

## Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard is adopted by the NERC Board of Trustees (Board).

### Description of Current Draft

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	08/19/15
SAR posted for comment	08/20/15 – 09/21/15
Draft Reliability Standard posted for Informal Comment Period	07/14/16 – 08/12/16
45-day formal comment period with ballot	09/29/17 – 11/14/17
45-day formal comment period with ballot	08/24/19 – 10/17/18
45-day formal comment period with additional ballot	06/19/20 – 08/26/20
45-day formal comment period with additional ballot	10/23/20 – 12/07/20
45-day formal comment period with additional ballot	02/19/21 - 04/05/21

Anticipated Actions	Date
10-day final ballot	April 2021
NERC Board adoption	May 2021

## A. Introduction

1. **Title:** Establish and Communicate System Operating Limits
2. **Number:** FAC-014-~~23~~
3. **Purpose:** To ensure that System Operating Limits (SOLs) used in the reliable ~~planning and~~ operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies and that Planning Assessment performance criteria is coordinated with these methodologies.
4. **Applicability**
  - 4.1. **Functional Entities**
    - 4.1.1. Planning Coordinator
    - 4.1.2. Reliability Coordinator
    - 4.1.3. Transmission Operator
    - 4.1.4. Transmission Planner
5. **Effective Date:** April 29, 2009 See Implementation Plan for Project 2015-09.

## B. Requirements and Measures

- R1. ~~The Each~~ Reliability Coordinator shall establish ensure that SOLs, including Interconnection Reliability Operating Limits (IROLs) for its Reliability Coordinator Area in accordance with its System Operating Limit methodology (SOL methodology). [Violation Risk Factor: High ] [Time Horizon: Operations Planning] ~~for its Reliability Coordinator Area are established and that the SOLs (including Interconnection Reliability Operating Limits) are consistent with its SOL Methodology~~
- M1. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation that demonstrates the Reliability Coordinator established IROLs in accordance with its SOL methodology. The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each be able to demonstrate that it developed its SOLs (including the subset of SOLs that are IROLs) consistent with the applicable SOL Methodology in accordance with Requirements 1 through 4.
- R2. ~~The Each~~ Transmission Operator shall establish System Operating Limits (SOLs) for its portion of the (as directed by its Reliability Coordinator) Area in accordance with for its portion of the Reliability Coordinator's Area that are consistent with its Reliability Coordinator's SOL Methodology. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning]
- M2. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation that demonstrates the Transmission Operator established SOLs in accordance with its Reliability Coordinator's SOL methodology. The Reliability

~~Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each have evidence that its SOLs (including the subset of SOLs that are IROLs) were supplied in accordance with schedules supplied by the requestors of such SOLs as specified in Requirement 5.~~

~~R3. The Each Planning Authority Transmission Operator shall provide its establish SOLs, to its Reliability Coordinator Coordinator including IROLs, for its Planning Authority Area that are consistent with its SOL Methodology. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Same-day Operations, Real-Time Operations]~~

~~M3. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation that demonstrates the Transmission Operator provided its SOLs. The Planning Authority shall have evidence it identified a list of multiple contingencies (if any) and their associated stability limits and provided the list and the limits to its Reliability Coordinators in accordance with Requirement 6.~~

~~R4. The Transmission Planner Each Reliability Coordinator shall establish stability limits when an identified instability impacts adjacent Reliability Coordinator Areas or more than one Transmission Operator in its Reliability Coordinator Area in accordance with SOLs, including IROLs, for its Transmission Planning Area that are consistent with its Planning Authority's SOL Methodology. [Violation Risk Factor: High] [Time Horizon: Operations Planning]~~

~~M1-M4. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation that demonstrates the Reliability Coordinator established stability limits in accordance with Requirement R4.~~

~~R3-R5. Each The Reliability Coordinator, Planning Authority, and Transmission Planner shall each provide its SOLs and IROLs to those entities that have a reliability-related need for those limits and provide a written request that includes a schedule for delivery of those limits as follows: [Violation Risk Factor: High] [Time Horizon: Operations Planning, Same-day Operations, Real-Time Operations]~~

