NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Rationale for FAC-011-4

~~September 2017~~
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Requirement R1

R1. Each Reliability Coordinator shall have a documented methodology for establishing ~~SOL~~SOLs (i.e., SOL Methodology) within its Reliability Coordinator Area.

Rationale R1

The three subparts in Requirement R1 in currently-effective Reliability Standard FAC-011-3 are either not necessary for reliability, or they are addressed through other mechanisms in FAC-011-4 and therefore are not included as part of Requirement R1.

Requirement R1.1 in currently-effective FAC-011-3 requires ~~that~~ the SOL Methodology ~~shall~~ "be applicable for developing System Operating Limits (SOLs) used in the operations horizon~~.~~." The revised Requirement R1 is applicable to the Operations Planning Time Horizon. Accordingly, there is no reliability-related need to have a requirement specifying that the Reliability Coordinator's (RC's) SOL Methodology is applicable for developing SOLs used in the operations horizon. Additionally, the purpose of the standard references SOLs used in the reliable operation of the BES.

Requirement R1.2 in currently-effective FAC-011-3 requires ~~that~~ the SOL Methodology to "state that SOLs shall not exceed associated Facility Ratings~~.~~." Facility Ratings to be used in operations as ~~System Operating Limits (~~SOLs~~)~~ are addressed through FAC-011-4 Requirement R2 and therefore, is not addressed as a subpart of R1.

Requirement R1.3 in currently-effective FAC-011-3 requires ~~that~~ the SOL Methodology to "include a description of how to identify the subset of SOLs that qualify as ~~Interconnection Reliability Operating Limits (~~IROLs~~).~~." This language is preserved in Requirement ~~R6~~R7.

Requirement R2

R2. Each Reliability Coordinator shall include in its SOL Methodology the method for Transmission Operators to determine ~~the applicable~~which owner-provided Facility Ratings are to be used in operations~~. The method shall address the use of common Facility Ratings between the Reliability Coordinator and~~ such that the Transmission ~~Operators in~~Operator and its Reliability Coordinator ~~Area~~use common Facility Ratings.

Rationale R2

The reliability objectives of Requirement R2 are 1) to ensure ~~that~~ the owner-provided Facility Ratings that are selected for use in operations are determined in accordance with the RC's SOL Methodology, and 2) to ensure the consistent use of applicable Facility Ratings between RCs and their Transmission Operators (TOP). For example, if a Transmission Owner (TO) provides three levels of Facility Ratings pursuant to Reliability Standard FAC-008-3, and another TO provides five levels of ratings, the RC will

establish the method for the TOPs to determine which of those Facility Ratings will be utilized in common with the TOP and the RC for monitoring and assessments.

The intent of Requirement R2 is not to change, limit, or modify Facility Ratings determined by the equipment owner. The equipment owner is still the functional entity responsible for determining ~~the~~ Facility Ratings per FAC-008. The intent is to use those owner-provided Facility Ratings in a consistent manner between ~~the TOP~~RCs and ~~RC~~their TOPs during operations.

Requirement R3

R3. Each Reliability Coordinator shall include in its SOL Methodology the method for Transmission Operators to determine the System Voltage Limits to be used in operations. The method shall:

3.1. Require that BES ~~buses/stations~~ bus/station have an associated System Voltage Limit ~~except for~~, unless the ~~BES buses/stations that may be excluded as specified in the Reliability Coordinator's~~Reliabilty Coordinators SOL Methodology specificall allows the exclusion of BES buses/stations from the requirement to have an associated System Voltage Limit;

3.2. Require that System Voltage Limits respect ~~the~~ voltage-based Facility ~~voltage~~ Ratings;

3.3. Require that System Voltage Limits are ~~higher~~greater than or equal to in-service ~~undervoltage~~relay settings for under voltage load shedding ~~(UVLS) relay settings~~systems and Undervoltage Load Shedding Programs;

3.4. Identify the lowest allowable System Voltage Limit;

3.5. Require the use of common System Voltage Limits between the ~~Reliability Coordinator and the~~ Transmission ~~Operators in~~Operator and its Reliability Coordinator ~~Area~~and provide the method for determining the common System Voltage Limits to be used in operations;

3.6. ~~Require~~Address coordination of System Voltage Limits between adjacent Transmission Operators in its Reliability Coordinator Area; and

3.7. ~~Require~~Address coordination of System Voltage Limits between adjacent Reliability Coordinator Areas within an Interconnection.

