by issuing Operating Instructions. **[IRO-001-4 R1]** The TVA RC has clear decision-making authority to act and to direct actions to be taken by Balancing Authorities, Transmission Operators, Generator Operators, Transmission Service Providers, Load-Serving Entities, Distribution Providers and Purchasing Selling Entities within its Reliability Coordinator Area to preserve the integrity and reliability of the Bulk Electric System. TVA RC responsibilities and authority are clearly defined in the executed Reliability Coordination Agreements in Appendix B and the Operating Personnel Responsibility and Authority to Meet NERC Compliance (Authority Letter).
- C. The TVA RC shall have and implement Operating Procedures, Operating Processes, and Operating Plans, for activities that require notification or coordination of actions that may impact adjacent Reliability Coordinator Areas, to support interconnection reliability. **[IRO-014-3 R1]**
- D. The TVA RC will act in the interests of reliability for the overall RC Area and the Interconnection before the interests of any other entity.
- E. The TVA RC is ultimately responsible for the results of the Operational Planning Analysis (next-day analysis). The TVA RC is responsible for verifying the results, coordinating with TOps and BAs in reviewing and/or modifying the preliminary action plan, and issuing an approved action plan to mitigate the exceedances in the TVA RC Area.
- F. The TVA RC is responsible for recognizing incidents that require DOE and NERC reporting as detailed in EOP-004- 4 Attachment 1 and TRANS-TSO-SPP-30.050, Operational Desk Responsibilities, Communications and NERC-DOE Reporting to PSS/ODS who is responsible for making emergency notification to delegated executives in alignment with the Agency Emergency Response Plan duties and NERC/DOE Reporting.
- G. The TVA RC has execution of this procedure.

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3.1.4 Reliability Operations (RO)

- A. Reliability Operations is ultimately responsible for executing the RC function at TVA.
- B. Responsible for the Real-time 24 by 7 RC operations of the TVA RC Area.

3.1.5 Reliability Analysis (RA)

- A. Reliability Analysis provides engineering support for the RC function and supports the Real-time Reliability Coordination operators in their responsibility to fulfill the function of RC.
- B. Responsible for operational planning of the TVA RC Area.
- C. Responsible for providing the Operational Planning Analysis for next-day analysis and assisting in developing the plan for next-day operations.
- D. Responsible for support of this procedure.

3.1.6 TVA RC Member Companies and Entities in the TVA RC Area

- A. Each Transmission Operator, Balancing Authority, Generator Operator, and Distribution Provider in the TVA Reliability Coordinator Area shall comply with the TVA Reliability Coordinator's Operating Instructions and Emergency Operating Instructions unless compliance with the Operating Instructions cannot be physically implemented or unless such actions would violate safety, equipment, or regulatory or statutory requirements. **[IRO-001-4 R2]** Each Transmission Operator, Balancing Authority, Generator Operator, and Distribution Provider shall inform its Reliability Coordinator of its inability to perform the Operating Instruction issued by its Reliability Coordinator. **[IRO-001-4 R3]**
- B. Each Balancing Authority, Generation Owner, Generator Operator, Load-Serving Entity, Transmission Operator, Transmission Owner, and Distribution Provider receiving a data specification document from the TVA RC shall satisfy the obligations of the documented specification using: a mutually agreeable format, a mutually agreeable process for resolving data conflicts, and a mutually agreeable security protocol. **[IRO-010-2 R3]**.
- C. Execution and support of this procedure.

3.2 Program Elements

3.2.1 Operating Instructions

- A. TVA RC issues Operating Instructions in accordance with NERC Standard COM-002-4 - Operating Personnel Communications Protocols. The TVA RC has developed documented communications protocols for its operating personnel that issue and receive Operating Instructions in TRANS-TSO-SPP-30.040, Communications Protocol for Phones, Radios and the Intercom System. **[COM-002-4 R1]**
 1. TVA RC requires its operating personnel that issue an oral two-party, person-to-person Operating Instruction to take one of the following actions:

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3.2.1 Operating Instructions (continued)

- a. Confirm the receiver's response if the repeated information is correct.
 - b. Reissue the Operating Instruction if the repeated information is incorrect or if requested by the receiver.
 - c. Take an alternative action if a response is not received or if the Operating Instruction was not understood by the receiver
2. TVA RC requires its operating personnel that receive an oral two-party, person-to-person Operating Instruction to take one of the following actions:
 - a. Repeat, not necessarily verbatim, the Operating Instruction and receive confirmation from the issuer that the response was correct.
 - b. Request that the issuer reissue the Operating Instruction.
- B. RC shall communicate the expected timing associated with the Operating Instruction, i.e. when the Operating Instruction is expected to be implemented, the duration of the action, etc.

NOTE

Reliability Coordinator will utilize 3-way communication when issuing Operating Instructions. Operating Instructions should be clear, concise, and in a definitive manner.

- C. **Emergency Operating Instruction** – A TVA-defined term for an oral, two-party, person-to-person, Operating Instruction issued during an abnormal system condition that requires immediate and urgent action to prevent or limit the failure of Transmission Facilities or generation supply that could adversely affect the reliability of the Bulk Electric System. This type of Operating Instruction will be clearly identified as an Emergency Operating Instruction by the issuer and acknowledged as such by the recipient. The System Operator utilizes his judgment, based on the system conditions at the time, to make the determination to issue an Emergency Operating Instruction.

NOTE

“Emergency” alert or state does not have to be formally in effect for an Emergency Operating Instruction to be issued. An Emergency Operating Instruction could be issued that prevents the need for a declaration of an Emergency alert or state. All Operating Instructions issued during an Emergency alert or state are not necessarily Emergency Operating Instructions. Only those identified by the System Operator are Emergency Operating Instructions.

1. TVA RC requires its operating personnel that issue an oral two-party, person-to-person 'Emergency Operating Instruction' to take the following actions: **[COM-002-4 R5]**
 - a. TVA Reliability Coordinator (initiator) clearly states, This is a 'Emergency Operating Instruction'.

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3.2.1 Operating Instructions (continued)

- b. Confirm the receiver's response if the repeated information is correct
 - c. Reissue the Operating Instruction if the repeated information is incorrect or if requested by the receiver, or
 - d. Take an alternate action if a response is not received or if the Operating Instruction was not understood by the receiver
 - e. Document the Emergency Operating Instruction in eSOMS.
2. TVA RC requires its operating personnel and Member Company operators that receives an oral two-party, person-to-person Emergency Operating Instructions to take the following actions: **[COM-002-4 R6]**
- a. Repeat, not necessarily verbatim, the Operating Instruction and receive confirmation from the issuer that the response was correct, or
 - b. Request that the issuer reissue the Operating Instruction

3.2.2 Common Tasks for Next-Day and Current-Day Operations

- A. The TVA RC monitors Facilities, the status of Remedial Action Schemes, and non-BES facilities identified as necessary by the RC, within the TVA RC Area and neighboring RC Areas to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within the TVA RC Area. **[IRO-002-5 R5]** The TVA RC assesses the Bulk Electric System on a first-contingency (N-1) basis for Current-Day and Next-Day operations.
- B. TVA RC contacts neighboring Reliability Coordinator Areas when TVA RC is aware of an operational concern, such as declining voltages, excessive reactive flows, or an IROL violation, in a neighboring RC Area. TVA and neighboring Reliability Coordinators coordinate any actions, including emergency assistance required to mitigate the operational concern.
- C. TVA RC performs analysis and monitoring (as described in the appropriate sections below) of all critical facilities whose failure, degradation, or disconnection could result in any SOL or IROL exceedance. TVA RC ensures that Balancing Authorities and Transmission Operators within its RC Area always operate under known and studied conditions and do not burden others. TVA RC will instruct Member Companies to reposition the power system following contingency events within approved timelines.
- D. The TVA RC maintains a documented specification for the data necessary for it to perform its Operational Planning Analysis, Real-time monitoring, and Real-time Assessments. **[IRO-010-2 R1]** TVA RC data and information specifications are outlined in the Standard Programs and Processes (SPP) document, TOPS-RC-SPP-30.248 TVA Reliability Coordinator Data and Information Specifications. The TVA RC distributes its data specification to entities that have data required by the Reliability Coordinator's Operational Planning Analyses, Real-time monitoring, and Real-time Assessments. **[IRO-010-2 R2]**.

