Do not use this form for submitting comments. Use the [electronic form](#) to submit comments on Project 2015-09 Establish and Communicate System Operating Limits. The electronic form must be submitted by 8 p.m. Eastern, October 10, 2018.

Documents and information about this project are available on the [project page](#). If you have questions, contact Principal Technical Advisor, [Darrel Richardson](#) (via email) or at (609) 613-1848.

**Background**

The Reliability Standards that address SOLs – FAC-010, FAC-011, and FAC-014 – have remained essentially unchanged since their initial versions. Since that time, many improvements have been made to the body of reliability standards, specifically those in the TPL, TOP, and IRO family of standards. The former TPL-001, -002, -003, and -004 Reliability Standards have been replaced with TPL-001-4, all of the TOP standards were replaced with the currently effective TOP-001, TOP-002, and TOP-003, and several IRO standards have been replaced as well. One of the primary objectives of Project 2015-09 is to make changes to the FAC standards to create better alignment with the currently effective TPL, TOP, and IRO standards and the revised definitions of Operational Planning Analysis (OPA) and Real-time Assessments (RTA).

Please provide your responses to the questions listed below along with any detailed comments.
Questions

1. Industry response to the draft SOL Exceedance definition indicated numerous significant concerns. Given this response, the SDT concluded that creating a definition of SOL Exceedance which adequately reflects reliable operating principles could create an unnecessary compliance burden if action is not taken to substantially modify the existing TOP and IRO standards. Therefore, the SDT maintained system performance criteria through FAC-011-4 Requirement R6, similar to the approach within the currently effective FAC standards, rather than through an SOL Exceedance definition. Do you agree with the performance criteria in Requirement R6?

☐ Yes
☐ No

Comments:
We are in general agreement over the proposed changes as they essentially maintain the system performance criteria, similar to the approach in the currently effective FAC standards. Our main comments are:

- The proposed standards should require the Reliability Coordinator’s (RC) methodology to establish stability limits when those limits also impact other RC Areas, and that the criteria for the selection of contingency events is defined and applied consistently in all the RC areas, in order to ensure that all IROLs within a defined scope are detected and properly studied.

- Throughout the standard development process for the revisions of the IRO/TOP standards the IESO continued to comment on our serious concern over the proposed retirement of Requirement R4 of TOP-004-2 without having it reinstated in TOP-001-3 or having some of the requirements in TOP-001-3 revised to addressing the reliability need for confirming or reestablishing valid SOLs/IROLs in an unknown or unstudied state. We recognized that by virtue of the proposed definition of Operational Planning Analysis (OPA) and Real-time Assessment (RTA), as well as the new requirement for TOPs to update their OPA results through the performance of an RTA every 30 minutes, that the entities will always be assessing the reliability of the BES. However, this falls short of requiring an entity to determine new/revised limits to begin with. Without knowing the boundaries, performing real-time analysis every 30 minutes does not give the entity an indication if current operations (power flow or voltage levels) exceed the limits that are valid and applicable for the present conditions. These conditions pose unacceptable risks of instability since the operator does not know whether the next contingency will result in system instability.

We recognize that this issue is not within the scope of this project, but is directly related through the methodology that will be used to determine operating limits for these unknown states. In order to better coordinate the development of standards, we recommend that the scope of future
NERC projects should better identify relationships between families of standards at the onset, and encourage potential revisions to related requirements.

2. If you have any other comments regarding FAC-011-4 that you haven’t already provided, please provide them here.

Comments:
We offer the following specific comments:

**Sub-Requirement R4.1.3:**
It is not clear what is meant by “unit” stability. We suggest reverting back to using the current term “angular” stability as it is a term well understood by the industry.

**Sub-Requirement R4.3:**
A main concern is the lack of criteria to define contingencies for the establishment of IROLs. Today, some RCs respect single contingencies, while other respect double contingencies. Given the impact on the Interconnection, it is crucial that criteria for the selection of contingency events is defined and applied consistently in all the RC areas, in order to ensure that all IROLs within a defined scope are detected and properly studied. We recommend that the following wording is added to Sub-Requirement R4.3 to establish SOLs that impact on the Interconnection:

“Describe how the Reliability Coordinator establishes stability limits when there is an impact to more than one Transmission Operator in its Reliability Coordinator Area or other Reliability Coordinator Areas in accordance with its SOL Methodology.”

**Sub-Requirements R5.2 and R5.3**
Sub-Requirements R5.2 and R5.3 require the RC to identify any additional single or multiple Contingency events. We believe that specifying, at a minimum, which contingencies must be respected (similar to Sub-Requirement R5.1.1. for single Contingencies) would improve reliability. In particular, to the extent there is an alignment in respecting the same set of contingencies and performance criteria for IROLs.

