

RELIABILITY PLAN
for the
SERC
Southeastern Subregion
Reliability Coordinator
July 14, 2016

Introduction

The Southern Company Services is the Southeastern Reliability Coordinator (SeRC) for the Southeastern Subregion of the SERC Region. This document describes the SeRC Reliability Process. The Southeastern Reliability Coordinator members are:

Alabama Power Company
Georgia Transmission Corporation
Georgia Power Company
Gulf Power Company
Municipal Electric Authority of Georgia
Mississippi Power Company
Oglethorpe Power Corporation
Power South Energy Cooperative
Southeastern Power Administration

This document will be revised as needed to reflect changes in these authorities, functions and responsibilities.

I. Reliability Coordinator Responsibility and Authority

The SeRC is an integral component in maintaining the reliability of the Eastern Interconnection and reliability of the Southeastern Subregion power grid.

Reliability Coordinator Responsibilities

The SeRC, in coordination with the members, is responsible for assuring the reliability and integrity of the grid in accordance with NERC Reliability Standards. In addition, the SeRC in coordination with other RCs within the Eastern Interconnection is responsible for ensuring the reliability of the Interconnection.

These responsibilities include:

- Analyze current day operating conditions including ongoing real-time contingency analysis and the monitoring of the BES.
- Perform planning for the next day, with a process to include reliability analyses, identification of special operating procedures in conjunction with the members, and changes in transmission facilities or substation maintenance plans that might be needed.
- Ensure that current and future operating configurations have been adequately modeled and studied for impacts on reliability.

- Implement reliability standards, guidelines and procedures consistent with the NERC reliability requirements.
- Manage SeRC interfaces.
- Communicate and coordinate with other NERC Reliability Coordinators via telephone and satellite phone, and with NERC tools such as the NERC ISN, SDX, RCIS, NERC Hotline and IDC.
- Report suspected or actual physical and cyber threats in the SeRC Reliability Area to the Electricity Sector Information Sharing and Analysis Center (ES-ISAC) via the NERC RCIS.
- Communicate and coordinate energy emergency activities with other NERC Reliability Coordinators.
- Coordinate the restoration of the grid, and direct the actions of members in restoration of generation and load following a system disturbance or emergency.
- Implement the Interconnection-wide transmission loading relief procedure or local procedures to mitigate potential or actual SOLs or IROLs on the transmission system.
- Ensure the integrity of the database(s) used in reliability assessment.
- Safeguard the confidentiality of reliability data provided by members.
- Apply appropriate reliability assessment tools and techniques in power grid reliability analysis and decisions.
- Direct all reliability matters in a fair and non-discriminatory manner, acting in the interests of reliability for the Interconnection before the interests of any member.
- Ensure that all members operate to prevent the likelihood that a disturbance, action, or non-action in the SeRC Reliability Area will result in a SOL or IROL violation in another area of the Interconnection. In instances where there is a difference in derived limits, the SeRC shall resolve any discrepancies. In the event that resolution cannot be reached the SeRC RC and members shall operate the power grid to the most limiting parameter.
- Communicate in a clear, concise, and definitive manner, as necessary, and use 3-part communication when receiving/delivering instructions or status information.
- Follow the procedure for the issuance of directives or Operating Instructions and require 3-part communication as outlined in the procedure.
- Maintain logs and records of decisions and actions and participate in analysis review with members as required.
- Maintain adequate data as required per NERC standards that allow duplicate study results to be made for any instance that the RC directs a member to take significant action to relieve a reliability violation.

Reliability Coordinator Authority

The Southeastern Reliability Coordinator responsibilities include the real time operating, next-day planning, and capacity emergency coordination. The following items describe the authority given to the SeRC to perform up to and including directing the shedding firm load. The SeRC is accountable to the Southeastern Subregion Reliability

Coordinator Operating Committee whose membership is made up of the signatories to the Southeastern Subregion Reliability Coordination Agreement.