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3.2.2 Common Tasks for Next-Day and Current-Day Operations (continued)

- E. When receiving a data specification from a Reliability Coordinator, the TVA RC satisfies the obligations of the documented specification using, a mutually agreeable format, a mutually agreeable process for resolving data conflicts, and a mutually agreeable security protocol. **[IRO-010-2 R3]**

3.2.3 Operational Planning Analysis for Next-Day Operations **[SERC Regional Reliability Plan]**

- A. The TVA RC performs an Operational Planning Analysis that allows it to assess whether the planned operations for the next-day will exceed System Operating Limits (SOLs) and Interconnection Operating Reliability Limits (IROLs) within its Wide Area. **[IRO-008-2 R1]** The details of the Operational Planning Analysis for next-day operations is documented in TRANS-TSO-SPP-30.207, Next Day Reliability Analysis.
- B. The TVA RC has data exchange capabilities with its BAs and TOps, and with other entities it deems necessary, in order to perform an Operational Planning Analysis. **[IRO-002-5 R1]** The TVA RC System Operators have the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities. **[IRO-002-5 R4]**
- C. The TVA RC will verify adequate Operating Reserves and reactive reserves for the RC Area **[SERC Regional Reliability Plan]**.
- D. For each IROL (in the TVA RC Area) that the TVA RC identifies one or more days prior to the current day, the RC shall have one or more Operating Processes, Procedures, or Plans that identify actions the RC shall take or actions the RC shall instruct others to take (up to and including load shedding): **[IRO-009-2 R1]**
 - 1. That can be implemented in time to prevent the identified IROL exceedance.
 - 2. To mitigate the magnitude and duration of an IROL exceedance such that the IROL exceedance is relieved within the IROL's Tv of 30 minutes.
- E. The TVA RC, in conjunction with other Members within its Reliability Coordinator Area, develops required action plans, including reconfiguration of the transmission system, re-dispatching of generation, reduction or curtailment of Interchange Transactions, or reducing load to return transmission loading to within acceptable SOLs or IROLs .
- F. The TVA RC shall have a coordinated Operating Plan(s) for next-day operations to address potential System Operating Limit (SOL) and Interconnection Reliability Limit (IROL) exceedances identified as a result of its Operational Planning Analysis as performed in paragraph 3.2.3.A while considering the Operating Plans for the next-day provided by its Transmission Operators and Balancing Authorities. **[IRO-008-2 R2]**
- G. The TVA RC will notify impacted entities identified in its Operating Plan(s) cited in paragraph 3.2.3.E as to their role in such plan(s). **[IRO-008-2 R3]**

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3.2.3 Operational Planning Analysis for Next-Day Operations [SERC Regional Reliability Plan] (continued)

- H. The TVA RC will notify impacted TOPs and BAs within its RC Area, and other impacted RCs as indicated in its Operating Plan, when the results of a Real-time Assessment indicate an actual or expected condition that results in, or could result in, a System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL) exceedance within its Wide Area. **[IRO-008-2 R5]**
- I. The TVA RC will notify impacted TOPs and BAs within its RC Area, and other impacted RCs as indicated in its Operating Plan, when the SOL or IROL exceedance identified in paragraph 3.2.3.G has been prevented or mitigated. **[IRO-008-2 R6]**
- J. The TVA RC provides available data such as Bulk Electric System (BES) facility outages, load forecast, and Operating Reserve projections of the TVA RC Area to the NERC SDX.
- K. If the results of these studies indicate potential SOL or IROL exceedance, the TVA RC will make available the results to Member Companies and impacted neighboring RC Areas and notify those entities as appropriate through communication such as phone calls, conference calls, emails, or Reliability Coordinator Information System (RCIS) as appropriate.
- L. The TVA RC will determine if operating guides should be developed based on the analysis and will coordinate with Reliability Analysis and the affected RC, TOP and/or BA **[SERC Regional Reliability Plan]**.
- M. The TVA RC will coordinate with Members in the TVA Reliability Coordinator Area to take any necessary action the TVA RC deems appropriate to address a potential SOL or IROL exceedance.

3.2.4 Current-Day Operations [SERC Regional Reliability Plan]

- A. The TVA RC monitors Facilities, the status of Remedial Action Schemes, and non-BES facilities identified as necessary by the RC, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its RC Area. **[IRO-002-5 R5]**
- B. The TVA RC has data exchange capabilities, with redundant and diversely routed data exchange infrastructure within its primary Control Center, for exchange of Real-time data with its BAs and TOPs, and with other entities it deems necessary, for performing its Real-time monitoring and Real-time Assessments. **[IRO-002-5 R2]** The TVA RC will test its primary Control center data exchange capabilities for redundant capability at least once every 90 calendar days. If the test is unsuccessful, the TVA RC will initiate action within two hours to restore redundant functionality. **[IRO-002-5 R3]**
- C. The TVA RC has monitoring systems that provide information utilized by the RC's operating personnel, giving particular emphasis to alarm management and awareness systems, automated data transfers, and synchronized information systems, over a redundant infrastructure. **[IRO-002-5 R6]** The TVA RC monitors its Reliability Coordinator Area parameters, including, but not limited to the following:

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3.2.4 Current-Day Operations [SERC Regional Reliability Plan] (continued)

1. Current status of BES elements and system loading
 2. Current pre-contingency element conditions (voltage, thermal, or stability), including any applicable mitigation plans to alleviate SOL or IROL violations, including the plan's viability and scope
 3. Current post-contingency element conditions (voltage, thermal, or stability), including any applicable mitigation plans to alleviate SOL or IROL violations, including the plan's viability and scope
 4. System real and reactive reserves (actual versus required)
 5. Capacity and energy adequacy conditions
 6. Current ACE for all Balancing Authorities
 7. Current local or Transmission Loading Relief procedures in effect
 8. Planned generation dispatches
 9. Planned transmission or generation outages
 10. Contingency events
- D. The TVA Reliability Coordinator ensures that a Real-time Assessment is performed at least once every 30 minutes. **[IRO-008-2 R4]**
- E. TVA has a General Electric Real-time state estimator and security analysis package (Real-Time Contingency Analysis). The state estimator network model captures the full TVA RC footprint and surrounding facilities that impact the TVA RC Area. The network model consist of a detailed node/breaker models with Real-time measurements. Real-time contingency analysis cycles every two minutes.
- F. The TVA RC has implemented the PowerWorld Retriever Real-time Monitoring System. This flow based visualization tool is designed to help system operators and reliability personnel monitor and display the current state of the system. Real-time telemetry and State Estimator estimated data are input into the tool.
- G. The TVA RC utilizes power flow software to determine line outage distribution factors and applies these factors to critical flow gates. The RC System Operator can monitor these critical facilities and their contingent elements in Real-time.
- H. The TVA RC has information, including weather forecasts and past load patterns, available to predict the system's near-term load pattern.
- I. The TVA RC uses monitoring equipment to bring to the attention of operating personnel important deviations in operating conditions and to indicate, if appropriate, the need for corrective action. TVA RC's tools have visual and/or audible alarms to alert the operating personal to conditions that need attention.

