

# Project 2015-09 – System Operating Limits (SOL)

Industry Webinar  
August 3, 2016

**RELIABILITY | ACCOUNTABILITY**



- Background information
- FERC directive(s)
- Project schedule and milestones
- Proposed revisions to FAC-011 and FAC-014
- Question & Answer (Q&A) session

- Project 2015-03 – Periodic Review Team (PRT)
  - Recommendation 1: **Retire** FAC-010-3 – SOL Methodology for the Planning Horizon
  - Recommendation 2: **Revisions needed** to FAC-011-3 – SOL Methodology for the Operations Horizon
  - Recommendation 3: **Revisions needed** to FAC-014-3 – Establish and Communicate SOLs
- Project 2015-09 – System Operating Limits (SOL)
  - Standards Authorization Request (SAR) submitted by PRT
  - Approved by Standards Committee (SC) in August 2015
  - Scope of project: Address issues identified by the PRT and consider recommendations to revise FAC standards to align with existing TPL, TOP and IRO standards.

# Standard Drafting Team Members

Name	Organization/Company
Vic Howell (chair)	Peak Reliability
Hari Singh (vice-chair)	Xcel Energy
David Bueche	CenterPoint Energy Houston Electric
David Hislop	PJM Interconnection
Samuel Jager	Independent Electricity System Operator
Dean LaForest	ISO New England
Thomas Leslie	Georgia Transmission Corp
Jason Smith	Southwest Power Pool
Stephen Solis	Electric Reliability Council of Texas
Aaron Staley	Orlando Utilities Commission
Dede Subakti	California ISO

- [FERC Order No. 777](#): "...NERC should establish a clearly defined **communication structure to assure that IROLs and changes to IROL status are timely communicated to transmission owners.** This structure will better support compliance with the extended applicability of FAC-003-2 to sub-200 kV transmission lines that are an element of an IROL..." (P41)
- [FERC Order No. 817](#): While it appears that **regional discrepancies exist regarding the manner for calculating IROLs**, we accept NERC's explanation that this issue is more appropriately addressed in [the FAC Reliability Standards]...when this issue is considered in Project 2015-19, **the specific regional difference of WECC's 1,000 MW threshold in IROLs should be evaluated in light of the Commission's directive in Order No. 802 (approving Reliability Standard CIP-014) to eliminate or clarify the "widespread" qualifier on "instability" as well as our statement in the Remand NOPR that "operators do not always foresee the consequences of exceeding such SOLs and thus cannot be sure of preventing harm to reliability."** (P27)

Dec 1-2, 2015	Kickoff Standard Drafting Team (SDT) meeting in Atlanta
Jan-April 2016	SDT meetings
May 2016	System Operating Limit (SOL) Technical conference
May-June 2016	SDT meetings
July 8-August 8 2016	Post draft of FAC-011-3 and FAC-014-3 for 30-day informal comment period
Aug-Sept 2016	SDT meetings <b>(Note: August 23-25 SDT meeting at CAISO in Folsom, CA)</b>
Oct 19, 2016	Seek Standards Committee (SC) authorization to post for initial 45-day formal comment and ballot period
Oct 20-Dec 5	Post standards for initial 45-day formal comment and ballot period
Dec 2016	SDT meeting
Jan 2017	If needed, post standards for additional comment and ballot period

- Reliability Standards and definitions that **are** included:
  - FAC-011-3 – SOL Methodology for the Operations Horizon
  - FAC-014-2 – Establish and Communicate SOLs
  - Revisions to definition of SOL
  - New definition of SOL Exceedance
- Reliability Standards and definitions that **are not** included:
  - FAC-010-3 – SOL Methodology for the Planning Horizon
  - Revisions to definition of Interconnection Reliability Operating Limit (IROL)
  - Necessary revisions to existing Reliability Standards to incorporate concepts included in new defined term “SOL Exceedance” (*i.e.*, TOP-002-4 – capitalize SOL Exceedance to incorporate usage of defined term).