Real Time Operating

The SeRC has the authority to perform the following actions as necessary to maintain the reliability of the grid in the Southeastern Subregion:

- Direct the termination of transactions in accordance with NERC standards.
- Direct members to reconfigure the transmission system.
- Direct members to have sufficient operating reserve.
- Request reliability data to perform reliability assessments.
- Coordinate and set interface limits.
- Order interruption of firm load.
- Direct changes to generation to resolve potential reliability issues that cannot otherwise be resolved through transmission reconfiguration.
- Monitor the SeRC Balancing Authorities' parameters to ensure that the required amount of operating reserves is provided and available as required to meet the Disturbance Control Standard requirements.
- Monitor SeRC Balancing Authorities Area Control Error (ACE) values and direct them to mitigate (up to and including shedding load) ACE deviations should they be contributing adversely to Interconnection frequency deviations
- Direct the SeRC Balancing Authorities as necessary to arrange for assistance from neighboring Balancing Authorities.
- Issue Energy Emergency Alerts as needed and at the request of its Balancing Authorities.
- Coordinate, monitor, and, as required, direct grid restoration activities following a system disturbance.
- Determine data requirements to perform Reliability Coordinator tasks.

Next-Day Planning

The SeRC has the authority to perform the following actions as necessary to maintain the reliability of the grid in the Southeastern Subregion:

- Direct changes to planned transmission facilities and substation maintenance activities.
- Direct changes to planned generator maintenance schedules.
- Initiate any conference calls needed to perform its duties and responsibilities.
- Request operations planning data to develop reliability assessments.

Capacity and Energy Emergency Coordination

The SeRC has the authority to perform the following actions as necessary:

- Coordinate Capacity and Energy Emergency assistance including declaring Energy Emergency Alerts for deficient BAs.
- Initiate any conference calls needed to perform its duties and responsibilities.
- Request Capacity Assessment data as needed.

II. Delegation of Tasks

The Southeastern Reliability Coordinator has not delegated any reliability tasks.

III. Reliability Coordinator Operations

The real time operating and the next-day planning responsibilities require the SeRC to utilize different methods of analysis and may result in different kinds of actions. The following will describe the procedures the SeRC will follow.

Real-Time Operating

The SeRC will continuously monitor all grid activities in the Southeastern Subregion. The SeRC should be aware of the Interconnection frequency, voltage profiles, real and reactive flow patterns, generation dispatches, transmission outages and switching, and hourly interchange activities. There should be a complete overall understanding of the Southeastern Subregion power grid at all times. The SeRC will utilize its EMS to monitor and bring attention to important deviations through alarms for designated facilities and important system parameters and, if appropriate, the need for corrective actions by Subregion members.

Upon receiving Time Error Correction information from the Interconnection Time Error Monitor, the SeRC will communicate the start/stop time to the Subregion Balancing Authorities.

Upon receiving GeoMagnetic Disturbance (GMD) information, the SeRC will communicate the anticipated start/stop times of the anticipated disturbance to the Subregion members and instruct them of any system actions (e.g., increased reactive reserves) which may need to be taken.

Contingency Analysis

The RC will utilize tools to perform Contingency Analysis of the power grid. Based upon output of contingency analysis tools and knowledge of real time operating conditions, pre- or post-contingency actions shall be taken as necessary to ensure the reliability of the Southeastern Subregion and Interconnection. The following terms apply to operating conditions:

System Operating Limit (SOL): The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

System Operating Limits are based upon certain operating criteria. These include, but are not limited to:

- Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
- Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits)
- Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability)
- System Voltage Limits (Applicable pre- and post-Contingency Voltage Limits)

Interconnection Reliability Operating Limit (IROL): A System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading Outages that adversely impact the reliability of the grid.

The SeRC will utilize its contingency analysis to monitor SOL's that may become IROLs.

IV. Next-Day Planning

The Southeastern RC has various procedures that it uses to evaluate system reliability anticipated for next-day operations situations such as:

The SeRC members' projected system information is required to generate an accurate analysis for the next-day planning horizon. Information such as transmission equipment status, transmission line ratings, transformer ratings, generator limitations and availability, forecasted loads and interchanges are required.

The SeRC performs Next-Day Planning by conducting off-line contingency analysis studies for the Southeastern Subregion. The Next-Day Planning will be done on a day-ahead basis.

Each study will evaluate single contingencies of all network facilities 69 kV and above and each generator scheduled to be online. Studies will utilize system information provided by members and take into account the expected load levels.