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3.2.4 Current-Day Operations [SERC Regional Reliability Plan] (continued)

- J. The TVA RC is aware of all Interchange Transactions that wheel through, source, or sink in the TVA Reliability Coordinator Area, and that Interchange Transaction information is available to all Reliability Coordinators in the Eastern Interconnection via the NERC Interchange Distribution Calculator (IDC) .
- K. TVA RC will take appropriate actions in accordance with established policies, procedures, authority, and expectations to mitigate SOL and IROL exceedances and to relieve transmission loading. The document, Transmission Reliability Order of Curtailment outlines the process used by TVA RC regarding actions to be taken to mitigate SOL and IROL exceedances and relieve transmission loading issues.
- L. As portions of the transmission system approach or exceed SOLs or IROLs, the TVA RC works with Members in the TVA Reliability Coordination Area to evaluate and assess any additional Interchange Schedules that would violate those limits. If a potential or actual IROL exceedances cannot be avoided through proactive intervention, the TVA RC will initiate control actions or emergency procedures to relieve the exceedance without delay, and no longer than 30 minutes. TVA RC ensures that all resources, including load shedding, are available to address a potential or actual IROL exceedances.
- M. TVA RC shall initiate one or more Operating Processes, Procedures, or Plans (Operating Guides) (not limited to the Operating Processes, Procedures, or Plans developed as part of the Next-Day analysis) that are intended to prevent an IROL exceedance, as identified in the Reliability Coordinator's Real-time monitoring or Real-time Assessment. **[IRO-009-2 R2]**
- N. The TVA RC shall act or direct others to act so that the magnitude and duration of an IROL exceedance is mitigated within the IROL's Tv (30 minutes), as identified in the RC's Real-time monitoring or Real-time Assessment. **[IRO-009-2 R3] [SERC Regional Reliability Plan]**
- O. TVA RC monitors its Balancing Authorities' parameters to ensure that adequate Operating Reserves are provided and available. If necessary, TVA RC will instruct the Balancing Authorities in its Reliability Coordinator Area to arrange for assistance from neighboring Balancing Authorities. TVA RC issues Energy Emergency Alerts as needed and at the request of its Members.
 - 1. AECI participates in the SPP Reserve Sharing Pool. LG&E/KU and TVA participate in the TEE Reserve Sharing Group.
- P. The TVA RC developed, maintained, and implemented a GMD Operating Plan that coordinates GMD Operating Procedures or Operating Processes within its RC Area. At a minimum, the GMD Operating Plan includes **[EOP-010-1 R1]**:
 - 1. A description of activities designed to mitigate the effects of GMD events on the reliable operation of the interconnected transmission system within the Reliability Coordinator Area.
 - 2. A process for the RC to review the GMD Operating Procedures or Operating Processes of TOps within its RC Area.

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3.2.4 Current-Day Operations [SERC Regional Reliability Plan] (continued)

The roles and responsibilities associated with GMD of the TVA Reliability Coordinator and Member Companies is detailed in the TOPS-RC-SOP-30.249 RC Geomagnetic Disturbance Operating Plan Technical Procedure.

- Q. The TVA RC disseminates forecasted and current space weather information to functional entities identified as recipients in the RC Geomagnetic Distribution Operating Plan Technical Procedures **[EOP-010-1 R2]**.
- R. TVA RC participates in NERC hotline discussions, assists in the assessment of reliability of the overall interconnected system, and coordinates actions in anticipated or actual emergency situations. TVA RC will disseminate such information within its Reliability Coordinator Area, as needed.
- S. TVA RC monitors system frequency and its Balancing Authorities' ACE and BAAL and DCS performance and its impact on the TVA RC Area and the Eastern Interconnection and instructs any necessary rebalancing to return the ACE to reliable levels. The Members will utilize all resources, including firm load shedding, as instructed by the TVA RC to relieve an emergent condition. The process and expectations for the TVA RC is detailed in TRANS-TSO-SPP-30.251, TVA Reliability Coordinator Protocol for ACE Out of Bounds Events.
- T. TVA currently serves as NERC's Eastern Interconnection Frequency Monitor and initiates NERC Hotline calls when frequency exceeds specified limits. The roles and responsibilities associated with serving as the Eastern Interconnection Frequency Monitor is located in the SPP TOPS-RC-SPP-30.203, TVA Reliability Coordinator Responsibilities as Eastern Interconnection Frequency Monitor.
- U. All Balancing Authorities' frequency values are displayed via the RCIS.
- V. The TVA RC has developed, implemented, maintains an outage coordination process for generation and Transmission outages within its RC Area, TRANS-TSO-SPP-30.231, Tennessee Valley Authority Reliability Coordinator Outage Coordination **[IRO-017-1 R1]**.
- W. As necessary, the TVA RC assists the Balancing Authorities in its Reliability Coordinator Area in arranging for assistance from neighboring Reliability Coordinator Areas or Balancing Authorities.
- X. If another RC in the Eastern Interconnection declares an EEA and a BA in the TVA RC Area has available resources, the TVA RC should coordinate, as appropriate, with the RC that has an energy deficient Balancing Authority. **[EOP-011-1 Attachment 1]**
- Y. TVA RC monitors ACE for each Balancing Authority within the TVA RC Area and identifies sources of large Area Control Errors that may be contributing to Frequency Error, Time Error, or Inadvertent Interchange and discusses corrective actions with appropriate Balancing Authorities. If a Frequency Error, Time Error, or Inadvertent problem occurs outside of the TVA Reliability Coordinator Area, the TVA RC will initiate a NERC hotline call to discuss the Frequency Error, Time Error, or Inadvertent Interchange with other Reliability Coordinators.

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3.2.4 Current-Day Operations [SERC Regional Reliability Plan] (continued)

- Z. Whenever a Remedial Action Scheme, that may have an inter-Balancing Authority, inter-Transmission Operator, or inter-Reliability Coordinator Area impact (e.g., could potentially affect transmission flows resulting in a SOL or IROL violation), is armed, the TVA RC will be aware of the impact of the operation of that Remedial Action Scheme on inter-area flows. The Member will inform the TVA RC of the change of status of the Remedial Action Scheme including any degradation or potential failure to operate as expected.
- AA. TVA RC ensures that Members operate to prevent the likelihood that a disturbance, action, or non-action in its Reliability Coordinator Area will result in a SOL or IROL exceedance in another area of the Interconnection. In instances where there is a difference in SOLs or IROLs, the TVA RC and Members shall always operate the Bulk Electric System to the most limiting parameter. **[TOP-001-4 R18]** The TVA RC will operate to the most limiting IROL and T_v between RCs that are responsible for that Facility (or group of Facilities). **[IRO-009-2 R4]**
- BB. TVA RC makes known to its Members within its Reliability Coordinator Area the SOLs or IROLs within its Wide Area view.
- CC. TVA RC confirms reliability assessment results and determines the effects within the TVA Reliability Coordinator Area and adjacent Reliability Coordinator Areas. TVA RC will discuss options to mitigate potential or actual SOL or IROL violations and take actions as necessary to always act in the best interests of the Interconnection.
- DD. When an IROL or SOL is exceeded, the TVA RC will evaluate the local and Wide Area impacts, both Real-time and post-contingency, and determine if the actions being taken are appropriate and sufficient to return the system to within IROL in 30 minutes. If the actions being taken are not appropriate or sufficient, the TVA RC will direct the Members to return the system to within IROL or SOL limits **[IRO-009-2 R3],[SERC Regional Reliability Plan]**.
- EE. TVA RC, when experiencing a potential or actual SOL or IROL exceedance within its Reliability Coordinator Area, will, at its discretion, select from either a "local" (Regional, Interregional, or sub regional) transmission loading relief procedure and/or Interconnection-wide procedure. The Eastern Interconnection Transmission Loading Relief (TLR) procedure is available for use by the TVA RC via the IDC.
- FF. TVA RC notifies its Members of transmission problems by telephone and a daily operational conference call to discuss reliability issues. TVA RC notifies all RCs via telephone, RCIS, or NERC Hotline as appropriate and the TVA RC participates in daily conference calls with adjacent RCs. Provisions for periodic communications with neighboring RCs are outlined in the RC Coordination and Notification Plans.
- GG. TVA RC will use local transmission loading relief or congestion management procedures, provided the Transmission Operator experiencing the potential or actual SOL or IROL exceedance is a party to those procedures. TVA RC may implement a local transmission loading relief or congestion management procedure simultaneously with an Interconnection-wide procedure.