Furthermore, the loss of small or radial portions of the system should be acceptable provided the performance requirements are not violated for the remaining bulk power system.

**Sub-Requirement R6.2.2**
Sub-Requirement R6.2.2 should include the same wording as sub-requirement 6.1.2:

“Voltages are within normal System Voltage Limits; however, emergency System Voltage Limits may be used when System adjustments to return the voltage within its normal System Voltage Limits could be executed and completed within the specified time duration of those emergency System Voltage Limits.”
Sub-Requirements R6.3 and R6.4
For consistency purposes, we recommend that Sub-Requirements R6.3 and R6.4 also require to demonstrate that flow through Facilities are within Normal Ratings, similar to Sub-Requirements 6.1.1 and 6.2.1:

“Flow through Facilities are within Normal Ratings; however, Emergency Ratings may be used when System adjustments to return the flow within its Normal Rating could be executed and completed within the specified time duration of those Emergency Ratings.”

Sub-Requirements R7.1 and 7.2
Sub-requirements R7.1 and R7.2 require to describe how to identify IROLs, and to identify the criteria for IROLs which is basically the same thing. We recommend merging these sub-requirements into one:

7.1. A description of the criteria to identify the subset of SOLs that qualify as Interconnection Reliability Operating Limits (IROLs) and for developing any associated IROL Tvs.

R3
Sub-Requirement 3.5 combines two requirements, (1) require a method for determining… and (2) require common use. Sub-Requirement 3.5 should be re-written as “require a method for determining…” as shown below.

We assume that 3.6 and 3.7 intend to “address coordination” within the “method for determining” the limit. As such, that consideration should be rolled into the requirement for “a method for determining…”

Since System Voltage Limits are SOLs, it is unnecessary to explicitly require the operation within the restrictions of System Voltage Limits. Also it is inappropriate to place any system operation requirement (Require the use…) within an operating parameter development methodology. There are already requirements for the system to always be studied and operated within the SOL restrictions of the local reliability entity as well as the SOL of adjacent reliability entities. All requirements for “require the use of common” should be deleted.

3.5 Provide the method for determining the common System Voltage Limits in coordination with adjacent Reliability Coordinators and Transmission Operators.

R4
What is the point of R4.2? If R5 requires that all stability analysis to evaluate the contingencies listed in “5.1. Specify the following single Contingency events for use in determining stability limits and performing OPAs and RTAs.” How can one violate 5 without also violating 4.2? Is this not double jeopardy? The identical requirements are applied to both general SOL stability analysis and OPA/RTA stability analysis. R4.2 is a requirement to comply with R5.1.

Sub requirements 5.3 and 5. 4 are double jeopardy and should be deleted. How can there be any contingencies used “determining the stability limits to be used in operations” that are not completely
identical to the contingencies used in “determining stability limits and performing OPAs and RTAs.” It is impossible to violate 5.3 or 5.4 without simultaneously violating 5.2. We suggest the SDT Re-write 4.2 determining the stability limits to be used in operations as follows and eliminate R5 its entirety:

4.2 Specify the following single Contingency events for use in determining stability limits

4.2.1. Loss of any of the following either by single phase to ground or three phase Fault (whichever is more severe) with Normal Clearing, or without a Fault:

- generator;
- transmission circuit;
- transformer;
- shunt device; or
- Single pole block, with Normal Clearing, in a monopole or bipolar high voltage direct current system.

4.2.2. Identify any additional single or multiple Contingency events or types of Contingency events for use in performing Operational Planning Analysis and Real-time Assessments.

R5

What is the point of R5.2? If 5.2 requires that all stability analysis to evaluate the contingencies listed in “5.1. Specify the following single Contingency events for use in determining stability limits and performing OPAs and RTAs.” How can one violate 5.1 without also violating 4.2? Is this not double jeopardy? The identical requirements are applied to both general SOL stability analysis and OPA/RTA stability analysis. R4.2 is a requirement to comply with R5.1. Sub requirements 5.3 and 5.4 are double jeopardy and should be deleted. It is impossible to violate 5.3 or 5.4 without simultaneously violating 5.2. Re-write 4.2 as follows and eliminate R5 its entirety.

4.2 Specify the following single Contingency events for use in determining stability limits

4.2.1. Loss of any of the following either by single phase to ground or three phase Fault (whichever is more severe) with Normal Clearing, or without a Fault:

- generator;
- transmission circuit;
- transformer;
- shunt device; or
- Single pole block, with Normal Clearing, in a monopole or bipolar high voltage direct current system.