# “Summary of Proposed Revisions”

Draft	Actions	Dates	Results	Consideration of Comments
<p><b>Informal Comment Draft</b></p> <p>FAC-011-4</p> <p>FAC-014-3</p> <p><b>Supporting Documents</b></p> <p>FAC-011-4 Unofficial Comment Form (Word)</p> <p>FAC-014-3 Unofficial Comment Form (Word)</p> <p>Summary of Proposed Revisions</p> 	<p>Comment Period</p> <p>Info</p> <p>Submit Comments</p>	<p>07/14/16 - 08/12/16</p>		
<p>Standard Authorization Request</p> <p><b>Supporting Materials</b></p> <p>Unofficial Comment Form (Word)</p>	<p>Comment Period</p> <p>Info</p> <p>Submit Comments</p>	<p>08/20/15 - 09/21/15</p>	<p>Comments Received</p>	
<p><b>Drafting Team Nominations</b></p> <p><b>Supporting Materials</b></p> <p>Unofficial Nomination Form (Word)</p>	<p>Nomination Period</p> <p>Info</p> <p>Submit Nominations</p>	<p>08/20/15 - 09/02/15</p>		

- Proposed revisions focus on aligning FAC standards and treatment of SOLs with the revised TOP and IRO Reliability Standards.
  - Revised TOP and IRO standards effective beginning April 1, 2017.
- Distinguish between the SOL itself vs. the operating practices employed to operate, given the limits.
- FAC standards will provide the methodology for establishing and communicating what the SOL “is” and the TOP and IRO standards will address how operators operate to those limits, using their Operating Plans.

- **TOP-002-4 Requirement R1** – TOP performs Operational Planning Analysis (OPA) to assess whether its planned operations for the next day will exceed its SOLs.
- **TOP-002-4 Requirement R2** – TOP must have an Operating Plan to address any potential SOL exceedance identified in its OPA.
- **TOP-001-3 Requirement R13** – TOP must perform a Real-time Assessment (RTA) every 30 minutes.
- **TOP-001-3 Requirement R14** – TOP must initiate its Operating Plan to address an SOL exceedance identified in its RTA.