Rationale R3

System Voltage Limits (SVLs) are intended to provide reliable pre- and post-contingency System performance for operations within ~~a Reliability Coordinator Area and across neighboring Reliability Coordinator Areas.~~each RC Area. The proposed definition of System Voltage Limits includes normal and emergency voltage limits, and can also include time-based voltage limits, depending on what the RC requires. It is expected that the RC would require a set of System Voltage Limits to cover the entire BES system within its ~~Reliability Coordinator~~RC Area for ~~facility~~voltage-based ~~voltage limits~~Facility Ratings, voltage instability, voltage collapse and misactuation of relay elements.

Both high and low limits are required. High limits tend to be associated with equipment/facility limitations. Low limits are often used to prevent phenomena associated with low voltages such as system instability, voltage collapse, and potential misactuation of relay elements. Identifying the set of "System Voltage Limits", both high and low, assures that all voltage limits associated with a particular bus or station, or the equipment connected to it, have been considered and the most limiting are used.

While all BES buses/stations have equipment related voltage ratings, there may be reasons that certain buses/stations do not require a System Voltage ~~limit~~Limit. Part 3.1 allows RCs to identify certain buses/stations that may be excluded from having an associated System Voltage Limit. These exempt buses/stations should be identified in the RC's SOL Methodology with appropriate reasoning. The identification of such buses/stations could be documented by citing the type of buses/stations (based on voltage level or area of the System) as opposed to a more detailed list of individual buses/stations which are exempt.

Buses or stations may not require System Voltage Limits when the voltage at the station has no material impact on System performance and associated SOLs. For example, System Voltage Limits at neighboring/nearby stations may be sufficient to protect the facilities from high voltage, and the System from instability, voltage collapse, and misactuation of relay elements.

Parts 3.5-3.7 ~~identifies~~identify the RC as the entity responsible for developing the overall method for TOPs and RCs to determine and coordinate System Voltage Limits in their areas and neighboring areas.

Part 3.2 provides that in establishing System Voltage Limits, the SOL Methodology shall respect any voltage-based Facility ~~voltage~~ Ratings established by the Generation Owner or TO under FAC-008. Recognizing that voltage limits are difficult to reflect by facility, the System Voltage Limits provided for stations/buses should reflect any voltage-based Facility ~~voltage~~ Ratings for facilities that terminate at, or are adjacent to the stations/buses with System Voltage Limits.

FERC Order No. 818 issued November 19, 2015, states that ~~UVLS~~Undervoltage Load Shedding Programs (UVLS) should not be triggered for an N-1 Contingency. As such, under Part 3.3, the SOL Methodology shall ensure System Voltage Limits are not set ~~above all~~at values less than UVLS settings to avoid UVLS operation following N-1 Contingencies.

Requirement R4

R4. Each Reliability Coordinator shall include in its SOL Methodology the method for determining the stability limits to be used in operations. The method shall:

4.1 Specify stability performance criteria, including any margins applied. The criteria shall, at a minimum, include the following:

4.1.1 steady-state voltage stability;

4.1.2 transient voltage response;

4.1.3 ~~angular~~unit stability; and

4.1.4 System damping~~;~~.

4.2 Require that stability limits are established to meet the criteria specified in Part 4.1 for the Contingencies identified in Requirement R5~~;~~.

4.3 Describe how the Reliability Coordinator establishes stability limits when there is an impact to more than one Transmission Operator in its Reliability Coordinator Area~~;~~.

4.4 Describe how ~~instability risks~~stability limits are ~~identified~~determined, considering levels of transfers, Load and generation dispatch, and System conditions including any changes to System topology such as Facility outages;

4.5 Describe the level of detail that is required for the study model(s~~),~~; including the extent of the Reliability Coordinator Area, as well as the critical modeling details from other Reliability Coordinator Areas, necessary to determine different types of stability limits.

