



# Congestion Management Methodology

## Reliability Coordinator Area

### Western Interconnection

# 8300EXT00133

**Business Owner:** Derek Hawkins

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**Version:** 3.0

<b>Approved By:</b>	
SME Signature	Date

<b>Approved By:</b>	
Business Owner Signature	Date

## Revision History

Version	Description of Modification	Revision Date	Effective Date
0.1	Original Draft	05/06/2019	
1.0	Approved by WRWG on 7/17/2019.	07/17/2019	
2.0	Added a Total Net Relief Obligation section and defined Market Operator per the NERC Functional Model.	09/30/2020	
2.1	Updated format. Added document identifier.	08/29/2023	
3.0	Threshold for severe loading is 115% for Western Interconnection.	04/01/2024	04/01/2024

## Audience

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> BA Analyst              | <input type="checkbox"/> OAPS  | <input type="checkbox"/> SE                 |
| <input type="checkbox"/> BC                      | <input type="checkbox"/> OIT   | <input type="checkbox"/> Seams and AFC      |
| <input type="checkbox"/> DA                      | <input type="checkbox"/> Ops Eng & Analysis Support                                | <input type="checkbox"/> SS                 |
| <input type="checkbox"/> East RC                 | <input checked="" type="checkbox"/> Mgmt Ops <input type="checkbox"/> Mgmt Markets | <input type="checkbox"/> System Operations  |
| <input type="checkbox"/> EMS MDI                 | <input type="checkbox"/> Ops Planning  | <input type="checkbox"/> Tariff Support     |
| <input type="checkbox"/> FC                      | <input type="checkbox"/> OST   | <input type="checkbox"/> Tech Analyst (URT) |
| <input type="checkbox"/> Market Support/Analysis | <input type="checkbox"/> QC/QA Analyst   | <input type="checkbox"/> TI Analyst         |
| <input type="checkbox"/> Model Coordination      | <input type="checkbox"/> RTBM  | <input type="checkbox"/> WEIS               |
| <input checked="" type="checkbox"/> EXTERNAL     | <input type="checkbox"/> RTP   | <input type="checkbox"/> West RC            |

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## Purpose

This Congestion Management Methodology provides the SPP Reliability Coordinator<sup>1</sup> (RC) established procedures for mitigating System Operating Limit (SOL) and Interconnection Reliability Operating Limit (IROL) exceedances in Real-time operations for both pre- and post-Contingency conditions to secure the safe and reliable operation of the Bulk Electric System (BES) in the Western Interconnection.

## Roles and Responsibilities

The SPP RC must ensure that SOLs and IROLs for the SPP RC Area are established and are consistent with the SPP SOL Methodology – Western Interconnection<sup>2</sup>. Among other options, the SPP RC has the authority to redispatch generation, reconfigure the transmission system, or coordinate load shedding to mitigate an SOL exceedance.

The SPP RC performs the functions outlined in the SPP SOL Methodology – Western Interconnection in accordance with NERC Reliability Standards. This SPP Congestion Management Methodology for the Western Interconnection provides a detailed overview of the procedures used to perform the following congestion management functions in Real-time:

1. The SPP RC ensures that Facilities in the network model, which is the SPP RC Energy Management System (EMS) model, are consistent with the Facility Ratings as provided by TOPs and with the SPP SOL Methodology - Western Interconnection.
2. The SPP RC ensures RC System Operators and engineers have awareness of identified Stability limits and IROLs.
3. The SPP RC performs Real-time monitoring and Real-time Assessments (RTAs) to determine exceedances of reliability limits in accordance with the SOL Methodology – Western Interconnection. The SPP RC mitigates this condition in accordance with NERC Reliability Standards.

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<sup>1</sup> The SPP Reliability Coordinator function divides RC responsibilities between an East RC desk and a West RC desk. The SPP East RC desk is responsible only for facilities in the Eastern Interconnection. The SPP West RC desk is responsible only for facilities in the Western Interconnection. References to “the SPP RC” in this methodology apply to the SPP West RC desk only.

<sup>2</sup> [SPP SOL Methodology – Western Interconnection](#)

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4. The SPP RC's Real-time Contingency Analysis (RTCA) application provides indication of whether acceptable steady-state system performance is being achieved for the post-Contingency state given actual system conditions. The SPP RC shall post its RTCA results in a format that is mutually agreed upon by the SPP RC and SPP RC Area TOPs.
5. The SPP RC utilizes a Real-time voltage stability analysis tool (VSAT) and communicates the results of this tool to impacted TOPs.