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3.2.4 Current-Day Operations [SERC Regional Reliability Plan] (continued)

- HH. If the TVA RC initiates an Eastern Interconnection TLR to prevent or mitigate an SOL or IROL exceedance, the TVA RC shall identify the TLR level and congestion management actions to be implemented and shall update this information at least every clock hour (except TLR-1) after initiation up to and including the hour when the TLR level has been identified as TLR Level 0 **[IRO-006-EAST-2 R1]**.
- II. The TVA RC will follow the curtailments as directed by the Interconnection-wide procedure. If the TVA RC has a Sink BA that must implement congestion management actions pursuant to the Eastern Interconnection TLR procedure, the TVA RC shall instruct the Sink BA to implement the congestion management actions within 15 minutes of receiving the request from the issuing RC unless: **[IRO-006-EAST-2 R2]**
 - 1. An assessment determines that one or more of the congestion management actions communicated will result in a reliability concern or will be ineffective, the RC with a Sink BA shall coordinate alternate congestion management actions with the issuing RC.
- JJ. When implemented, the TVA RC will comply with the provisions of the Interconnection-wide procedure including action by Reliability Coordinators in other Interconnections to curtail an Interchange Transaction that crosses an Interconnection boundary.
 - 1. If the TVA RC receives a request pursuant to an Interconnection-wide transmission loading relief procedure (such as Eastern Interconnection TLR, WECC Unscheduled Flow Mitigations, or congestion management procedures from the ERCOT Protocols) from any Reliability Coordinator, Balancing Authority, or Transmission Operator in another Interconnection to curtail an Interchange Transaction that crosses an Interconnection boundary shall comply with the request, unless it provides a reliability reason to the requestor why it cannot comply with the request. **[IRO-006-5 R1]**.
- KK. TVA RC has the authority to request that the Interconnection Time Monitor terminate a Time Error Correction in progress, or a scheduled Time Error Correction that has not begun, for reliability considerations
- LL. TVA RC communicates start and end times for time error corrections to the Balancing Authorities within its RC Area by telephone.

NOTES

- 1. Only a Reliability Coordinator is eligible to act as Interconnection Time Monitor.
- 2. A single Reliability Coordinator in each Interconnection is designated by the NERC Operating Committee to serve as Interconnection Time Monitor.
- 3. TVA RC is not currently the designated Interconnection Time Monitor

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3.2.5 Emergency Operations

- A. TVA RC, Balancing Authorities, and Transmission Operators in the TVA Reliability Coordination Area will promptly analyze Bulk Electric System disturbances on its system or facilities.
- B. The TVA RC, upon identification of an expected or actual Emergency in its RC Area, shall notify other impacted RC. **[IRO-014-3 R3]**
- C. The TVA RC, upon receiving an Emergency notification from a TOp or BA in the TVA RC Area, shall notify, within 30 minutes from the time of receiving notification, other BAs and TOPs in its RC Area, and neighboring RCs. **[EOP-011-1 R5]**
- D. The TVA RC will operate as though an Emergency exists during each instance where RCs disagree on the existence of an Emergency. **[IRO-014-3 R4]**
- E. If the TVA RC identifies an Emergency in the TVA RC Area, the TVA RC shall develop an action plan to resolve the Emergency during instances where impacted RCs disagree on the existence of an Emergency. **[IRO-014-3 R5]**
- F. The TVA RC will implement the action plan developed by the RC that identifies an Emergency during those instance where RCs disagree on the existence of an Emergency, unless such actions would violate safety, equipment, regulatory, or statutory requirements. **[IRO-014-3 R6]**
- G. The TVA RC will assist RCs, if requested and able, provided that the requesting RC has implemented its emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements. **[IRO-014-3 R7]**
- H. TVA RC, Balancing Authorities, Transmission Operators, or other applicable functional entity in the TVA Reliability Coordination Area shall have an event reporting Operating Plan in accordance with EOP-004-4 Attachment 1 that includes the protocol(s) for reporting to the Electric Reliability Organization and other organizations (e.g., the Regional Entity, company personnel, the Responsible Entity's RC, law enforcement, or governmental authority) **[EOP-004-4 R1]**.
 - 1. TVA RC and/or the affected Balancing Authorities and Transmission Operators in the TVA Reliability Coordination Area shall report events per their Operating Plan within 24 hours of recognition of meeting an event type threshold for reporting or by the end of the next business day if the event occurs on a weekend (which is recognized to be 4 PM local time on Friday to 8 AM Monday local time). **[EOP-004- 4 R2]**

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3.2.5 Emergency Operations (continued)

2. Under certain adverse conditions, e.g., severe weather, it may not be possible to assess the damage caused by a disturbance and issue a written Interconnection Reliability Operating Limit and Preliminary Disturbance Report within 24 hours. In such cases, TVA RC, Balancing Authority, and/or Transmission Operator will promptly notify applicable regions and NERC, and verbally provide as much information as is available at that time. TVA RC and the affected Balancing Authority and Transmission Operator will provide timely, periodic verbal updates until adequate information is available to issue a written Preliminary Disturbance Report. **[EOP-004-4 Attachment 1 Note]**
3. The TVA RC is responsible for recognizing incidents that require DOE and NERC reporting as detailed in EOP-004 and SPP TRANS-TSO-SPP-30.050 Operational Desk Responsibilities, Communications and NERC-DOE Reporting to PSS/ODS who is responsible for making emergency notification to delegated executives in alignment with the Agency Emergency Response Plan duties and NERC/DOE Reporting
 - I. The TVA RC has procedures for the recognition of and for making their operating personnel aware of sabotage events on its facilities and multi-site sabotage affecting larger portions of the Interconnection TVA-SPP-14.310, Bomb Threat, Sabotage, Vandalism, Terrorism, and Other Security-Related Incidents. TVA RC also has procedures for the communication of information concerning sabotage events to appropriate parties in the Interconnection. TVA RC provides its operating personnel with sabotage response guidelines, including personnel to contact, for reporting disturbances due to sabotage events. TVA RC has established communications contacts with local Federal Bureau of Investigation (FBI) officials and develops reporting procedures as appropriate to their circumstances.
 - J. The TVA RC has a Capacity and Energy Emergency plan, TOPS-RC-SPP-30.204 TVA RC Capacity and Energy Emergency Plan, which details the roles and responsibilities of the TVA RC and Member Companies during a Capacity and Energy Emergency.
 - K. The TVA RC will instruct its Members to implement their Capacity and Energy Emergency plan, when required and as appropriate, to reduce risks to the interconnected system.
 - L. The TVA RC will communicate its Members' current and future system conditions to neighboring areas if it experiences an operating Capacity or Energy Emergency.
 - M. When a TVA RC Area Balancing Authority experiences a potential or actual Energy Emergency within its RC Area, the TVA RC shall declare an Energy Emergency Alert as detailed in NERC Standard EOP-011-1 Attachment 1. TVA RC will act to mitigate the emergency condition, including a request for emergency assistance if required **[EOP-011-1 R6]**.
 - N. The TVA RC has a plan to continue reliability operations in the event its Control Center becomes inoperable, TRANS-TSO-SOP-30.504, System Operations Center (SOC) Emergency Evacuation and TRANS-TSO-SOP-30.505 Regional Operations Center (ROC) Emergency Evacuation.

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3.2.5 Emergency Operations (continued)

- O. TVA Operates two Control centers, one for the Reliability Coordination functions and one for the Balancing Authority and Transmission Operator functions. The Regional Operations Center (ROC) is the primary Control Center for the TVA RC and Transmission Provider (TSP) functions. The System Operations Center (SOC) is the backup Control Center for the TVA RC and TSP. **[EOP-008-2 R3]** The SOC is the primary Control Center for the TVA BA and TOp. The ROC is the backup Control Center for the TVA BA and TOp. During RC transition to the backup Control Center the SOC NERC certified System Operators would monitor the system. Each site utilizes the same systems and have their own backup power supplies, and also have fully redundant communications and data exchange capabilities independent of each other. The TVA RC has an Operating Plan that describes the manner in which it continues to meet its functional obligations with regard to the reliable operations of the BES in the event its primary Control Center functionality is lost. The TVA RC will conduct an annual test of its Operating Plan. **[EOP-008-2 R7]** The TVA RC expects that it will take less than two hours to transfer operations to its backup Control Center. **[EOP-008-2 R1]**
- P. The TVA RC reviews the Operating Plan(s) to mitigate operating Emergencies submitted by a TOp or a BA regarding any reliability risks that are identified between Operating Plans. Within 30 calendar days of receipt, the TVA RC will: **[EOP-011-1 R3]**
 - 1. Review each submitted Operating Plan(s) on the basis of compatibility and inter-dependency with other BAs' and TOps' Operating Plans;
 - 2. Review each submitted Operating Plan(s) for coordination to avoid risk to Wide Area reliability; and
 - 3. Notify each BA and TOp of the results of its review, specifying any time frame for resubmittal of its Operating Plan(s) if revisions are identified.