4.6 Describe the allowed uses of Remedial Action Schemes ~~(RAS)~~ and other automatic post-Contingency mitigation actions[1] in establishing stability limits used in operations.

4.4. State that the use of underfrequency load shedding (UFLS) programs and Undervoltage Load Shedding Programs are not allowed in the establishment of stability limits.

Rationale R4

Reliability Standard FAC-011-3 currently requires the System to demonstrate transient, dynamic, and voltage stability for both pre- and post-contingent states, but does not provide specifics. By requiring specific stability criteria within the SOL Methodology, the standard is improved and provides greater clarity and uniformity on practices across the industry. The set of commonly used stability criteria specified in Requirement R4 Part 4.1 is based upon information provided by standard drafting team members and observers, including many RCs and TOPs. Industry input from areas with significant experience managing stability issues led to the inclusion of ~~system~~System damping.

Also included in Part 4.1 is language requiring the SOL Methodology to include descriptions of how margins are applied. This language was added to explicitly capture the practices in use by RCs for off-line or on-line calculated stability limits, including any margin used in the application of the stability limits. It is left to the RC what type of margin to use (a percentage of the limit or a fixed MW value, for example), if it uses one at all.

Requirement R4 Part 4.2 provides the link to the Contingencies which must be respected in operations, which are unchanged from the current standard. In response to industry comments, Contingency specifications were moved to a separate requirement.

Requirement R4 Part 4.3 was introduced to preclude ambiguity in the resolution of stability limits when multiple TOPs within an RC's footprint are impacted. For example, ~~this requirement may be met~~

[1] ~~The planned use of underfrequency load shedding (UFLS) is not allowed in the establishment of stability limits.~~

~~by providing language in~~ the SOL Methodology ~~describing~~could describe which TOP ~~(~~or ~~identifying that the~~ RC~~)~~ has the responsibility to determine stability SOLs impacting multiple TOPs, and could also determine how to choose between stability limits derived by multiple TOPs for the same stability limit exceedance.

Requirement R4 Parts 4.4, 4.5 and 4.6 require that the SOL Methodology provide a description of the key parameters that must be considered and monitored when performing analyses to determine the stability limits. The intent of these parts is to help ensure that the SOL Methodology provides guidance such that the process/method used by the RC to determine stability limits may be repeated, successfully, by anyone reading the SOL Methodology. For example, the SOL Methodology could state that stability limits will be determined for any combination of all facilities in and single facility out conditions, for all valid transfer conditions for the highest allowable thermal transfer condition (i.e. winter ratings), plus a flow margin of 10~~%,~~ percent, to account for potential emergency transfer conditions. This level of detail would allow TOPs and other entities to consistently duplicate results from study to study. Part 4.5 combines FAC-011-3 Requirements R3.1 and R3.4 into a single part while providing flexibility to the extent of the ~~Reliability Coordinator~~RC Area (including other ~~Reliability Coordinator~~RC Areas) that must be modeled to reflect the varying needs for different types of stability limits (e.g. local single unit stability up to wide area or inter area instability). By recognizing that some types of localized stability issues do not require the modeling of the entire Reliability Coordinator Area ~~modeling~~ to establish a stability limit, this revision aligns with and promotes the ability to monitor these localized areas with real time stability analysis tools.

Requirement 4 Part 4.4 is specifically intended to address the need for the SOL Methodology to identify the method for ensuring stability limits are “valid” (i.e. provide stable operations pre- and post-Contingency) for the Operational Planning Analysis (OPA) and Real-time Assessments (RTA) for which they will be used. Since stability limits may vary based on the system topology, load, generation dispatch, etc., and the current definitions for OPA and RTA include “An evaluation of … system conditions to assess anticipated (pre-Contingency) and potential (post-Contingency) conditions for ….operations”, the stability limits used in OPA/RTA should be “valid” for those system conditions.