## Monitoring SOLs

The SPP RC will use the following situational awareness tools to monitor SOL exceedances, including:

- EMS Alarm Summary
- Real Time Contingency Analysis (RTCA)
- Custom developed applications

## SOL Exceedance

SOLs, which include Facility Ratings, system voltage limits, and stability limitations, are established in the SPP RC Area in the Western Interconnection in accordance with NERC Reliability Standards as described in the SPP SOL Methodology – Western Interconnection.

The SPP SOL Methodology – Western Interconnection considers an SOL exceedance to be a condition characterized by any of the following:

1. Actual/pre-Contingency flow on a Facility is above the Normal Rating.
2. Calculated post-Contingency flow on a Facility is above the highest Emergency Rating.
3. Actual/pre-Contingency bus voltage is outside normal system voltage limits.
4. Calculated post-Contingency bus voltage is outside emergency system voltage limits.
5. Operating parameters indicate a Contingency could result in instability.

## Managing SOL Exceedances

When a Real-time SOL exceedance occurs, or is anticipated to occur, the SPP RC will use the following guidelines, time permitting, to coordinate mitigating actions. Depending on the circumstances and in coordination with the impacted TOP or TOPs, the SPP RC will determine the most efficient and effective option that will provide the required mitigation and will issue Operating Instructions as necessary. The SPP RC is not obligated to use the following guidelines in the numerical order.

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## General Congestion Management Procedure

1. The SPP RC validates the SOL exceedance. The SPP RC contacts the impacted entities (e.g. TOP(s), BA(s), RC(s), etc.) and validates the system conditions, the SOL values and the associated time duration for each available Rating, and any local actions taken or planned to be taken soon, including TOP/local/company op-guides, etc.
2. The SPP RC applies or assists in applying appropriate op-guides, agreements, mitigation plans developed in real time, or procedures, including Unscheduled Flow Mitigation Plan (UFMP).
3. The SPP RC coordinates with BAs which are operating in a manner that results in a significant burden on neighboring entities due to unscheduled flows.
4. The SPP RC evaluates Phase Shifting Transformers (PSTs) for mitigation. This may be performed in parallel or outside of the UFMP. Respecting regulatory requirements, the SPP RC will issue Operating Instructions to the PST operator.
5. The SPP RC evaluates outages impacting the SOL exceedance, and coordinates action for outages that can be recalled.
6. The SPP RC evaluates and coordinates additional transmission reconfiguration (open monitored element, etc.).
7. The SPP RC evaluates and coordinates generation redispatch on a pro-rata gen-to-load available MW impact basis. The RC may communicate re-dispatch obligation to each BA and/or Market Operator<sup>3</sup> utilizing Operating Instructions identifying specific generators or as a Total Net Relief Obligation from the BA or Market Operator. Total Net Relief Obligation allows a BA or Market Operator to participate in re-dispatch of generation in accordance with the methodology illustrated in Step 7(a) utilizing a fleet of generators to achieve a relief as requested by the RC. The Total Net Relief Obligation assigned to a BA, or Market Operator, represents the sum of the relief MW assigned to generators within the BA or to the Market Operator in accordance with the methodology as illustrated below.
  - a) The SPP RC will evaluate resources based on a ranked grouping, where resources are grouped by percent GLDF (GSF – LSF) cutoff, minimum relief available from each resource in the group, and a maximum number of resources in each group. The criteria

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<sup>3</sup> The term “Market Operator” follows the [NERC Functional Model](#) definition - The market entity whose interrelationships with other entities are included in the Functional Model only as an interface point of reliability functions with commercial functions.

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is included in the table below, with the values being reviewed by the WRWG periodically and amended as necessary.

<b>Group</b>	<b>Percent GLDF</b>	<b>Minimum Available Relief in MW</b>	<b>Maximum Number of Units</b>
1	75%	10	5
2	25%	10	5
3	10%	10	5
4	7%	10	5
5	5%	10	5

- i) Resources are ranked by GLDF and assigned to groups based on criteria approved by the WRWG.
  - ii) The SPP RC assigns the needed relief on a pro-rata basis on available relief (GLDF \* available MW) within the first group. If additional relief is required, the SPP RC sequentially moves on to further groups until the required relief obligation is met.
  - iii) Electrically equivalent generators at facilities are considered as a single resource for redispatch evaluation.
  - iv) The SPP RC has discretion on redispatching resources, for example, considering MW and/or time available for relief, due to lack of fuel, slow ramp, etc.
- b) If the process outlined in subbullet a) does not adequately provide relief, the SPP RC will utilize alternative redispatch options to achieve the relief needed.
8. The SPP RC initiates emergency operations with neighboring RC(s), in accordance with NERC Reliability Standards.
  9. The SPP RC evaluates and coordinates load shedding. Load-shed plans will be developed so immediate action can be taken.
  10. The SPP RC will notify impacted TOPs, BAs, and RCs when the exceedance has been mitigated.