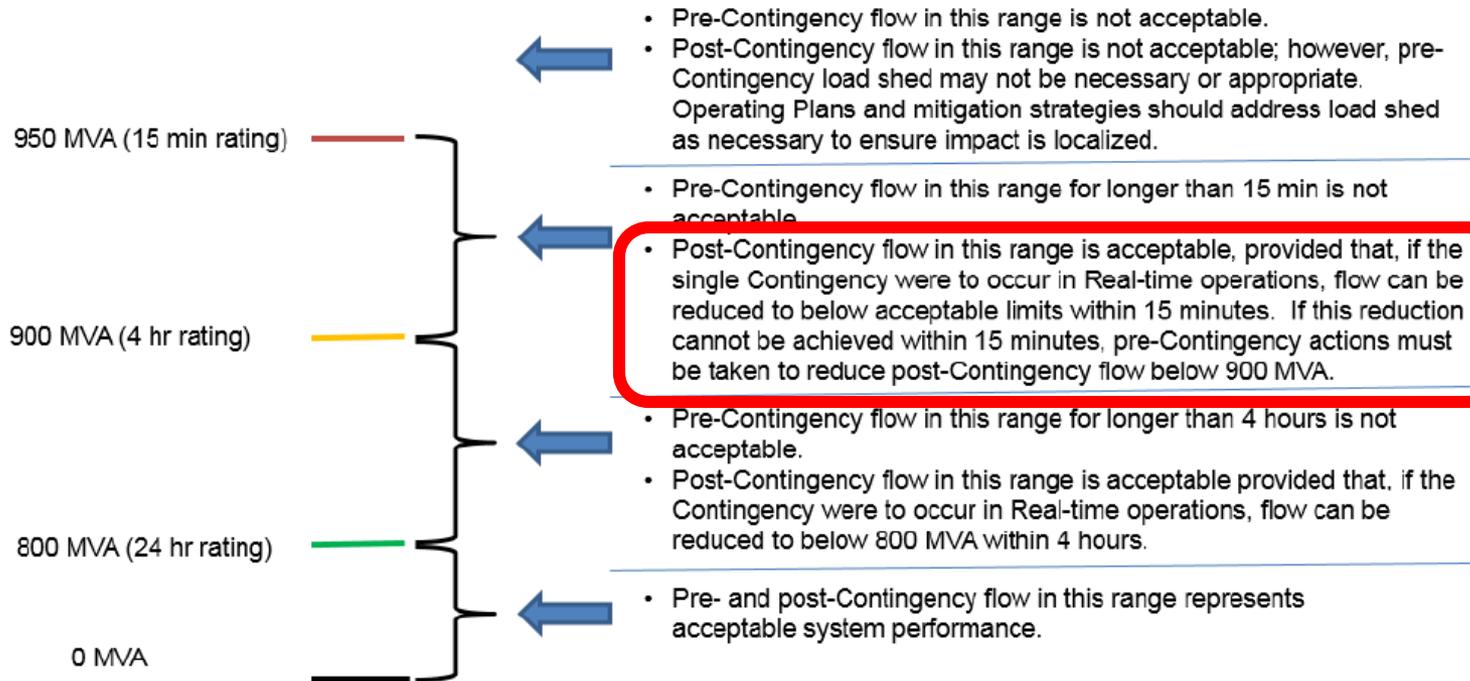
- **IRO-002-4 Requirement R3** – RC monitors Facilities to identify any SOL (and IROL) exceedances.
- **IRO-008-2 Requirement R1** – RC must perform OPA to assess whether next-day operations will exceed its SOLs (and IROLs).
- **IRO-008-2 Requirement R2** – RC to have coordinated Operating Plan for next-day operations to address potential SOL (and IROL) exceedances identified in its OPA.
- **IRO-008-2 Requirement R4** – RC must perform RTA every 30 minutes.
- **IRO-008-2 Requirement R5** – RC to notify TOP/BA when RTA indicates actual or expected condition resulting in SOL (or IROL) exceedance.

- **Operational Planning Analysis (OPA)**: 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 (RTA)**: 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.)

Existing Definition	Revised Definition
<p>“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:</p> <ul style="list-style-type: none"> <li>• Facility Ratings (applicable pre- and post-Contingency Equipment Ratings or Facility Ratings)</li> <li>• transient stability ratings (applicable pre- and post- Contingency stability limits)</li> <li>• voltage stability ratings (applicable pre- and post-Contingency voltage stability)</li> <li>• system voltage limits (applicable pre- and post-Contingency voltage limits)”</li> </ul>	<p>Reliability limits used for operations, to include Facility Ratings, System voltage limits, and stability limitations.</p>

Existing Definition	Proposed Definition
N/A	<p>An operating condition characterized by any of the following:</p> <ul style="list-style-type: none"> <li>• Actual or pre-Contingency flow on a Facility is above the Normal Rating;</li> <li>• Calculated post-Contingency flow on a Facility is above the highest Emergency Rating;</li> <li>• Calculated post-Contingency flow on a Facility is above a Facility Rating for which there is not sufficient time to reduce the flow to acceptable levels should the Contingency occurs;</li> <li>• Actual or pre-Contingency bus voltage is outside normal System voltage limits;</li> <li>• Calculated post-Contingency bus voltage is outside the emergency system voltage limits;</li> <li>• Calculated post-Contingency bus voltage is outside emergency system voltage limits for which there is not sufficient time to relieve the condition should the Contingency occurs; or,</li> <li>• Operating parameters indicate the next Contingency could result in instability.</li> </ul>

# SOL Performance Summary



**Note 1:** Pre-Contingency flow is the actual MVA flow observed on the Facility through Real-time operations monitoring.