The SeRC will perform a steady-state study each day for the next day to determine if there is a potential reliability problem. If a violation is anticipated, the SeRC operator will communicate with the affected member to coordinate and resolve planned outages or other anticipated conditions that may result in a first contingency violation. Pre-contingency violation mitigations plans are prepared for anticipated next-day violations greater than 10% and reviewed for adequacy by the SeRC. Potential extreme SOL violations are reviewed for the potential to become an IROL in the next-day horizon and mitigation plans developed. Based on next-day study results, if necessary, operational alerts will be issued to the appropriate Subregion members.

The RC shall make study results available no later than 1500 Central Prevailing Time, (CPT) unless circumstances warrant otherwise.

As part of its proactive management of system reliability, the SeRC operator has available to it an “N-1-1 tool” for evaluating the need to commit additional generation resources to provide area protection for voltage and/or thermal line flow problems. The N-1-1 tool will outage a generator as the first contingency followed by the contingency removal of a transmission element to determine if additional online generation resources are required to reliably operate following the loss of a generator. Due to the time often required to start a generating unit, this tool is often used in evaluating next-day system conditions.

The SeRC operator also has available on a 24 hour a day on-call basis, engineering support to evaluate potential voltage and transient stability problems caused by system conditions and configurations which are anticipated in the next-day plan horizon.

V. Current Day and Real Time Analysis

The Southeastern RC has various procedures that it uses to maintain system reliability during current day and real-time operations situations such as:

The monitoring and analysis of current day and real-time operations relies on real time data input specified by the SeRC and provided by the members. The SeRC operator is provided with various system displays showing SeRC Area and neighboring system parameters of interest and with alarming capabilities of important system information. In addition, the SeRC operator is provided with various real-time and study analysis tools for detecting and resolving potential SOL and IROL violations.

The SeRC members provide real time system information as required to generate an accurate state estimation of the Southeastern Subregion and appropriate neighboring portions of the Eastern Interconnection. The model generates a complete solution of the electric system on which the Steady State Contingency Analysis function will run contingency tests.

The steady state contingency analysis is used to determine if the Southeastern Subregion is reliable by:

- Predicting voltages and loadings on transmission lines and equipment as a result of selected future line and equipment outages.
- Aiding the SeRC in the development of a strategy for corrective action to restore the system to a reliable state.

Approximately every ten minutes a real time steady state contingency analysis will be performed based on real-time conditions from the recent state estimator solution. Outage contingencies of all specified network facilities 69 kV and above will be evaluated. These specified contingencies include not only single but some multiple contingency conditions.

Every twenty minutes a complete single contingency of each network transmission facility and each generator (i.e., typically known as N-1) is performed on the entire Southeastern Subregion and those external facilities modeled. Information such as transmission equipment status, transmission line flows, transformer loadings, voltages, generator output, utility loads and interchanges are required for an accurate state estimation.

Upon identifying a potential contingency violation, the SeRC operator will contact the member to further identify the problem and confirm that an operating procedure is in place to mitigate the problem per NERC Reliability Standards. If the mitigation procedure is determined by the SeRC operator to be inadequate, the SeRC operator will take the necessary action to ensure an adequate procedure is developed jointly or the SeRC will direct the procedure to implement.

In addition to the automatic execution of the real-time state estimation and steady-state contingency analysis process, the SeRC has available a study mode set of tools where the operator can evaluate potential near-term future system conditions for potential SOL/IROL problems by varying load, generation output, interchange, transmission/generation status, and reactive resources.

As was noted in the next-day processes, the SeRC operator also has available on a 24 hour a day on-call basis, engineering support to evaluate potential voltage and transient stability problems caused by anticipated system conditions and configurations.

VI. Emergency Operations

The Southeastern RC has various procedures that it uses to maintain system reliability during system emergency operations situations such as:

Capacity and Energy Monitoring

The SeRC monitors the unit commitment and committed resources of the BAs and will request updated information as necessary. If a deficient member requests the SeRC for emergency assistance, the SeRC will request all BAs to identify available emergency power for the deficient member.

Emergency Plan Implementation

In the event of a major system disturbance, the SeRC will coordinate system restoration among all members and neighboring RC areas to restore the system to a normal condition (including the authorization of resynchronizing energized islands), ensure reliability is maintained, and priority is placed on restoring the Interconnection.

Emergency Plans

The SeRC shall be aware of each BA's capacity emergency and TOP restoration plans.