3.2.6 System Restoration

- A. TVA RC has a Reliability Coordinator Area restoration plan, TRANS-TSO-SPP-30.042 TVA RC System Restoration Plan, that provides coordination between individual Member restoration plans and that ensures reliability is maintained during system restoration events. The scope of the RC's restoration plan starts when Blackstart Resources are utilized to re-energize a shut down area of the BES, or separation has occurred between neighboring RCs, or an energized island has been formed on the BES within the RC Area. The scope of the RC's restoration plan ends when all of its Transmission Operators are interconnected and its RC Area is connected to all of its neighboring RC Areas. **[EOP-006-3 R1]** The plan will be implemented by the TVA RC based on the circumstances at the time, island boundaries and operating conditions.

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3.2.6 System Restoration (continued)

- B. TVA RC shall review restoration plan of each Member in its Reliability Coordinator Area in accordance with NERC standard EOP-005 and EOP-006. TVA RC shall determine whether the Transmission Operator's restoration plan is coordinated and compatible with the TVA RC's restoration plan and other Transmission Operators' restoration plans within its Reliability Coordinator Area. TVA RC shall approve or disapprove, with stated reasons, the Transmission Operator's submitted restoration plan within 30 calendar days following the receipt of the restoration plan from the Transmission Operator **[EOP-006-3 R5]**.
- C. The TVA RC will work with its affected Generator Operators, and TOps as well as neighboring RCs to monitor restoration progress, coordinate restoration, and take actions to restore the BES frequency within acceptable operating limits. If the restoration plan cannot be completed as expected the TVA RC will utilize its restoration plan strategies to facilitate System restoration.
- D. TVA RC will monitor restoration progress and coordinate any needed assistance.
- E. The TVA RC will coordinate or authorize resynchronizing islanded area that bridge boundaries between TOps or RCs. If the resynchronization cannot be completed as expected the TVA RC will utilize its restoration plan strategies to facilitate resynchronization.
- F. TVA RC will take actions to restore normal operations once an operating emergency has been mitigated in accordance with its restoration plan.
- G. TVA RC assists the Members in re-establishing normal system configuration and coordinate communications as required.
- H. TVA RC has a copy of its latest restoration plan and copies of the latest approved restoration plan of each Transmission Operator in its Reliability Coordinators Area within its primary and backup control rooms so that it is available to all of its System Operators prior to the implementation date **[EOP-006-3 R6]**.

3.2.7 Coordination and Data Sharing

- A. The TVA RC has Coordination Agreements in place with all of its neighboring Reliability Coordinators. Those are Southwest Power Pool (SPP), Southeastern RC (SOCO), VACAR South, PJM and MISO.
- B. The TVA RC has implemented Operating Procedures, Operating Processes, or Operating Plans, (Operating Guides) for activities that require notification or coordinator of actions that may impact adjacent RC Areas, to support Interconnection reliability. These Operating Guides include, but are not limited to, the following: **[IRO-014-3 R1]**
 - 1. Criteria and processes for notifications
 - 2. Energy and Capacity shortages
 - 3. Control of voltage, including the coordination of reactive resources

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3.2.7 Coordination and Data Sharing (continued)

4. Exchange of information including planned and unplanned outage information to support its Operational Planning Analyses and Real-time Assessments
 5. Provisions for periodic communications to support reliable operations
- C. The TVA RC maintains its Operating Guides identified in 3.2.7 B as follows **[IRO-014-3 R2]**:
1. Reviewed and updated annually with no more than 15 months between reviews
 2. Obtained written agreement from all of the RCs required to take the indicated action(s) for each update
 3. Distributed to all RCs that are required to take the indicated action(s) within 30 days of an update
- D. The TVA RC has a documented specification, TOPS-RC-SPP-30.248 TVA Reliability Coordinator Data and Information Specification, for data necessary to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments. **[IRO-010-2 R1]**
- E. The TVA RC distributes its data specification to entities that have data required by the RC's Operational Planning analyses, Real-time monitoring, and Real-time Assessments. **[IRO-010-2 R2]**
- F. TVA RC Area Members and other RCs provide data as requested to support reliability coordination.

3.2.8 Facility

- A. TVA RC has multi-directional communications capabilities with its Members, and with neighboring Reliability Coordinators, for both voice and data exchange to meet reliability needs of the Interconnection.
- B. TVA RC has detailed Real-time monitoring capability of its Reliability Coordinator Area and sufficient monitoring capability of its surrounding Reliability Coordinator Areas to ensure that potential or actual System Operating Limit or Interconnection Reliability Operating Limit exceedances are identified. TVA RC has monitoring systems that provide information that is easily understood and interpreted by the Reliability Coordinator's operating personnel. Particular emphasis is given to alarm management and awareness systems, automated data transfers, and synchronized information systems, over a redundant and highly reliable infrastructure .
- C. TVA RC monitors Bulk Electric System elements (generators, transmission lines, buses, transformers, breakers, etc.) that could result in SOL or IROL violations within its Reliability Coordinator Area. TVA's RC monitors both real and reactive power system flows, Operating Reserves, and the status of Bulk Electric System elements that are, or could be, critical to SOLs and IROLs and system restoration requirements within its Reliability Coordinator Area.

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3.2.8 Facility (continued)

- D. TVA RC has adequate analysis tools, including state estimation, pre-and post-contingency analysis capabilities (thermal, stability, and voltage), and Wide Area overview displays . TVA RC has detailed monitoring capability of the TVA Reliability Area and sufficient monitoring capability of the surrounding Reliability Coordinator Areas to ensure potential reliability violations are identified. TVA RC continuously monitors key transmission facilities in its area in conjunction with the Members monitoring of local facilities and issues. TVA RC receives SCADA information at a four second per scan update rate and ISN data that updates at least every thirty seconds.
- E. The TVA RC has an Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments. **[IRO-018-1 R1]**
- F. The TVA RC has an Operating Procedure to address the quality of analysis used in its Real-time Assessments. **[IRO-018-1 R2]**
- G. TVA RC ensures that SOL and IROL monitoring and derivations continue if the main monitoring system is unavailable. TVA's RC has provisions for backup tools that shall be exercised if the main monitoring system is unavailable. Communication facilities at the SOC and the BOC are fully redundant and independent from each other.
- H. TVA RC controls its Reliability Coordinator analysis tools, including approvals for planned maintenance. TVA's RC has procedures in place to mitigate the effects of analysis tool outages.
- I. TVA RC has Interpersonal Communication capability with the following entities: **[COM-001-3 R1]**:
 - 1. All Transmission Operators and Balancing Authorities within its Reliability Coordinator Area.
 - 2. Each adjacent Reliability Coordinator within the same Interconnection.
- J. TVA RC has designated the RC back-up cell phone as the Alternative Interpersonal Communication capability. This information has been communicated to the following entities: **[COM-001-3 R2]**.
 - 1. All Transmission Operators and Balancing Authorities within its Reliability Coordinator Area.
 - 2. Each adjacent Reliability Coordinator within the same Interconnection.
- K. TVA RC performs testing of its Alternative Interpersonal Communication capability each calendar month. Results of testing is logged in the RC log utilizing standards log entry. **[COM-001-3 R9]**.

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3.2.8 Facility (continued)

- L. TVA RC utilizes TRANS-TSO-SPP-30.040 Communication Protocol for Phones, Radios and the Intercom System (Section 3.3) procedure for notification process for detection of a failure of its Interpersonal Communication capability lasting in excess of the designated time threshold **[COM-001-3 R10]**.

3.2.9 Staffing

- A. TVA RC staff all operating positions that have the primary responsibility, either directly or through communications with others, for the Real-time operation of the interconnected Bulk Electric System with personnel that are NERC certified for the applicable functions.
- B. The TVA RC is staffed with adequately trained and NERC-certified RC operators, 24 hours per day, and seven days per week. **[PER-004-2 R1]**
- C. TVA RC required to verify capabilities of its personnel's TVA RC BES company specific Reliability-Related Tasks prior to release to work in an on-shift position independently. Each RC identified reliability-related task is verified and signed off with an SME to ensure consistent and accurate evaluation as well as demonstration of competency and accuracy in performance of each task **[PER-005-2 R3]**.
- D. TVA RC operating personnel have a comprehensive understanding of the Reliability Coordinator Area and interactions with neighboring Reliability Coordinator Areas.
- E. TVA RC operating personnel have an extensive understanding of the Balancing Authorities, Transmission Operators, and Generation Operators within the TVA Reliability Coordinator Area, including the operating staff, operating practices and procedures Restoration priorities and objectives, outage plans, equipment capabilities, and operational restrictions.
- F. TVA RC operating personnel place particular attention on SOLs and IROLs and inter-tie facility limits. TVA RC ensures protocols are in place to allow Reliability Coordinator operating personnel to have the best available information at all times. **[PER-005-2 R3]**
- G. TVA's TOPS System Operator Training Process (document TRANS-TRA-SPP-30.043) describes the process by which System Operations personnel are trained to perform their duties, both at entry level and in continuing training status. The Technical Qualification Training Checklists contain competencies for the RC System Operator position. An analysis of the operator position was conducted by Subject Matter Experts (SME), Management, and training representatives to develop the checklist. The checklist provide a way to identify, track, status, and document completion of required initial training for any new System Operator **[PER-005-2 R1]**.