**Note 2:** Post-Contingency flow is the calculated MVA flow expected to occur on the Facility in response to a single Contingency as indicated by Real-time Assessments.

**Note 3:** 24 hour, 4 hour, 15 minute ratings are provided as an example for illustration purposes and may be different based on individual TO Rating methodologies.

Figure 1. Facility Rating System Operating Limit Performance Summary

## Question(s) regarding the proposed definitions:

Question 1: Given how the revisions are intended to work together with the revised TOP and IRO Reliability Standards (including the definitions of OPA, RTA and Operating Plan), do you agree with the proposed revisions to the definition of SOL and new definition of “SOL Exceedance”? If not, please explain why you do not support the revisions, and what revisions you propose to align the definition(s) with the revised TOP and IRO Reliability Standards.

Question 2: The suggested revisions would mean that the Facility Ratings, System voltage limits, and stability limitations are the actual SOLs. OPAs and RTAs are performed to determine whether these SOLs may potentially be exceeded (through an OPA) or are actually being exceeded (through a RTA). Operating Plans are developed to address “SOL Exceedances.” **Do you believe the proposed revisions to the definition of SOL (and companion definition of “SOL Exceedance”) allow for a clear distinction between “what the limits are” and “how the system should be operated”?**

Question 3: Do you agree with removing “the most limiting criteria,” “specified system configuration,” “operation within acceptable reliability criteria,” and “pre- and post-Contingency” concepts from the definition of SOL? If no, please explain your concerns.

- **Requirement R1**: Each Reliability Coordinator shall have a methodology for establishing SOLs (“SOL Methodology”) within its Reliability Coordinator Area.
- **Requirement R2**: Each Reliability Coordinator shall include in its SOL Methodology the method for Transmission Operators to determine the applicable Facility Ratings to be used in operations. The method shall address the use of common Facility Ratings between the Reliability Coordinator and the Transmission Operators in its Reliability Coordinator Area.

## Question regarding Requirement R2

**Question 4: Do you agree that the TOP should determine the appropriate Facility Ratings for use in operations, in accordance with the requirements set in the RC SOL Methodology?** Note: This assumes the Facility owner will continue to provide the Facility Ratings to the RC and TOP as currently required under FAC-008. The RC Methodology will simply describe the manner in which the TOP determines which of those owner-provided Facility Ratings are appropriate for use in operations.

- **Requirement R3**: Each Reliability Coordinator shall include in its SOL Methodology the method for Transmission Operators to determine the applicable steady-state System voltage limits to be used in operations. The method shall:
  - 3.1** Require that System voltage limits are not outside of the Facility voltage ratings;
  - 3.2** Require that System voltage limits are not outside of voltage limits identified in Nuclear Plant Interface Requirements;
  - 3.3** Require that System voltage limits are above UVLS relay settings;
  - 3.4** Identify the lowest allowable System voltage limit;
  - 3.5** Address the use of common System voltage limits between the Reliability Coordinator and the Transmission Operators in its Reliability Coordinator Area; and,
  - 3.6** Address coordination of System voltage limits between adjacent Transmission Operators in its Reliability Coordinator Area.

## Questions regarding Requirement R3

**Question 5: Do you agree that the TOP should establish the System voltage limits pursuant to the RC SOL Methodology, and that the proposed Requirement R3 provides sufficient clarity for what the RC SOL Methodology must include?**

**Question 6: Is it clear what System voltage limits are? Does a definition for “System Voltage Limits” need to be created?** A draft definition under consideration by the SDT is “System Voltage Limits: The maximum and minimum steady-state voltages (both Normal and Emergency) that provide for reliable system operations.” Please provide your perspective on whether, currently, it is clear what is meant by System voltage limits, and if not, what you believe to be the appropriate definition.