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## Total Net Relief Obligation Participation Requirements

In order to opt-in to receive relief obligation from the RC in the form of Total Net Relief Obligation, a BA or Market Operator must:

1. Clearly designate the BA and Market Operator's generators and loads that are participating in Total Net Relief Obligation and identify those loads and generators that are within the BA or Market Operator Area that are not participating and should continue to receive direct instructions from the RC via the host BA. This designation may only change during SPP's monthly model upload with a 45-day minimum advanced notice.
2. Elements participating in a BA's or Market Operator's Total Net Relief Obligation must exist within the SPP West RC area.
3. Agree to SPP RC utilizing its calculated generation to load impact (GLDF\*MW) for a BA or Market Operator to determine the impact and relief assigned and provided by the entity.

If the RC deems a BA or Market Operator participating in the Total Net Relief Obligation is ineffective in complying with the RC's Operating Instructions, then this designation may be terminated.

## General Voltage Management Procedure

1. The SPP RC validates the SOL exceedance. The SPP RC contacts the impacted entities (e.g. TOP(s), BA(s), RC(s), etc.) and validates the system conditions, the SOL values and the associated time duration for each available Rating, and any local actions taken or planned to be taken soon, including TOP/local/company op-guides, etc.
  2. The SPP RC applies or assists in applying appropriate op-guides, agreements, mitigation plans developed in real time, or procedures.
  3. The SPP RC evaluates and coordinates transmission reconfiguration (operate reactive devices, etc.).
  4. The SPP RC evaluates Phase Shifting Transformers (PSTs) for mitigation. Respecting regulatory requirements, the SPP RC will issue Operating Instructions to the PST operator.
  5. The SPP RC evaluates modifying generation voltage schedules.
  6. The SPP RC evaluates outages impacting the SOL exceedance, and coordinates action for outages that can be recalled.
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7. The SPP RC initiates emergency operations with neighboring RC(s), in accordance with NERC Reliability Standards.
8. The SPP RC evaluates and coordinates load shedding. Load-shed plans will be developed so immediate action can be taken.
9. The SPP RC will notify impacted TOPs, BAs, and RCs when the exceedance has been mitigated.

## **Competing Constraints**

SOL exceedances will be addressed using the guidelines outlined in the General Congestion Management Procedure section. The SPP RC will take actions to mitigate SOL exceedances that are occurring or are anticipated to occur.

The SPP RC may use discretion during redispatch or other actions that would harm any pre-existing reliability concerns.

## **Extreme Loading Events**

Cascading can occur when studies indicate that a Contingency results in severe loading on a Facility, triggering a chain reaction of Facility disconnections by relay action, equipment failure or forced immediate manual disconnection of the Facility (for example, due to line sag or public safety concerns). In the event post-contingent loading approaches extreme values (e.g. > 115%) or Real-time loading is > 100%, or IROL exceedance, actions taken should not be limited to the guidelines in the General Congestion Management Procedure section, as this could result in taking unnecessarily long periods of time to get the constraint under the SOL value. In times of severe pre-contingency exceedances, real-time overloads, or IROL exceedances, the SPP RC must determine the most timely action to abate the risk associated with additional contingencies. Reliability goals dictate that if this is not easily determined, the most conservative action (relying on an Operating Instruction) would be the appropriate action to take in reducing the next contingency overload.

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## **Dispute Resolution**

### **Disputes between Entities**

The SPP RC shall make a final determination on the appropriate course of action if a dispute should arise between two or more entities in the SPP RC Area in any situations contemplated by this methodology. The SPP RC will coordinate with neighboring RCs if a dispute on the application of applicable SOL Methodology(ies) or Congestion Management Methodology(ies) should arise between two or more entities in separate RC Areas.

### **Most Conservative Operating Approach**

If, in the application of this methodology, an operational situation should arise where entities (RCs, BAs, TOPs, GOPs) do not agree on actions necessary to maintain reliability of the BES, the most conservative approach will be implemented until such time that additional evidence can resolve the dispute. The SPP RC will coordinate with neighboring RCs if entities involved in a dispute operate in different RC Areas.

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