As described within PRC-006-2 in alignment with FERC Order No. 763, underfrequency load shedding (UFLS) programs are designed “to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures.” In the establishment of stability limits under Requirement R4 Part 4.~~6~~7, UFLS programs or UVLS Programs are expressly prohibited from being considered as an acceptable post-Contingency mitigation action in order to preserve the intended availability of UFLS programs and UVLS Programs as ~~a~~measures of “last resort system preservation ~~measure~~”.

Requirement R5

R5. Each Reliability Coordinator shall ~~include~~identify in its SOL Methodology the ~~method for identifying the single Contingencies and multiple Contingencies~~Contingency events for use in determining stability limits and performing Operational Planning ~~Analyses~~Analysis (OPAs) and Real-time Assessments (RTAs~~),~~) for the area under study. The ~~method~~SOL Methodology shall ~~include~~:

5.1. ~~5.1 The~~Specify the following ~~list of~~ single Contingency events for use in determining stability limits and performing OPAs and RTAs:

5.1.1. ~~5.1.1~~ Loss of any of the following either by single phase to ground or three phase Fault (whichever is more severe) with ~~normal clearing~~Normal Clearing, or without a Fault:

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

5.2. ~~5.2 Any~~Identify any additional single or multiple Contingency events or types of ~~single~~ Contingency events ~~identified~~for use in performing Operational Planning Analysis and Real-Time Assessments.

~~5.2.~~**5.3.** Identify any additional single or multiple Contingency events or types of Contingency events for use in determining stability limits~~, or for use in performing OPAs and RTAs.~~.

~~**5.3.** Any types of multiple Contingency events identified for use in determining stability limits, or for use in performing OPAs and RTAs.~~

~~5.3.~~**5.4.** ~~5.4 The~~Describe the method(s) for ~~considering~~identifying which, if any, of the Contingency events provided by the Planning Coordinator or Transmission Planner in accordance with FAC-015-1, Requirement ~~R6~~R4, to ~~identify the Contingencies for~~ use in determining stability limits.

Rationale R5

Requirement R5 combines both the requirements for single Contingencies (formerly in Requirement R2.2 of FAC-011-3) and for multiple Contingencies (formerly in Requirement R3.3 of FAC-011-3) for ease of interpretation.

Furthermore, Requirement R5 continues to maintain the flexibility that existed in FAC-011-3 Requirement R2.2 and Requirement R3.3 for each RC to determine which additional single and multiple Contingencies to respect given the uniqueness of their system. Through both the feedback received as a result of the July 2016 informal posting and the May 2016 technical conference it was evident that both the drafting team and industry agree that sufficient flexibility is required for each RC to determine its own methodology for addressing Contingencies other than single Contingencies.

Requirement R5 mandates that the RC specify which types of Contingencies (both single and multiple) are used for determining stability limits as well as those used in ~~checking for all types~~the evaluation of

~~SOL exceedances~~ post-Contingency state in OPAs and RTAs (thermal~~,~~ and voltage ~~and stability limits~~). The SOL Methodology is the best place to communicate which Contingencies the RC is respecting in their footprint such that all TOPs and any neighboring RCs understand one another's internal and interconnection-related reliability objectives.

Requirement R5 Part 5.1.1 identifies the types of single Contingency events that, at a minimum, must be used for stability limit analysis and for performing OPAs and RTAs. However, other types of single Contingency events, such as inadvertent breaker operation and bus faults, may be considered if the probability of such an event is relevant. ~~The method for determining those~~These Contingencies must ~~also~~ be identified in the RC's methodology as per Requirement R5 Part 5.2.

Requirement R5 Parts 5. 1 through 5.~~4~~3 require that differences in Contingency events for determining stability limits, those used for OPAs and those used for RTAs, be specified in the RC's methodology. It is important to distinguish between Contingencies used for determining stability limits and those that are actually applied in OPAs and RTAs as only specific system conditions may actually warrant their use in the days leading up to real-time operations. For example, multiple Contingencies at heightened risk under specific weather or system conditions may not need to be respected (and thus monitored) the majority of the time when these conditions are not present.

Requirement R5 Part 5.4 compliments the proposed Requirement ~~R6~~R4 in FAC-015-1 by ensuring the RC's methodology describes how the Contingency event information from the Planning Coordinator is used in deriving stability limits used in operations.