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3.2.9 Staffing (continued)

- H. TVA uses several means to provide initial and continuing training opportunities for System Operators. TVA Technical Training provides much of the corporate and non-technical courses such as Standards of Conduct, Fitness for Duty, Ethics and Employee Conducts and Disciplinary Guidelines. NERC Regulatory and Operations Training supports the development/procurement of technical training for System Operators such as the L&K Computer Based Training series on Transmission System Operations and the SOS training for NERC certification exam preparation. Continuing training is designed to keep System Operators knowledgeable of NERC Reliability Standards, operating policies, tools and equipment, and management expectations. Drills on emergency procedures and simulated exercises are included in continuing training activities. This training also provides sufficient NERC Continuing Education Hours (CEH) in order for the System Operators to maintain their NERC Certification.

- I. Operators in training will work shift with Certified Operators prior to assuming shift independently. By rotating with different Reliability Coordinators the employee is exposed to different ideas and thought processes of those currently holding shift. Only with the input from skilled RCs who have worked with the trainee, completion of the Technical Qualification Training Checklist, and the successful completion of NERC certification, can the supervisor assess the employee's readiness to operate unsupervised. These Technical Qualification Training Checklists are then retained for documentation.

- J. TVA RC is independent of the merchant function. RC does not pass information or data to any wholesale merchant function or retail merchant function (either internal or external) that is not made available simultaneously to all such wholesale merchant functions. An officer of TVA signed the NERC Reliability Coordinators Standards of Conduct on October 13, 2000 and this information is posted on the NERC website. TVA's RC staff has completed training on TVA's Standards of Conduct. Refresher training on TVA's Standards of Conduct is required every year. Training records are maintained.

4.0 RECORDS

4.1 QA Records

None

4.2 Non-QA Records

Technical Qualification Training Checklist

5.0 DEFINITIONS

Definitions not defined within the document are defined in the NERC Glossary of Terms.

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5.0 DEFINITIONS (continued)

Operational Planning Analysis – An evaluation of projected system conditions to assess anticipated (pre-Contingency) and potential (post-Contingency) conditions for next-day operations. The evaluation shall reflect applicable inputs including, but not limited to, load forecasts; generation output levels; Interchange; known Protection System and Special Protection System status or degradation; Transmission outages; generator outages; Facility Ratings; and identified phase angle and equipment limitations. (Operational Planning Analysis may be provided through internal systems or through third-party services.)

Real-time Assessment – An evaluation of system conditions using Real-time data to assess existing (pre-Contingency) and potential (post-Contingency) operating conditions. The assessment shall reflect applicable inputs including, but not limited to: load, generation output levels, known Protection System and Special Protection System status or degradation, Transmission outages, generator outages, Interchange, Facility Ratings, and identified phase angle and equipment limitations. (Real-time Assessment may be provided through internal systems or through third-party services.)

6.0 REFERENCES

Operating Personnel Responsibility and Authority to Meet NERC Compliance (Authority Letter)

SERC Regional Reliability Plan

NERC Reliability Functional Model - Version 5

TRANS-TSO-SPP-30.050, Operational Desk Responsibilities, Communications and NERC-DOE Reporting

TRANS-TSO-SPP-30.040, Communications Protocol for Phones, Radios and the Intercom System

TOPS-RC-SPP-30.248 TVA Reliability Coordinator Data and Information Specifications

TRANS-TSO-SPP-30.207 Next Day Reliability Analysis

TOPS-RC-SOP-30.249 RC Geomagnetic Disturbance Operating Plan Technical Procedure

TRANS-TSO-SPP-30.231 Tennessee Valley Authority Reliability Coordinator Outage Coordination

TVA-SPP-14.310 Bomb Threat, Sabotage, Vandalism, Terrorism, and Other Security-Related Incidents

TOPS-RC-SPP-30.204 TVA RC Capacity and Energy Emergency Plan

TRANS-TSO-SOP-30.504, System Operations Center (SOC) Degradation & Evacuation

TRANS-TSO-SOP-30.505 Regional Operations Center (ROC) Emergency Evacuation

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6.0 REFERENCES (continued)

TRANS-TSO-SPP-30.042 TVA RC System Restoration Plan

TOPS-RC-SPP-30.248 TVA Reliability Coordinator Data and Information Specification

TRANS-TRA-SPP-30.043 Transmission Operations & Power Supply (TOPS) System Operator Training Program

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TVA RC Member Balancing Authorities and Transmission Operators

Associated Electric Cooperative, Inc. (AECI): BA and TOp

Smoky Mountain Transmission (SMT): TOp

Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E / KU):
BA and TOp

Owensboro Municipal Utility (OMU): TOp

Tennessee Valley Authority (TVA): BA and TOp

Memphis Light Gas & Water (MLGW): TOp

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**Appendix B
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Reliability Coordination Agreements

“Reliability Coordination Umbrella and Related Services Agreement” executed by TVA and AECI (09/26/14)

“Reliability Coordination Agreement” executed by TVA and LGEE/KU (08/25/14)

“Memorandum of Understanding” executed by TVA and MLGW (11/22/10)

“Reliability Coordination Agreement” executed by TVA and SMT (11/15/12)

“Reliability Coordination Agreement” executed by TVA and OMU (11/01/14)

“Inter-Organizational Operating Procedure For Reliability Coordination” internal TVA document (02/26/07)

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Adjacent Reliability Coordination Agreements

TVA - PJM: Joint Reliability Coordination Agreement Amount And Between PJM Interconnection, L.L.C., And Tennessee Valley Authority (10/15/14)

TVA - VACAR South: Adjacent Reliability Coordinator Coordination Agreement (06/29/06)

TVA - Southern Company: Adjacent Reliability Coordinator Coordination Agreement (08/28/06)

TVA - SPP: Adjacent Reliability Coordinator Coordination Agreement (05/12/06)

TVA - MISO: Adjacent Reliability Coordinator Coordination Agreement (06/15/11)