~~5.1 The Reliability Each Planning Coordinator and each Transmission Planner within shall provide its SOLs (including the subset of SOLs that are IROLs) to adjacent Reliability Coordinator Area and Reliability Coordinators who indicate a reliability-related need for those limits, and to the SOLs Transmission Operators, Transmission Planners, Transmission Service Providers and Planning Authorities within for its Reliability Coordinator Area (including including the subset of SOLs that are For each IROLs) at least once every twelve calendar months. [Time Horizon: Operations Planning], the Reliability Coordinator shall provide the following supporting information:~~

~~5.2 Identification and status of the associated Facility (or group of Facilities) that is (are) critical to the derivation of the IROL.~~

~~The value of the IROL and its associated  $T_v$ .~~

~~The associated Contingency(ies).~~

~~The type of limitation represented by the IROL (e.g., voltage collapse, angular stability).~~

~~Each impacted Planning Coordinator and each impacted Transmission Operator Planner shall provide any SOLs it developed to within its Reliability Coordinator Area, and to the following information for each established stability limit and each established IROL at least once every twelve calendar months: [Time Horizon: Operations Planning] Transmission Service Providers that share its portion of the Reliability Coordinator Area.~~

~~5.2.1 The value of the stability limit or IROL;~~

~~5.2.2 Identification of the Facilities that are critical to the derivation of the stability limit or the IROL;~~

~~5.2.3 The associated IROL  $T_v$  for any IROL;~~

~~5.2.4 The associated critical Contingency(ies);~~

~~5.2.5 A description of system conditions associated with the stability limit or IROL; and~~

~~5.2.6 The type of limitation represented by the stability limit or IROL (e.g., voltage collapse, angular stability).~~

~~5.3 Each impacted Transmission Operator within The Planning Authority shall provide its SOLs (including the subset of SOLs that are IROLs) to adjacent Planning Authorities, and to Transmission Planners, Transmission Service Providers, Transmission Operators and Reliability Coordinator Areas, the value of the stability limits —established pursuant to Requirement R4 and each IROL established pursuant to Requirement R1, in an agreed upon time frame necessary for inclusion in the Transmission Operator’s Operational Planning Analyses, Real-time monitoring, and Real-time Assessments. [Time Horizon: Operations Planning, Same-day Operations, Real-Time Operations] that work within its Planning Authority Area.~~

~~5.4 Each impacted The Transmission Planner-Operator shall provide its SOLs (including the subset of SOLs that are IROLs) to within its Planning Authority, Reliability Coordinators Area, the information identified in —Requirement R5 Parts 5.2.2 – 5.2.6 for each established stability limit and each established IROL, and any updates to that information within an agreed upon time frame necessary for inclusion in the Transmission Operator’s Operational Planning Analyses. [Time Horizon: Operations Planning, Same-day Operations, Real-Time Operations] Transmission Operators, and Transmission Service Providers that work within its Transmission Planning Area and to adjacent Transmission Planners.~~

~~5.5 Each requesting Transmission Operator within its Reliability Coordinator Area, requested SOL information for its Reliability Coordinator Area, on a mutually agreed upon schedule. [Time Horizon: Operations Planning]~~

5.6 Each impacted Generator Owner or Transmission Owner, within its Reliability Coordinator Area, with a list of their Facilities that have been identified as critical to the derivation of an IROL and its associated critical contingencies at least once every twelve calendar months. [Time Horizon: Operations Planning]

M2-M5. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation, posting to a secure website, or other electronic means, that demonstrates the Reliability Coordinator provided the information in accordance with Requirement R5.

R4,R6. The Each Planning Authority Coordinator and each Transmission Planner shall implement a documented process to use Facility Ratings, System steady-state voltage limits and stability criteria in its Planning Assessment of Near Term Transmission Planning Horizon that are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits and stability described in its respective Reliability Coordinator's SOL methodology. [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning] shall identify the subset of multiple contingencies (if any), from Reliability Standard TPL 003 which result in stability limits.

- The Planning Coordinator may Authority use less limiting Facility Ratings, System steady-state voltage limits and stability criteria if it provides a technical rationale to each affected Transmission Planner, Transmission Operator and Reliability Coordinator. shall provide this list of multiple contingencies and the associated stability limits to the Reliability Coordinators that monitor the facilities associated with these contingencies and limits.
- If the Transmission Planner may use less limiting Facility Ratings, System steady-state voltage limits and stability criteria if it provides a technical rationale to each affected Planning Coordinator, Transmission Operator and Planning Authority does not identify any stability-related multiple contingencies, the Planning Authority shall so notify the Reliability Coordinator.