Requirement R6

R6. Each Reliability Coordinator shall include in its SOL Methodology, at a minimum, the following Bulk Electric System performance criteria:

6.1. The actual pre-Contingency state (Real-time monitoring and Real-time Assessments) and anticipated pre-Contingency state (Operational Planning Analysis) demonstrates the following:

6.1.1. 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

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.

6.1.3. Instability, Cascading or uncontrolled separation do not occur

6.2. The evaluation of potential single Contingencies listed in Part 5.1.1 against the actual pre-Contingency state (Real-time monitoring and Real-time Assessments) and

anticipated pre-Contingency state (Operational Planning Analysis) demonstrates the following:

6.2.1. Flow through Facilities are within applicable Emergency Ratings, provided that System adjustments could be executed and completed within the specified time duration of those Emergency Ratings. Flow through a Facility must not be above the Facility's highest Emergency Rating.

6.2.2. Voltages are within emergency System Voltage Limits.

6.2.3. Instability, Cascading or uncontrolled separation do not occur.

6.3. The evaluation of the potential Contingencies identified in Part 5.2 against the actual pre-Contingency state (Real-time monitoring and Real-time Assessments) and anticipated pre-Contingency state (Operational Planning Analysis) demonstrates that instability, Cascading, or uncontrolled separation does not occur.

6.4. The evaluation of the potential Contingencies identified in Part 5.3 demonstrates that instability does not occur.

6.5. In determining the System's response to any Contingency identified in Parts 5.1 through 5.3, planned load shedding is acceptable only after all other available System adjustments have been made.

Rationale R6

Requirement R6 addresses BES performance criteria, which is addressed in the currently effective FAC-011-3 Requirement R2 and subparts R2.1 and R2.2. The proposed requirement has some differences in the manner in which the performance criteria are addressed and in the level of detail reflected in the requirement when compared to the existing requirement. Those differences are discussed here.

Currently effective FAC-011-3 Requirement R2 states that the "*RC's SOL Methodology shall include a requirement that SOLs provide BES performance consistent with the following.*" The subsequent subparts to FAC-011-3 Requirement R2 further describe pre-Contingency performance criteria (in R2.1), the post-Contingency performance criteria (in R2.2), and describe other rules related to the establishment of SOLs in the remaining subparts. The language in Requirement R2 indicates that the SOLs established in accordance with Requirement R2 are expected to "provide" a level of pre- and post-Contingency reliability described in the subparts of Requirement R2. Accordingly, the assessments of the pre-Contingency state and the post-Contingency state are expected to be performed as part of the SOL establishment process, yielding a set of SOLs that "provide" for meeting the performance criteria denoted in FAC-011-3 Requirement R2 and its subparts.

Pursuant to the construct in the currently-effective TOP/IRO Reliability Standards, the pre- and post-Contingency states are assessed on an ongoing basis as part of Operational Planning Analyses (OPAs)

and Real-time Assessments (RTAs). Any SOL exceedances that are observed are required to be mitigated per the respective Operating Plans. Under this construct, it is the OPA, the RTA, and the implementation of Operating Plans that "provide" for reliable pre- and post-Contingency operations through the application of the minimum performance criteria specified in FAC-011-4 requirement R6 and subparts. Under this construct, the assessments of the pre-Contingency state and the post-Contingency state are expected to be performed as part of the OPA and RTA for Facility Rating and System Voltage Limits. Stability limits are either established prior to the OPA/RTA or established and assessed during the OPA and RTA.

Requirement R6 works together with proposed FAC-014-3 Requirement R7 to support reliable operations for pre- and post-Contingency operating states. FAC-014-3 Requirement R7 states, *"Each Transmission Operator and Reliability Coordinator shall use the Bulk Electric System performance criteria specified in the Reliability Coordinator's SOL Methodology when performing OPAs, RTAs, and Real-time monitoring to determine SOL exceedances."*

FAC-011-4 Requirement R6, Parts 6.1.1 and 6.1.2 are intended to prescribe the appropriate use of Emergency Ratings and Emergency System Voltage Limits when actual (or OPA pre-Contingency) flows or voltages exceed Normal Ratings or fall outside normal System Voltage Limits, respectively.