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Requirements Statement	Source Document	Implementing Statement
<p>Objective of the Reliability Plan for the TVA RC Area is to ensure and maintain the operational reliability</p>	<p>SERC Regional Reliability Plan</p>	<p>Section 1.0, 3.2.3, 3.2.4</p>
<p>The Reliability Coordinator maintains the Real-time operating reliability of its Reliability Coordinator area and in coordination with its neighboring Reliability Coordinator's wide-area view.</p>	<p>NERC Reliability Functional Model - Version 5</p>	<p>Section 3.1.3</p>
<p>Each Reliability Coordinator shall act to address the reliability of its Reliability Coordinator Area via direct actions or by issuing Operating Instructions.</p>	<p>IRO-001-4 R1</p>	<p>Section 3.1.3</p>
<p>Each Reliability Coordinator shall have and implement Operating Procedures, Operating Processes, or Operating Plans, for activities that require notification or coordination of actions that may impact adjacent Reliability Coordinator Areas, to support Interconnection reliability. These Operating Procedures, Operating Processes, or Operating Plans shall include, but are not limited to, the following..</p>	<p>IRO-014-3 R1</p>	<p>Section 3.1.3, 3.2.7</p>
<p>Each Transmission Operator, Balancing Authority, Generator Operator, and Distribution Provider shall comply with its Reliability Coordinator's Operating Instructions unless compliance with the Operating Instructions cannot be physically implemented or unless such actions would violate safety, equipment, regulatory, or statutory requirements.</p>	<p>IRO-001-4 R2</p>	<p>Section 3.1.6</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Transmission Operator, Balancing Authority, Generator Operator, and Distribution Provider shall inform its Reliability Coordinator of its inability to perform the Operating Instruction issued by its Reliability Coordinator in Requirement R1.</p>	<p>IRO-001-4 R3</p>	<p>Section 3.1.6</p>
<p>Each Reliability Coordinator, Balancing Authority, Generator Owner, Generator Operator, Load-Serving Entity, Transmission Operator, Transmission Owner, and Distribution Provider receiving a data specification in Requirement R2 shall satisfy the obligations of the documented specifications using..</p>	<p>IRO-010-2 R3</p>	<p>Section 3.1.6, 3.2.2</p>
<p>Each Balancing Authority, Reliability Coordinator, and Transmission Operator shall develop documented communications protocols for its operating personnel that issue and receive Operating Instructions.</p>	<p>COM-002-4 R1</p>	<p>Section 3.2.1</p>
<p>Each Balancing Authority, Reliability Coordinator, and Transmission Operator that issues an oral two-party, person-to-person Operating Instruction during an Emergency, excluding written or oral single-party to multiple-party burst Operating Instructions, shall either..</p>	<p>COM-002-4 R5</p>	<p>Section 3.2.1</p>
<p>Each Balancing Authority, Distribution Provider, Generator Operator, and Transmission Operator that receives an oral two-party, person-to-person Operating Instruction during an Emergency, excluding written or oral single-party to multiple party burst Operating Instructions, shall either..</p>	<p>COM-002-4 R6</p>	<p>Section 3.2.1</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall monitor Facilities, the status of Remedial Action Schemes, and non-BES facilities identified as necessary by the Reliability Coordinator, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area.</p>	<p>IRO-002-5 R5</p>	<p>Section 3.2.2, 3.2.4</p>
<p>The Reliability Coordinator shall maintain a documented specification for the data necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments. The data specification shall include but not be limited to..</p>	<p>IRO-010-2 R1</p>	<p>Section 3.2.2, 3.2.7</p>
<p>The Reliability Coordinator shall distribute its data specification to entities that have data required by the Reliability Coordinator’s Operational Planning Analyses, Realtime monitoring, and Real-time Assessments.</p>	<p>IRO-010-2 R2</p>	<p>Section 3.2.2, 3.2.7</p>
<p>Each Reliability Coordinator shall perform an Operational Planning Analysis that will allow it to assess whether the planned operations for the next-day will exceed System Operating Limits (SOLs) and Interconnection Operating Reliability Limits (IROLs) within its Wide Area.</p>	<p>IRO-008-2 R1</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall have data exchange capabilities with its Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for it to perform its Operational Planning Analyses.</p>	<p>IRO-002-5 R1</p>	<p>Section 3.2.3</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall provide its System Operators with the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities.</p>	<p>IRO-002-5 R4</p>	<p>Section 3.2.3</p>
<p>For each IROL (in its Reliability Coordinator Area) that the Reliability Coordinator identifies one or more days prior to the current day, the Reliability Coordinator shall have one or more Operating Processes, Procedures, or Plans that identify actions the Reliability Coordinator shall take or actions the Reliability Coordinator shall direct others to take (up to and including load shedding)..</p>	<p>IRO-009-2 R1</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall have a coordinated Operating Plan(s) for next-day operations to address potential System Operating Limit (SOL) and Interconnection Reliability Operating Limit (IROL) exceedances identified as a result of its Operational Planning Analysis as performed in Requirement R1 while considering the Operating Plans for the next-day provided by its Transmission Operators and Balancing Authorities.</p>	<p>IRO-008-2 R2</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall notify impacted entities identified in its Operating Plan(s) cited in Requirement R2 as to their role in such plan(s).</p>	<p>IRO-008-2 R3</p>	<p>Section 3.2.3</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall notify impacted Transmission Operators and Balancing Authorities within its Reliability Coordinator Area, and other impacted Reliability Coordinators as indicated in its Operating Plan, when the results of a Realtime Assessment indicate an actual or expected condition that results in, or could result in, a System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL) exceedance within its Wide Area.</p>	<p>IRO-008-2 R5</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall notify impacted Transmission Operators and Balancing Authorities within its Reliability Coordinator Area, and other impacted Reliability Coordinators as indicated in its Operating Plan, when the System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL) exceedance identified in Requirement R5 has been prevented or mitigated.</p>	<p>IRO-008-2 R6</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall have data exchange capabilities, with redundant and diversely routed data exchange infrastructure within the Reliability Coordinator's primary Control Center, for the exchange of Real-time data with its Balancing Authorities and Transmission Operators, with other entities it deems necessary, for performing its Real-time monitoring and Real-time Assessments.</p>	<p>IRO-002-5 R2</p>	<p>Section 3.2.4,</p>
<p>Each Reliability Coordinator shall test its primary Control Center data exchange capabilities specified in Requirement 2 for redundant functionality at least once every 90 calendar days. If the test is unsuccessful, the Reliability Coordinator shall initiate action within two hours to restore redundant functionality.</p>	<p>IRO-002-5 R3</p>	<p>Section 3.2.4</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall have monitoring systems that provide information utilized by the Reliability Coordinator’s operating personnel, giving particular emphasis to alarm management and awareness systems, automated data transfers, and synchronized information systems, over a redundant infrastructure.</p>	<p>IRO-002-5 R6</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall ensure that a Real-time Assessment is performed at least once every 30 minutes.</p>	<p>IRO-008-2 R4</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall initiate one or more Operating Processes, Procedures, or Plans (not limited to the Operating Processes, Procedures, or Plans developed for Requirement R1) that are intended to prevent an IROL exceedance, as identified in the Reliability Coordinator’s Real-time monitoring or Real-time Assessment.</p>	<p>IRO-009-2 R2</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall act or direct others to act so that the magnitude and duration of an IROL exceedance is mitigated within the IROL’s Tv, as identified in the Reliability Coordinator’s Real-time monitoring or Real-time Assessment.</p>	<p>IRO-009-2 R3</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall develop, maintain, and implement a GMD Operating Plan that coordinates GMD Operating Procedures or Operating Processes within its Reliability Coordinator Area. At a minimum, the GMD Operating Plan shall include..</p>	<p>EOP-010-1 R1</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall disseminate forecasted and current space weather information to functional entities identified as recipients in the Reliability Coordinator's GMD Operating Plan.</p>	<p>EOP-010-1 R2</p>	<p>Section 3.2.4</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall develop, implement, and maintain an outage coordination process for generation and Transmission outages within its Reliability Coordinator Area. The outage coordination process shall..</p>	<p>IRO-017-1 R1</p>	<p>Section 3.2.4</p>
<p>Other Reliability Coordinators of Balancing Authorities with available resources shall coordinate, as appropriate, with the Reliability Coordinator that has an energy deficient Balancing Authority.</p>	<p>EOP-011-1 Attachment 1</p>	<p>Section 3.2.4</p>