- **Requirement R4**: Each Reliability Coordinator shall include in its SOL Methodology the method for determining the stability limitations to be used in operations. The method shall:
  - 4.1** Specify stability performance criteria for single Contingencies and for multiple Contingencies (as identified in Requirement R5), including any margins applied. The criteria shall consider the following:
    - 4.1.1** steady-state voltage stability;
    - 4.1.2** transient voltage response;
    - 4.1.3** angular stability; and
    - 4.1.4** System damping.

## **Requirement R4: (cont)**

**4.2** Require that stability limitations are established to meet the BES performance criteria specified in Part 4.1 for the following Contingencies:

**4.2.1** Loss of one of the following either by single phase or three phase Fault to ground with normal clearing, or without a Fault:

- generator;
- Transmission circuit;
- transformer;
- shunt device;
- single pole of a direct current line.

**4.2.2** Loss of any multiple Contingencies identified in Requirement R5.

**4.3** Describe how instability risks are identified, considering realistic levels of transfers, Load and generation dispatch;

**4.4** Consider the stability limitations (and corresponding multiple Contingencies) provided by the Planning Coordinator in accordance with FAC-014-3 Requirement R8;

**4.5** Include a description of the study models, including the level of detail that is required and allowed uses of Remedial Action Schemes (RAS); and,

**4.6** Specify how stability limitations will be established when there is an impact to more than one TOP in its Reliability Coordinator Area.

## Questions regarding Requirement R4

Question 7: Do you agree that the proposed use of the word stability “limitations” is a better choice than “limit” to capture the full breadth of all phenomena and determination methods/time frames for stability concerns?

Question 8: With regard to proposed Part 4.1: Do you agree that the RC SOL Methodology should have criteria that consider *all* items in Parts 4.1.1 – 4.1.4? Are there additional criteria that should be included? If yes, please list and explain. Are there criteria that are included, that you believe should *not* be included?

Question 9: With regard to proposed Part 4.2: Do you agree that the RC SOL Methodology should consider the contingencies listed in Parts 4.2.1 and 4.2.2? Are there additional Contingencies that should be included? If yes, please list and explain. Are there Contingencies that are included, but you believe should *not* be included?

## Questions regarding Requirement R4

Question 10: With regard to proposed Part 4.3: When instability risks are identified, there are various studies or assessments that analyze different transfer levels, load levels and generation dispatch combinations. The intent of Part 4.3 is to ensure that the RC SOL Methodology adequately describes how these various factors are considered in the identification of instability risks. In the identification of stability risks, the RC SOL Methodology should consider the levels of transfers, load and generation dispatch. Should the RC SOL Methodology include a description of any additional types of information?

- a. Should proposed Part 4.3 specifically include “offline analyses”?
- b. Should proposed Part 4.3 include forced Transmission and generation outages (*i.e.*, N-1-1)?
- c. Should proposed Part 4.3 include planned outages (*i.e.*, all planned outages in the base case)?

## Questions regarding Requirement R4

Question 11: With regard to proposed Part 4.3: The SDT used the term “realistic” as opposed to “expected” in order to perform sufficient assessment to identify potential stability risks. The SDT takes that position that “unrealistic” stressing scenarios may be more of an academic exercise to “break the system” and may not translate to actual operations preparedness. Is “realistic” transfer, Load and generation dispatch levels an adequate description or should more clarifying language be added, such as a reference to firm and non-firm transfers?

Question 12: With regard to proposed Part 4.5: Current FAC-011-3 Part 3.1 requires that the study models include the entire RC Area. However, the SDT believes that it is not necessary for reliability that the entire RC Area is studied; instead, the area modeled may vary depending upon the facts and circumstances of the particular footprint or electrical area. Should Part 4.5 require the anything different for description of the study model used? If so, what should else be included and why?

## Questions regarding Requirement R4

Question 13: With regard to proposed Part 4.5: The requirement specifically identifies Remedial Action Schemes (RAS), however other protective schemes (such as UVLS and UFLS) and their impact on stability performance were not included. Should the requirement specifically identify other types of protective schemes? If yes, please describe why.