The language in Part 6.1.1 reflects the concepts in Figure 1 of the Project 2014-03 Whitepaper (NERC SOL Whitepaper) with regard to Facility Rating performance. Part 6.1.1 states, *"Flow through Facilities are within applicable Emergency Ratings, provided that System adjustments to return the flow within its Normal Rating can be executed and completed within the specified time duration of those Emergency Ratings."* This is intended to allow, as an example, for the use of the 4-hour Emergency Rating and the 15-minute Emergency Rating consistent with the bullet descriptions in Figure 1. As is described in Figure 1, the use of the Emergency Ratings is governed by the amount of time it takes to execute the Operating Plan to mitigate the condition. The portion of Part 6.2.1 that states, *"Flow through a Facility must not be above the Facility's highest Emergency Rating"* is intended to specifically address the operating state highlighted in yellow in Figure 1. In this operating state, the System Operator has no time to implement post-Contingency mitigation actions (i.e., actions that are taken after the Contingency event occurs); therefore, pre-Contingency mitigation actions consistent with the Operating Plan must be taken as soon as possible to reduce the calculated post-Contingency flow.

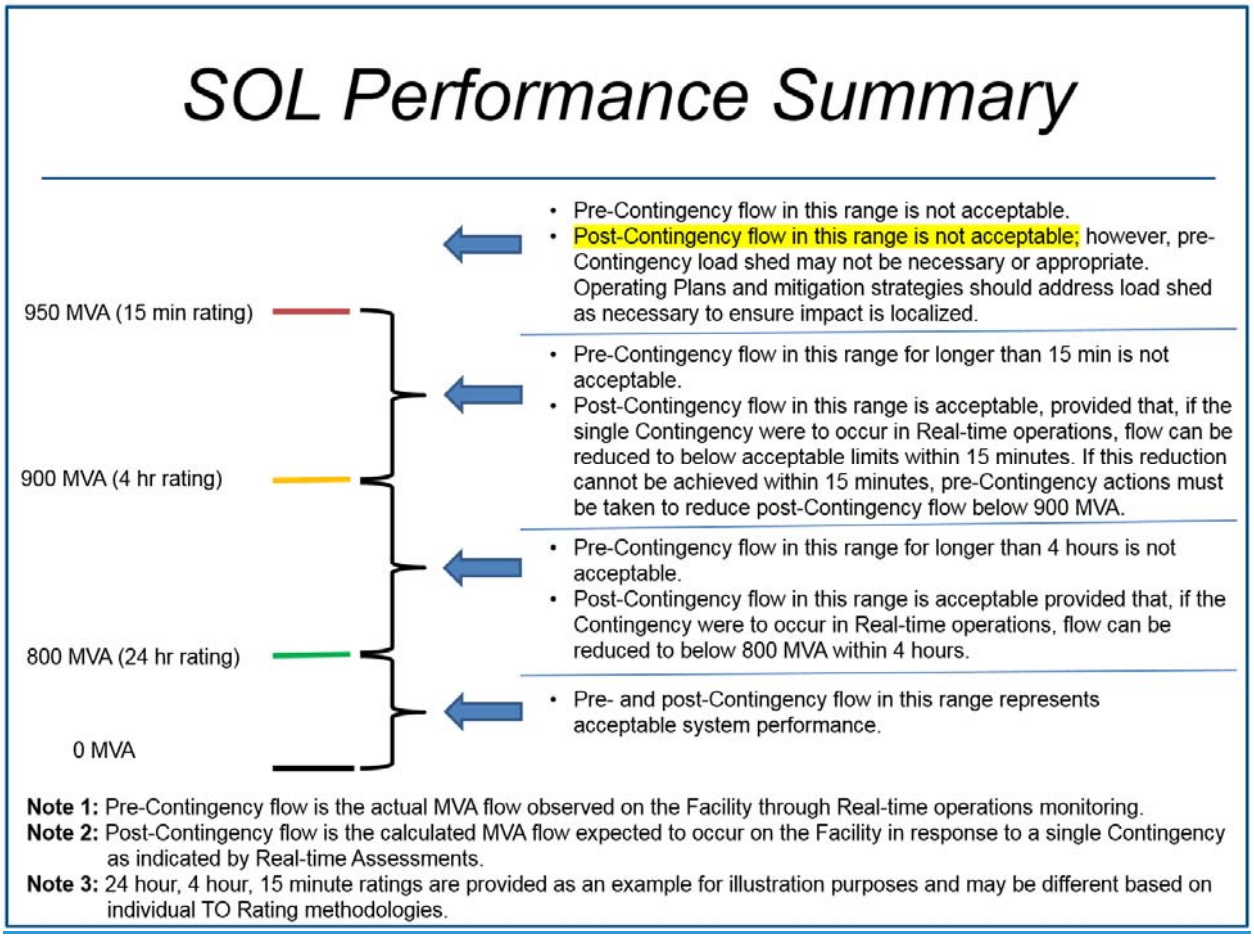

Figure 1 of the NERC SOL Whitepaper

Part 6.3 recognizes the potential for regional differences and is intended to describe the minimum performance criteria for Contingency events that are more severe than the single Contingency events listed in Requirement R5, Part 5.1.1 for OPAs and RTAs (i.e., Contingencies identified in Part 5.2). Per Part 6.3, if any of these more severe Contingency events were to occur, at a minimum the System is expected to remain stable, there should be no Cascading, and there should be no uncontrolled separation.

Part 6.4 recognizes the potential for regional differences and is intended to describe the minimum performance criteria for Contingency events that are more severe than the single Contingency events listed in Requirement R5, Part 5.1.1 for establishing stability limits as identified in Requirement R5 Part 5.3. Per Requirement R6 Part 6.4, if any of these more severe Contingency events identified in R5 Part 5.3 were to occur, at a minimum the System is expected to remain stable. Part 6.4 was written in its own part to be very clear that these contingencies identified in R5 Part 5.3 are for the establishment of stability limits which may not be used in OPAs and RTAs. Typically, stability limits are established to prevent a Contingency (or set of specific Contingencies) from resulting in instability. Such stability limits are established such that if actual (pre-contingency) flow is kept under the stability limit, then