M6. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation demonstrating the Planning Coordinator and Transmission Planner implemented its documented process in accordance with Requirement R6.

R7. Each Planning Coordinator and each Transmission Planner shall annually communicate the following information for Corrective Action Plans developed to address any instability identified in its Planning Assessment of the Near-Term Transmission Planning Horizon to each impacted Transmission Operator and Reliability Coordinator. This communication shall include: [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]

7.1 The Corrective Action Plan developed to mitigate the identified instability, including any automatic control or operator-assisted actions (such as Remedial Action Schemes, under voltage load shedding, or any Operating Procedures);

- 7.2 The type of instability addressed by the Corrective Action Plan (e.g. steady-state and/or transient voltage instability, angular instability including generating unit loss of synchronism and/or unacceptable damping);
  - 7.3 The associated stability criteria violation requiring the Corrective Action Plan (e.g. violation of transient voltage response criteria or damping rate criteria);
  - 7.4 The planning event Contingency(ies) associated with the identified instability requiring the Corrective Action Plan;
  - 7.5 The System conditions and Facilities associated with the identified instability requiring the Corrective Action Plan.
- M7. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation demonstrating the Planning Coordinator and Transmission Planner communicated the information in accordance with Requirement R7.
- R8. Each Planning Coordinator and each Transmission Planner shall annually communicate to each impacted Transmission Owner and Generation Owner a list of their Facilities that comprise the planning event Contingency(ies) that would cause instability, Cascading or uncontrolled separation that adversely impacts the reliability of the BES as identified in its Planning Assessment of the Near-Term Transmission Planning Horizon. *[Violation Risk Factor: Medium] [Time Horizon: Long- term Planning]*
- M3,M8. Acceptable evidence may include, but is not limited to, dated electronic or hard copy documentation demonstrating the Planning Coordinator and Transmission Planner communicated the information in accordance with Requirement R8.

## C. Measures

- ~~M4.M1.~~ The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each be able to demonstrate that it developed its SOLs (including the subset of SOLs that are IROLs) consistent with the applicable SOL Methodology in accordance with Requirements 1 through 4.
- ~~M5.M1.~~ The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each have evidence that its SOLs (including the subset of SOLs that are IROLs) were supplied in accordance with schedules supplied by the requestors of such SOLs as specified in Requirement 5.
- ~~M6.M1.~~ The Planning Authority shall have evidence it identified a list of multiple contingencies (if any) and their associated stability limits and provided the list and the limits to its Reliability Coordinators in accordance with Requirement 6.

## G.C. Compliance

1. Compliance Monitoring Process
  - 1.1. Compliance Enforcement Authority: Compliance Monitoring Responsibility

“Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions. Regional Reliability Organization

**1.2. Evidence Retention:~~Compliance Monitoring Period and Reset Time Frame~~**

The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

The applicable entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

- The Reliability Coordinator, Transmission Operator, Transmission Planner, Planning Coordinator shall keep data or evidence of Requirements R1 through R8 for the current year plus the previous 12 calendar months.

~~The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each verify compliance through self-certification submitted to its Compliance Monitor annually. The Compliance Monitor may conduct a targeted audit once in each calendar year (January — December) and an investigation upon a complaint to assess performance.~~

~~The Performance Reset Period shall be twelve months from the last finding of non-compliance.~~

**1.5.1.3. Compliance Monitoring and Enforcement Program~~Data Retention~~**

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

~~The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each keep documentation for 12 months. In addition, entities found non-compliant shall keep information related to non-compliance until found compliant.~~

~~The Compliance Monitor shall keep the last audit and all subsequent compliance records.~~

**~~1.6. Additional Compliance Information~~**

~~The Reliability Coordinator, Planning Authority, Transmission Operator, and Transmission Planner shall each make the following available for inspection during a targeted audit by the Compliance Monitor or within 15 business days of a request as part of an investigation upon complaint:~~

~~**1.6.1** SOL Methodology(ies)~~

~~**1.6.2** SOLs, including the subset of SOLs that are IROLs and the IROLs supporting information~~

~~**1.6.3** Evidence that SOLs were distributed~~

~~**1.6.3** Evidence that a list of stability related multiple contingencies and their associated limits were distributed~~