Question 14: With regard to proposed Part 4.6: Do you agree that the RC SOL Methodology should specifically address this issue?

- **Requirement R5:** Each Reliability Coordinator shall include in its SOL Methodology the method for determining the multiple Contingencies used in the evaluation for potential System instability, Cascading outages or uncontrolled separation.

## Questions regarding Requirement R5

**Question 15:** Do you agree that the RC should continue to have a process to specify the multiple contingencies used in the evaluation for potential System instability, Cascading outages or uncontrolled separation?

**Question 16:** The multiple contingencies referenced in Requirement R5 relate to those stability limitations established under Requirement R4, some of which may be IROLs, while others may not. The intent of SDT was to allow the RC flexibility in developing its RC SOL Methodology so that it can use the list of multiple Contingencies in a manner that is broader than solely for use in establishing IROLs. For example, the multiple Contingencies can be used by the RC in identifying the conditions referenced in Requirement R8. Additionally, the RC could use the multiple Contingencies in its OPA to identify potential instability and Cascading outages. Do you believe an additional requirement is necessary to specifically identify how an entity would implement the multiple Contingencies? If yes, please provide the specific language you propose for the requirement.

- **Requirement R6:** Each Reliability Coordinator shall include in its SOL Methodology the method and criteria for establishing Interconnection Reliability Operating Limits (IROLs). The criteria shall describe the severity and extent of reliability impact that warrants establishment of an IROL, including:
  - 6.1 Unacceptable quantity of load loss due to System instability, Cascading outages or uncontrolled separation;
  - 6.2 Unacceptable quantity of supply loss due to System instability, Cascading outages or uncontrolled separation;
  - 6.3 Unacceptable thresholds for inter-area oscillations (including acceptable damping criteria and criteria for inter-area oscillations versus intra-area oscillations); and,
  - 6.4 Unacceptable impacts on neighboring Reliability Coordinator Areas within an Interconnection.
  
- **Requirement R7:** Each Reliability Coordinator shall include in its SOL Methodology the criteria for developing the IROL  $T_v$  for any IROLs in its Reliability Coordinator Area. Each IROL  $T_v$  shall be less than or equal to 30 minutes.

## Questions regarding Requirement R6

Question 17: Do you agree that the RC SOL Methodology should be required to include *all* of the criteria included in proposed Parts 6.1 through 6.4? Do you believe there are additional criteria that are not currently included, but should be?

Question 18: Should the criteria identified in proposed Parts 6.1 through 6.4 also include a minimum or maximum threshold? If so, what should the thresholds be, and why?

## Question regarding Requirement R7

Question 19: Do you believe the IROL  $T_v$  definition should be modified to remove the 30 minute not-to-exceed time limit, and instead the specific time limit should be identified in the specific Reliability Standard requirement, as appropriate?

- **Requirement R8**: Each Reliability Coordinator shall include in its SOL Methodology the method to address a Real-time operating state, where the next Contingency has the potential to cause System instability, Cascading outages or uncontrolled separation, but was not identified one or more days prior to the current day. The method shall address:
  - 8.1** Thresholds for initiating evaluation of potential impacts;
  - 8.2** A description of when pre-Contingency Load shedding is warranted to mitigate the condition; and,
  - 8.3** A review of the operating state experience for the purpose of determining whether an IROL should be established.

## Questions regarding Requirement R8

Question 20: Do you agree with the proposed approach for addressing this Real-time operating state issue?

Question 21: **Do you believe there should be a timing requirement for implementing actions to address the risk (e.g., 30 min)? If yes, when should the time start? End?**

Question 22: Do you believe that this issue is already addressed in other Reliability Standards (i.e., IRO-009 and EOP-011)? If not, should it be?