<p>Each Transmission Operator shall operate to the most limiting parameter in instances where there is a difference in SOLs.</p>	<p>TOP-001-4 R18</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator shall operate to the most limiting IROL and Tv in instances where there is a difference in an IROL or its Tv between Reliability Coordinators that are responsible for that Facility (or group of Facilities).</p>	<p>IRO-009-2 R4</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator that initiates the Eastern Interconnection TLR procedure to prevent or mitigate an SOL or IROL exceedance shall identify the TLR level and the congestion management actions to be implemented, and shall update this information at least every clock hour (except TLR-1) after initiation up to and including the hour when the TLR level has been identified as TLR Level 0.</p>	<p>IRO-006-EAST-2 R1</p>	<p>Section 3.2.4</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator with a Sink Balancing Authority that must implement congestion management actions pursuant to the Eastern Interconnection TLR procedure shall, within 15 minutes of receiving the request from the issuing Reliability Coordinator, instruct the Sink Balancing Authority to implement the congestion management actions, subject to the following exception:</p>	<p>IRO-006-EAST-2 R2</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator and Balancing Authority that receives a request pursuant to an Interconnection-wide transmission loading relief procedure (such as Eastern Interconnection TLR, WECC Unscheduled Flow Mitigation, or congestion management procedures from the ERCOT Protocols) from any Reliability Coordinator, Balancing Authority, or Transmission Operator in another Interconnection to curtail an Interchange Transaction that crosses an Interconnection boundary shall comply with the request, unless it provides a reliability reason to the requestor why it cannot comply with the request.</p>	<p>IRO-006-5 R1</p>	<p>Section 3.2.4</p>
<p>Each Reliability Coordinator, upon identification of an expected or actual Emergency in its Reliability Coordinator Area, shall notify other impacted Reliability Coordinators.</p>	<p>IRO-014-3 R3</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator that receives an Emergency notification from a Transmission Operator or Balancing Authority within its Reliability Coordinator Area shall notify, within 30 minutes from the time of receiving notification, other Balancing Authorities and Transmission Operators in its Reliability Coordinator Area, and neighboring Reliability Coordinators.</p>	<p>EOP-011-1 R5</p>	<p>Section 3.2.5</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each impacted Reliability Coordinator shall operate as though the Emergency exists during each instance where Reliability Coordinators disagree on the existence of an Emergency.</p>	<p>IRO-014-3 R4</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator that Identifies an Emergency in its Reliability Coordinator Area shall develop an action plan to resolve the Emergency during those instances where impacted Reliability Coordinators disagree on the existence of an Emergency.</p>	<p>IRO-014-3 R5</p>	<p>Section 3.2.5</p>
<p>Each impacted Reliability Coordinator shall implement the action plan developed by the Reliability Coordinator that identifies the Emergency during those instances where Reliability Coordinators disagree on the existence of an Emergency, unless such actions would violate safety, equipment, regulatory, or statutory requirements.</p>	<p>IRO-014-3 R6</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator shall assist Reliability Coordinators, if requested and able, provided that the requesting Reliability Coordinator has implemented its emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements.</p>	<p>IRO-014-3 R7</p>	<p>Section 3.2.5</p>
<p>Each Responsible Entity shall have an event reporting Operating Plan in accordance with EOP-004-4 Attachment 1 that includes the protocol(s) for reporting to the Electric Reliability Organization and other organizations (e.g., the Regional Entity, company personnel, the Responsible Entity's Reliability Coordinator, law enforcement, or governmental authority).</p>	<p>EOP-004-4 R1</p>	<p>Section 3.2.5</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Responsible Entity shall report events specified in EOP-004-4 Attachment 1 to the entities specified per their event reporting Operating Plan by the later of 24 hours of recognition of meeting an event type threshold for reporting or by the end of the Responsible Entity's next business day (4 p.m. local time will be considered the end of the business day).</p>	<p>EOP-004-4 R2</p>	<p>Section 3.2.5</p>
<p>Under certain adverse conditions (e.g. severe weather, multiple events) it may not be possible to report the damage caused by an event and issue a written Event Report within the timing in the standard. In such cases, the affected Responsible Entity shall notify parties per Requirement R2 and provide as much information as is available at the time of the notification.</p>	<p>EOP-004-4 Attachment 1 Note</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator that has a Balancing Authority experiencing a potential or actual Energy Emergency within its Reliability Coordinator Area shall declare an Energy Emergency Alert, as detailed in Attachment 1.</p>	<p>EOP-011-1 R6</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator shall have a backup control center facility (provided through its own dedicated backup facility or at another entity's control center staffed with certified Reliability Coordinator operators when control has been transferred to the backup facility) that provides the functionality required for maintaining compliance with all Reliability Standards are applicable to the primary control center functionality.</p>	<p>EOP-008-2 R3</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall conduct and document results of an annual test of its Operating Plan.</p>	<p>EOP-008-2 R7</p>	<p>Section 3.2.5</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator, balancing Authority, and Transmission Operator shall have a current Operating Plan describing the manner in which it continues to meet its functional obligations with regard to the reliable operations of the BES in the event that its primary control center functionality is lost.</p>	<p>EOP-008-2 R1</p>	<p>Section 3.2.5</p>
<p>The Reliability Coordinator shall review the Operating Plan(s) to mitigate operating Emergencies submitted by a Transmission Operator or a Balancing Authority regarding any reliability risks that are identified between Operating Plans.</p>	<p>EOP-011-1 R3</p>	<p>Section 3.2.5</p>
<p>Each Reliability Coordinator shall develop and implement a Reliability Coordinator Area restoration plan. The scope of the Reliability Coordinator's restoration plan starts when Blackstart Resources are utilized to re-energize a shut down area of the Bulk Electric System (BES), or separation has occurred between neighboring Reliability Coordinators, or an energized island has been formed on the BES within the Reliability Coordinator Area. The scope of the Reliability Coordinator's restoration plan ends when all of its Transmission Operators are interconnected and its Reliability Coordinator Area is connected to all of its neighboring Reliability Coordinator Areas. The restoration plan shall include:</p>	<p>EOP-006-3 R1</p>	<p>Section 3.2.6</p>
<p>Each Reliability Coordinator shall review the restoration plans required by EOP-005 of the Transmission Operators within its Reliability Coordinator Area.</p>	<p>EOP-006-3 R5</p>	<p>Section 3.2.6</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall have a copy of its latest restoration plan and copies of the latest approved restoration plan of each Transmission Operator in its Reliability Coordinator Area within its primary and backup control rooms so that it is available to all of its System Operators prior to the effective date.</p>	<p>EOP-006-3 R6</p>	<p>Section 3.2.6</p>
<p>Each Reliability Coordinator shall maintain its Operating Procedures, Operating Processes, or Operating Plans identified in Requirement R1 as follows: Review and update annually with no more than 15 months between reviews. Obtain written agreement from all of the Reliability Coordinators required to take the indicated action(s) for each update. Distribute to all Reliability Coordinators that are required to take the indicated action(s) within 30 days of an update.</p>	<p>IRO-014-3 R2</p>	<p>Section 3.2.7</p>
<p>Each Reliability Coordinator shall have data exchange capabilities with its Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for it to perform its Operational Planning Analyses.</p>	<p>IRO-002-5 R1</p>	<p>Section 3.2.3</p>
<p>Each Reliability Coordinator shall implement an Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments...</p>	<p>IRO-018-1 R1</p>	<p>Section 3.2.8</p>
<p>Each Reliability Coordinator shall implement an Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments.</p>	<p>IRO-018-1 R2</p>	<p>Section 3.2.8</p>
<p>Each Reliability Coordinator shall have Interpersonal Communication capability with the following entities:</p>	<p>COM-001-3 R1</p>	<p>Section 3.2.8</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator shall designate an Alternative Interpersonal Communication capability with the following entities..</p>	<p>COM-001-3 R2</p>	<p>Section 3.2.8</p>
<p>Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall test its Alternative Interpersonal Communication capability at least once each calendar month. If the test is unsuccessful, the responsible entity shall initiate action to repair or designate a replacement Alternative Interpersonal Communication capability within 2 hours.</p>	<p>COM-001-3 R9</p>	<p>Section 3.2.8</p>
<p>Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall notify entities as identified in Requirements R1, R3, and R5, respectively within 60 minutes of the detection of a failure of its Interpersonal Communication capability that lasts 30 minutes or longer.</p>	<p>COM-001-3 R10</p>	<p>Section 3.2.8</p>
<p>Each Reliability Coordinator shall be staffed with adequately trained and NERC certified Reliability Coordinator operators, 24 hours per day, seven days per week.</p>	<p>PER-004-2 R1</p>	<p>Section 3.2.9</p>
<p>Each Reliability Coordinator, Balancing Authority, Transmission Operator, and Transmission Owner shall verify, at least once, the capabilities of its personnel, identified in Requirement R1 or Requirement R2, assigned to perform each of the BES company-specific Real-time reliability-related tasks identified under Requirement R1 part 1.1 or Requirement R2 part 2.1.</p>	<p>PER-005-2 R3</p>	<p>Section 3.2.9</p>

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Requirements Statement	Source Document	Implementing Statement
<p>Each Reliability Coordinator, Balancing Authority, Transmission Operator, and Transmission Owner shall verify, at least once, the capabilities of its personnel, identified in Requirement R1 or Requirement R2, assigned to perform each of the BES company-specific Real-time reliability-related tasks identified under Requirement R1 part 1.1 or Requirement R2 part 2.1.</p>	<p>PER-005-2 R3</p>	<p>Section 3.2.9</p>
<p>Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall use a systematic approach to develop and implement a training program for its System Operators as follows</p>	<p>PER-005-2 R1</p>	<p>Section 3.2.9</p>