~~**1.6.3** Distribution schedules provided by entities that requested SOLs~~



### Violation Severity Levels:

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	<del>N/A There are SOLs, for the Reliability Coordinator Area, but from 1% up to but less than 25% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R1)</del>	<del>N/A There are SOLs, for the Reliability Coordinator Area, but 25% or more, but less than 50% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R1)</del>	<del>N/A There are SOLs, for the Reliability Coordinator Area, but 50% or more, but less than 75% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R1)</del>	<del>The Reliability Coordinator failed to establish Interconnection Reliability Operating Limits (IROLs) for its Reliability Coordinator Area in accordance with its System Operating Limit Methodology ("SOL methodology"). There are SOLs for the Reliability Coordinator Area, but 75% or more of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R1)</del>
R2.	<del>N/A The Transmission Operator has established SOLs for its portion of the Reliability Coordinator Area, but from 1% up to but less than 25% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R2)</del>	<del>N/A The Transmission Operator has established SOLs for its portion of the Reliability Coordinator Area, but 25% or more, but less than 50% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R2)</del>	<del>N/A The Transmission Operator has established SOLs for its portion of the Reliability Coordinator Area, but 50% or more, but less than 75% of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R2)</del>	<del>The Transmission Operator failed to establish SOLs for its portion of the Reliability Coordinator Area in accordance with its Reliability Coordinator's SOL methodology. The Transmission Operator has established SOLs for its portion of the Reliability</del>

				Coordinator Area, but 75% or more of these SOLs are inconsistent with the Reliability Coordinator's SOL Methodology. (R2)
R3.	<del>N/A</del> There are SOLs, for the Planning Coordinator Area, but from 1% up to, but less than, 25% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R3)	<del>N/A</del> There are SOLs, for the Planning Coordinator Area, but 25% or more, but less than 50% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R3)	<del>The Transmission Operator provided its SOLs to its Reliability Coordinator, but failed to provide its SOLs at the periodicity at which the Reliability Coordinator needs such information to perform its reliability functions.</del> There are SOLs for the Planning Coordinator Area, but 50% or more, but less than 75% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R3)	<del>The Transmission Operator failed to provide its SOLs to its Reliability Coordinator.</del> There are SOLs, for the Planning Coordinator Area, but 75% or more of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R3)
R4.	<del>N/A</del> The Transmission Planner has established SOLs for its portion of the Planning Coordinator Area, but up to 25% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R4)	<del>N/A</del> The Transmission Planner has established SOLs for its portion of the Planning Coordinator Area, but 25% or more, but less than 50% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R4)	<del>N/A</del> The Transmission Planner has established SOLs for its portion of the Reliability Coordinator Area, but 50% or more, but less than 75% of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R4)	<del>The Reliability Coordinator failed to establish stability limits to be used in operations when the limit impacts an adjacent Reliability Coordinator or more than one Transmission Operator in its Reliability Coordinator Area in accordance with its SOL methodology.</del> The

				<del>Transmission Planner has established SOLs for its portion of the Planning Coordinator Area, but 75% or more of these SOLs are inconsistent with the Planning Coordinator's SOL Methodology. (R4)</del>
<b>R5.</b>	<del>The Reliability Coordinator failed to provide one of the items listed in Requirement R5, Parts 5.1 through 5.6. The responsible entity provided its SOLs (including the subset of SOLs that are IROs) to all the requesting entities but missed meeting one or more of the schedules by less than 15 calendar days. (R5)</del>	<del>The Reliability Coordinator failed to provide two of the items listed in Requirement R5, Parts 5.1 through 5.6. One of the following: The responsible entity provided its SOLs (including the subset of SOLs that are IROs) to all but one of the requesting entities within the schedules provided. (R5) OR The responsible entity provided its SOLs to all the requesting entities but missed meeting one or more of the schedules for 15 or more but less than 30 calendar days. (R5) OR The supporting information provided with the IROs does not address 5.1.4</del>	<del>The Reliability Coordinator failed to provide three of the items listed in Requirement R5, Parts 5.1 through 5.6. One of the following: The responsible entity provided its SOLs (including the subset of SOLs that are IROs) to all but two of the requesting entities within the schedules provided. (R5) OR The responsible entity provided its SOLs to all the requesting entities but missed meeting one or more of the schedules for 30 or more but less than 45 calendar days. (R5) OR The supporting information provided with the IROs does not address 5.1.3</del>	<del>The Reliability Coordinator failed to provide four or more of the items listed in Requirement R5, Parts 5.1 through 5.6. One of the following: The responsible entity failed to provide its SOLs (including the subset of SOLs that are IROs) to more than two of the requesting entities within 45 calendar days of the associated schedules. (R5) OR The supporting information provided with the IROs does not address 5.1.1 and 5.1.2.</del>
<b>R6.</b>	<del>N/A The Planning Authority failed to notify the Reliability Coordinator in accordance with R6.2</del>	<del>N/A Not applicable.</del>	<del>The Planning Coordinator or a Transmission Planner used less limiting Facility Ratings, System steady state voltage</del>	<del>The Planning Coordinator or a Transmission Planner failed to implement a process to ensure that Facility Ratings,</del>