4.2.2. Identify any additional single or multiple Contingency events or types of Contingency events for use in performing Operational Planning Analysis and Real-time Assessments.
3. The SDT acknowledges that requirement R6 could alternatively be located within a TOP or IRO standard; however, the Project 2015-09 SAR does not specifically authorize the SDT to modify those standards. The SDT is seeking feedback specific to the content of the requirement not where it should reside. Proposed Requirement R6 was created to correspond with FAC-011-4 Requirement R6 in lieu of creating a definition for SOL Exceedance. Do you agree with Requirement R6?

☐ Yes
☒ No

Comments:

However, we have the same comment as with Question 1:

Throughout the standard development process for the revisions of the IRO/TOP standards the IESO continued to comment on our serious concern over the proposed retirement of Requirement R4 of TOP-004-2 without having it reinstated in TOP-001-3 or having some of the requirements in TOP-001-3 revised to addressing the reliability need for confirming or reestablishing valid SOLs/IROLs in an unknown or unstudied state.

We recognize that this issue is not within the scope of this project, but is directly related through the methodology that will be used to determine operating limits for these unknown states. In order to better coordinate the development of standards, we recommend that the scope of future NERC projects should better identify relationships between families of standards at the onset, and encourage potential revisions to related requirements.

4. If you have any other comments regarding FAC-014-3 that you haven't already provided, please provide them here.

Comments:

Requirement R4:
Similar to our comment on Sub-Requirement 4.3 (FAC-011-4) in Question 2, a main concern is the lack of criteria to define contingencies for the establishment of IROLs. Today, some RCs respect single contingencies, while other respect double contingencies. Given the impact on the Interconnection, it is crucial that criteria for the selection of contingency events is defined and applied consistently in all the RC areas, in order to ensure that all IROLs within a defined scope are detected and properly studied. We recommend that the following wording is added to Requirement R4 to establish SOLs that impact on the Interconnection:

“Each Reliability Coordinator shall establish stability limits to be used in operations when the limit impacts more than one Transmission Operator in its Reliability Coordinator Area or other Reliability Coordinator Areas in accordance with its SOL Methodology.”
Sub-Requirement R5.2.5
A description of the associated system conditions is normally included in the RC’s methodology as part of Requirement R4.4 in FAC-011-4. The sub-requirement R5.2.5 can be removed as it is redundant with Requirement R4.4 in FAC-011-4.

5. The original posting of FAC-015-1 included six requirements. Industry comments to this original version indicated significant concerns. In response to these concerns, the SDT attempted to streamline and clarify the intended interactions between relevant functional entities and to consolidate the standard into fewer requirements. To achieve this the SDT:

- Consolidated Requirements R1 – R5 in the original posting into three (R1 – R3) requirements,
- Clarified the roles of the Planning Coordinator and Transmission Planner in Requirements R1 – R3, and
- Clarified that Facility Ratings are “owner-provided” in Requirement R1.

The SDT acknowledges that some of the requirements in FAC-015-1 could alternatively be located within other standards such as TPL, MOD, etc.; however, the Project 2015-09 SAR does not currently authorize the SDT to modify those standards. The SDT is seeking feedback specific to the content of the requirement not where it should reside. Do you support the revised FAC-015-1?

Please provide any other comments regarding FAC-015-1.

☐ Yes
☒ No

Comments:

Requirement 1
The intent of Requirement 1 stated in the Rationale for FAC-015-1 “is not to change, limit, or modify Facility Ratings determined by the equipment owner per FAC-008. The intent is to utilize those owner-provided Facility Ratings such that the System is planned to support the reliable operation of that System.” Requiring the Planning Coordinator to change ratings to what is provided to the Reliability Coordinator is contrary to established NERC criteria. The requirement as written would require planning to use different ratings than what is provided for the purposes of planning under MOD-032-1 and FAC-008-3 which is contrary to the stated purpose of the standard. As the Transmission Owners are already obligated to provide planning and operating ratings under FAC-008-3 and MOD-032-1, the burden of establishing a technical justification for potentially different ratings used in planning and operations should be placed upon Functional Entities who own facilities (such as Transmission or Generation).

Requirement 2
The rationale provided for Requirement #2 has strong ties to NERC TPL-001. The intent of this requirement is to try and ensure that Planning is fulfilling its role to determine potential reliability deficiencies of the future planned system and to develop Corrective Action Plans to resolve the reliability concerns. This requirement is viewed as a supplement of TPL-001-4 R5.