Question 23: If the proposed requirement is added, **should a reciprocal requirement be added to require implementation of the method (e.g., possibly a new TOP or IRO requirement)?**

- **Requirement R9**: Each Reliability Coordinator shall issue its SOL Methodology and any changes to the SOL Methodology, prior to the effective date, to:
  - 9.1 Each adjacent Reliability Coordinator within an Interconnection, and each Reliability Coordinator that requested and indicated it has a reliability-related need for the SOL Methodology;
  - 9.2 Each Planning Coordinator and Transmission Planner that models any portion of the Reliability Coordinator Area; and,
  - 9.3 Each Transmission Operator that operates in the Reliability Coordinator Area.

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Question & Answer Session

**RELIABILITY | ACCOUNTABILITY**



- **Requirement R1**: Each Reliability Coordinator shall establish Interconnection Reliability Operating Limits (IROLs) for its Reliability Coordinator Area that are consistent with its System Operating Limit Methodology (“SOL Methodology”) as established in FAC-011-4.
- **Requirement R2**: Each Transmission Operator shall establish SOLs for its portion of the Reliability Coordinator Area consistent with its Reliability Coordinator’s SOL Methodology.
- **Requirement R3**: Each Reliability Coordinator shall determine stability limitations to be used in operations when the limitation impacts more than one Transmission Operator in its Reliability Coordinator Area consistent with its SOL Methodology.

## Question regarding Requirement R1

Question 1: Do you agree with that the Reliability Coordinator (RC) should have primary responsibility for establishing IROLs for its RC Area? If not, please provide your comments on the appropriate break down of responsibilities (between RC and TOP) in establishing IROLs.

## Questions regarding Requirement R2

Question 2: The proposed revisions work together with the proposed revisions to the definition of SOL. The new requirement makes clear that the TOP will establish SOLs in accordance with the RC SOL Methodology. This means that the TOP will follow the RC Methodology to determine: applicable Facility Ratings for use in operations (see, proposed FAC-011-4 Requirement R2); applicable steady-state System voltage limits to be used in operations (see, proposed FAC-011-4 Requirement R3); and, the applicable stability limitations, if any, that are to be used in operations (see, proposed FAC-011-4 Requirement R4). Do you believe that it is clear that the TOP must establish SOLs in accordance with what is outlined in the RC Methodology?

Question 3: TOP application of the RC Methodology will always result in identification of the appropriate Facility Ratings and steady-state System voltage limits, however, it may not always result in identification of stability limitations (this is *only if* there are no applicable limitations specific to the TOP). If there are appropriate stability limitations (identified as a result of implementing the RC method for determining the stability limitations in proposed FAC-011-4 Requirement R4), then the TOP will identify these SOLs. Do you believe this is clear from the language of the requirements (both in FAC-14-3 Requirement R2 combined with the proposed revisions to FAC-011)?

## Question regarding Requirement R3

Question 4: Do you believe that the RC should be responsible for establishing stability limitations used in operations where more than one TOP is impacted?

- **Requirement R4**: Each Reliability Coordinator shall provide the SOLs for its RC Area to adjacent Reliability Coordinators within an Interconnection and Reliability Coordinators who request and indicate a reliability-related need for those limits, and to the Transmission Operators, Transmission Planners, and Planning Coordinators within its Reliability Coordinator Area.
  - 4.1** The Reliability Coordinators shall provide any updates to the SOL values established as part of Requirement R1 or Requirement R3 to impacted TOPs in its Reliability Coordinators Area in a mutually agreeable periodicity and format.

## Questions regarding Requirement R4

Question 5: Do you agree that the RC should be the only entity responsible for providing other entities within its RC Area the established SOLs? If no, do you believe the entity that establishes the SOL (either the RC *or the TOP*) should be the entity that communicates the SOL to other entities?

Question 6: With regard to proposed Part 4.1: Do you believe that the language provides sufficient clarity regarding what is required for communicating updates to dynamically updated limits? If not, what language do you propose?