			<p><u>limits or stability criteria than the criteria for Facility Ratings, System Voltage Limits or stability described in its respective Reliability Coordinator’s SOL methodology, but failed to provide a technical rationale for allowing the use of less limiting Facility Ratings, System Voltage Limits or stability criteria</u>The Planning Authority identified the subset of multiple contingencies which result in stability limits <del>but</del> did not provide the list of multiple contingencies and associated limits to one Reliability Coordinator that monitors the Facilities associated with these limits. (R6.1)</p>	<p><u>System steady state voltage limits or stability criteria used in Planning Assessment are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits or stability described in its respective Reliability Coordinator’s SOL methodology.</u>The Planning Authority did not identify the subset of multiple contingencies which result in stability limits. (R6)  OR  The Planning Authority identified the subset of multiple contingencies which result in stability limits <del>but</del> did not provide the list of multiple contingencies and associated limits to more than one Reliability Coordinator that monitors the Facilities associated with these limits. (R6.1)</p>
R7.	<u>The Planning Coordinator or a Transmission Planner communicated the identified instability to each impacted Reliability Coordinator and Transmission Operator, but the communication did not</u>	<u>The Planning Coordinator or a Transmission Planner communicated the identified instability to each impacted Reliability Coordinator and Transmission Operator, but the communication did not</u>	<u>The Planning Coordinator or a Transmission Planner communicated the identified instability to each impacted Reliability Coordinator and Transmission Operator, but the communication did not</u>	<u>The Planning Coordinator or a Transmission Planner communicated the identified instability to each impacted Reliability Coordinator and Transmission Operator, but the communication did not</u>

	<u>contain one of the elements listed in Requirement R7, Parts 7.1 through 7.5.</u>	<u>contain two of the elements listed in Requirement R7, Parts 7.1 through 7.5.</u>	<u>contain three elements listed in Requirement R7, Parts 7.1 through 7.5.</u>	<u>contain four or more of the elements listed in Requirement R7, Parts 7.1 through 7.5.</u>  <u>OR</u> <u>The Planning Coordinator or a Transmission Planner failed to communicate any identified instability, to each impacted Reliability Coordinator and Transmission Operator.</u>
<u>R8.</u>			<u>The Planning Coordinator or a Transmission Planner provided the instability, Cascading or uncontrolled separation information listed in Requirement R8 to the applicable Transmission Owner, and Generation Owner, but failed to provide them annually.</u>	<u>The Planning Coordinator or a Transmission Planner failed to provide the instability, Cascading or uncontrolled separation information listed in Requirement R8 to the applicable Transmission Owner, and Generation Owner.</u>

**H.D. Regional Variances**

None.

**I.E. Interpretations**

None.

**J.F. Associated Documents**

Implementation Plan

## Version History

Version	Date	Action	Change Tracking
1	November 1, 2006	Adopted by Board	New
2		Changed the effective date to January 1, 2009 Replaced Levels of Non-compliance with Violation Severity Levels	Revised
2	June 24, 2008	Adopted by Board: FERC Order	Revised
2	January 22, 2010	Updated effective date and footer to April 29, 2009 based on the March 20, 2009 FERC Order	Update
2	April 29, 2015 – July 23, 2015	Incorrectly included TOP as the applicable function for Requirement R5. 7/23/15: Corrected to designate R5 as: RC, PA and TP.	Revised
<u>3</u>		<b><u>Adopted by Board of Trustees</u></b>	<u>Revised</u>