The voltage requirements stated in TPL-001-4 R5 essentially state that Planning TPL assessments need to have criteria (and document that criteria) for:

- Acceptable system steady state voltage limits
- Post-contingency voltage deviations
- Transient voltage response
  - For this criteria at minimum the criteria need to specify a low voltage level and maximum length of time that the transient voltages may remain below that level.

The idea to implement R2 would be to state our requirements as exactly what is put forward in the RC SOL methodology. In reviewing the criteria for the RC SOL methodology, the above criteria for the TPL standard are all achieved with the exception of post-contingency voltage deviation.

Our recommendation would be that FAC-011-4 R4 list include criteria for post-contingency voltage deviation.

**Requirement 3**

While the rationale provided for Requirement #3 attempts to have ties to NERC TPL-001, no specific requirement of the TPL standard is identified (like there is in FAC-015-1 R2’s rationale).

**Requirement 4**

The rationale for R4 does not provide justification for the inclusion of Transfer Capability Assessments to be included in this requirement. NERC should clarify as to how referencing to FAC-013 plays a role in the requested communication in FAC-015 R4. Further, if the Transfer Capability Assessment respects known SOLS (R1.2) there would be no reporting in FAC-015 regarding Transfers. Further FAC-015 R4.6 requires discussion of corrective action plans which are not required as part of the Assessment of Transfer Capability. It seems that their argument for rationalizing this standard is circular to existing standards. For example, the rationale states, “the details required by Requirement R4 will supplement the severe system conditions identified in Requirements R4 Parts 4.4 and 45 of the TPL-001-4”. The TPL standard requires that entities evaluate the events that may produce the more severe system impacts. It is unclear how reporting this information per the FAC-015 standard will improve the TPL assessments. It is also unclear how this information in the near-term planning horizon will benefit the entities to which this information is provided. Instead, when violations are observed in the Planning Horizon, corrective Action Plans should be developed which resolve the violation.
6. Discussions within the SDT indicated concerns with eliminating some of the components of the approved SOL definition. While the industry feedback was largely supportive of the draft SOL definition provided in the informal posting, the SDT modified the proposed definition to incorporate some of the concepts in the approved version. The SDT believes that the revised definition posted for ballot represents an improvement over the definition provided in the informal posting. Reference the SOL rationale document for more information. Do you agree with the proposed SOL definition?

☐ Yes
☐ No

Comments:
We agree with the proposed SOL definition. A minor comment is to change the singular term SOL to plural SOLs to align with the plural form for limits in the proposed definition.

7. With the retirement of FAC-010, and the elimination of Planning-based SOLs and IROLs, do you agree with the changes to CIP-014, FAC-003, FAC-013, PRC-002, PRC-023 and PRC-026?

☐ Yes
☒ No

Comments:
It is our understanding that ‘Planning Assessment’ in the proposed change from referring to IROLs to “…, per its Planning Assessment of the Near-Term Transmission Planning Horizon or its Transfer Capability Assessment (Planning Coordinator only) as Facilities that if lost or degraded are expected to result in instances of instability, Cascading, or uncontrolled separation” refers to studies performed for the Near-Term Transmission Planning Horizon per NERC Reliability Standard TPL-001-4. The term Planning Assessment is in the NERC ‘Glossary of Terms Used in NERC Reliability Standards’ defined as “Documented evaluation of future Transmission System performance and Corrective Action Plans to remedy identified deficiencies.” To reduce the risk of continued inconsistency, we propose to add “technical analyses such as its” to the text replacing the previous reference to IROLs as well as a minor editorial change to the reference to Transfer Capability assessment in all applicable NERC Reliability Standards listed in Project 2015-09 as well as, if approved, to NERC Reliability Standard CIP-006-2. Hence, we proposed the text replacing the reference to IROLs to read “…, per technical analyses such as its Planning Assessment of the Near-Term Transmission Planning Horizon or the Planning Coordinator’s Transfer Capability assessment, as Facilities, that, if lost or degraded are expected to result in instances of instability, Cascading, or uncontrolled separation.”

We agree with changes to reflect the elimination of Planning-based SOLs and IROLs for CIP-014, FAC-003, FAC-013, PRC-002, and PRC-023.
However, we do not agree with the change to the PRC-026 standard. The Planning Coordinator requires the Reliability Coordinator to provide those SOLS that are based on angular stability in order to assess Criteria 1 and 2 of Requirement R1. We suggest revising Requirement R1 to require the Reliability Coordinator provide the Planning Coordinator with those SOLs that are based on angular stability.