VII. System Restoration

The Southeastern RC has a Restoration Plan that outlines the processes it will use to monitor and coordinate restoration activities internal to and external to the Southeastern RC Area. The plan contains restoration strategies, information gathering protocols, island resynchronization coordination and authorization, reporting and communication expectations and TOP plan expectations used for approval by the Southeastern RC.

The Southeastern RC operator will have available in the control room and be familiar with each Subregion member TOP's restoration plan and those of each neighboring RC where specific plan coordination has been identified.

VIII. Coordination Agreements and Data Sharing

The Southeastern RC has an RC-to-RC agreement with its immediate RC neighbors (MISO, TVA, VACAR-South and FRCC). Each agreement discusses coordination related to restoration, emergency operations, congestion management, outage coordination, facility evacuation and data sharing.

The Southeastern RC has identified the types of data required from the entities in the Subregion and its neighboring RC's and has communicated the information to each entity. Similarly, the Southeastern RC provides required data to neighboring RC's and BA/TOPs via the Eastern Interconnection Data Sharing Network (EIDSN) for use exclusively for reliability purposes.

IX. Facilities

The Southeastern RC primarily operates from an access controlled control room that is secured from both a physical and cyber perspective. The primary facility has back-up, onsite generator support in the event of the loss of distribution system power. The facility also has redundant, multi-directional voice communications and data exchange capabilities necessary to perform its reliability functions with both internal entities and neighboring RC's.

In the event of the loss of the primary control center, a back-up control center is available for the RC operators to relocate to for continued operations. The back-up center data exchange and voice communications is independent of the primary control center. The back-up control center, similar to the primary center, has back-up generation and is access controlled. In the event an evacuation from the primary control center is required, the RC operators have a written procedure to facilitate the relocation and they train on it at least once a year.

The power system analysis and monitoring tools used by the Southeastern RC operators reside at both the primary and back-up control center locations.

Application and telecommunications support is available 24 hours a day, 7 days a week to assist the RC operator with tool, data, and telecommunications problems. The Southeastern RC operator is notified of planned outages to tools, data and telecommunications and is authorized to approved, deny or reschedule the outages if the timing of an outage could adversely impact their capability to maintain system reliability.

X. Staffing

The Southeastern RC is staffed 24 hours a day, 7 days a week with NERC RC-level certified operators who are authorized to either directly or through communications with other operators in the Southeastern Subregion maintain the reliability of the Bulk electric System via actions up to an including shedding firm load. The Southeastern RC Operators are independent of any merchant function and operate as a signatory of the NERC Reliability Coordinator Standards of Conduct (<http://www.nerc.com/filez/sc-soc/signers.html>).

The Southeastern RC operators work a 12 hour shift which rotates over 6 weeks between Days (2 weeks), Relief (1 week), Nights (2 weeks) and Training (1 week) Shifts.

Prior to assuming a shift to work independently, an RC operator must complete several months of On-the-Job Training (OJT) under the guidance of another RC Operator who remains responsible for the RC desk. In addition, toward the end of their OJT period, an RC Operator candidate's knowledge is assessed by their RC peers in a several hour long peer review, by successfully completing a written test, the RC operator is then tested on their ability to perform identified Reliability Related Tasks and assessed by floor management on their knowledge of RC procedures and protocols.

Upon being released to work independently at the RC Desk, RC Operators continue to receive ongoing training during their Training shift. The training program for operators includes review of standards, existing and new procedures, emergency operations, and system restoration. The training program is discussed in detail in the Southern Company Services "Comprehensive Training Program" document.

XI. Business Processes

The SeRC operators utilize an electronic Shift Log tool for documenting system events and actions. In addition to providing a record of such events/activities, the tool provides a mechanism to support shift turnover and situational awareness as SeRC operators assume desk operations during shift change.

Document Change Log

Date	Description of Change
October 1, 2005	Original Document
October 1, 2009	Document Review
June 1, 2013	<ul style="list-style-type: none"> • Remove South Mississippi Electrical Power Association (SMEPA) due to move to MISO RC Area on June 1, 2013 • General document review and reformatting of sections to match RC procedure numbering scheme • Addition of sections II and VII through XI • Added Document Change Log
June 26 th , 2015	Document Review
July 14 th , 2016	Document Fully reviewed <ul style="list-style-type: none"> • Removed references to LSE requesting EEAs. • Referenced issuance of Operating Instructions. • Corrected reference to the EIDSN for data sharing.