Question 7: With regard to proposed Part 4.1: Do you believe a specific timeframe should be included that sets the minimum acceptable time for when the RC must provide the communications, or should the RC have flexibility in determining what is appropriate for its particular RC Area?

- **Requirement R5**: Each Reliability Coordinator with an established IROL shall provide the following IROL information to adjacent Reliability Coordinators within an Interconnection, to other Reliability Coordinators that indicate a reliability-related need for the information, and to the Transmission Operators, Transmission Planners, and Planning Coordinators within its Reliability Coordinator Area:
  - 5.1 Identification of the Facilities that are critical to the derivation of the IROL;
  - 5.2 The value of the IROL and its associated IROL  $T_v$ ;
  - 5.3 The associated Contingency(ies); and,
  - 5.4 The type of limitation represented by the IROL (*e.g.*, voltage collapse, angular stability).

## Question regarding Requirement R5

Question 8: Do you agree with the information identified in Parts 5.1 through 5.4? Is there any additional information that the RC should provide regarding IROs? Are there any additional entities that should be included in this requirement and receive the information from the RC?

- **Requirement R6**: Each Reliability Coordinator with an established IROL shall provide the following IROL information to Transmission Owners and Generation Owners within its RC Area:
  - 6.1 Identification of the Facilities that are owned by that entity, which are critical to the derivation of the IROL.
- **Requirement R7**: The Transmission Operator shall provide any SOLs and updates to those limits to its Reliability Coordinator and to the Transmission Service Providers that share its portion of the Reliability Coordinator Area.

## Questions regarding Requirement R6

Question 9: In consideration of the FERC directive regarding **communicating IROL information to the Transmission Owner, do you agree with this proposed new requirement?** If not, please explain the basis for why you do not support the proposed requirement, and the alternative language you are proposing to address the issues raised in FERC Order No. 777.

Question 10: Do you believe a specific timeframe should be included that sets the minimum acceptable time for when the RC must provide the information to the Transmission Owner and Generator Owner?

- **Requirement R8**: Each Planning Coordinator and Transmission Planner shall communicate the results of the stability analysis identified in its Planning Assessment and Transfer Capability assessment to each affected Reliability Coordinator and Transmission Operator. This shall include:
  - 8.1** The type of the instability (*e.g.*, voltage collapse, angular instability, transient voltage dip criteria violation);
  - 8.2** The Contingencies which result in the instability;
  - 8.3** Any Remedial Action Scheme action, under voltage load shedding (UVLS) action, under frequency load shedding (UFLS) action, interruption of Firm Transmission Service, or Non-Consequential Load Loss that was employed (or invoked) to address the instability; and,
  - 8.4** Any Corrective Action Plan associated with the instability.

## Questions regarding Requirement R8

Question 11: Do you agree that there is a reliability-related need for the RCs and TOPs to obtain the information from the Planning Assessment and Transfer Capability analysis for the purpose of identifying instability risks when establishing SOLs (and IROLs)? Are there other “studies” that are currently performed that should also be included in this communication requirement?

Question 12: **Are there additional “studies” or activities that planners should undertake (beyond those currently required in the current standards, including TPL-001-4 and FAC-013-2) to identify instability risks?**

Question 13: With regard to Part 8.3: The SDT believes that the information listed in Part 8.3 is critical for RC and TOP awareness and understanding of the instability risks identified in the planning horizon and the listed mitigation measures employed to address those risks. **Do you agree? If not, please explain why you believe it is not critical that the RC and TOP obtain this information from the planning entities?**

Question 14: Do you agree that this proposed requirement is appropriately placed in FAC-014, or do you believe the proposed requirement should be placed in another standard (*i.e.*, TPL-001-4 and FAC-013-2)?

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Question & Answer Session

**RELIABILITY | ACCOUNTABILITY**



**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Closing Remarks

**RELIABILITY | ACCOUNTABILITY**