any occurrence of the critical Contingencies would not result in instability. When these stability limits are used in OPAs and RTAs, they are monitored against actual (pre-contingent) flows. These stability limits do not need to be evaluated for the post-Contingency state in OPAs and RTAs (for example, through tools such as Real-time Contingency Analysis) because they already have the critical Contingencies built in to the limit itself.

Part 6.5 maintains the concept identified in FAC-011-3 R2.3.2 and intent of FERC Commission Order No. 705, where FERC determined that load shedding shall only be utilized by system operators as a measure of last resort to prevent cascading failures. Requirement Part 6.5 clarifies that load shedding as a remedy in the operating plan should only be allowed after other options are exercised without regard for financial impact. The term "load shedding" refers to the inclusion of planned post-Contingency shedding of load either manually or by automated methods in an Operating Plan.

For clarity, the following examples of pre- or post-Contingency actions are provided to expand on the term "all other available System adjustments" that should have been made prior to planning to utilize load shedding:

- Generation commitment and re-dispatch regardless of economic cost
- Curtailment and adjustment of Interchange regardless of economic cost
- Transmission re-configuration (only if studies shows that the re-configuration does not put more load at risk or create other unacceptable system performance)

Requirement R7

~~R6.~~R7. Each Reliability Coordinator shall include in its SOL Methodology:

~~6.1.~~7.1. ~~6.1~~ A description of how to identify the subset of SOLs that qualify as Interconnection Reliability Operating Limits (IROLs~~.~~).

~~6.2.~~7.2. ~~6.2~~ Criteria for determining when violating a SOL qualifies as an ~~Interconnection Reliability Operating Limit (~~IROL~~)~~ and criteria for developing any associated IROL T_V.

~~**Rationale R6**~~

~~The two IROL related requirements in FAC-011-3 were preserved under Requirement R6.~~

~~Requirement R7~~

~~Each Reliability Coordinator shall include in its SOL Methodology the method and periodicity for Transmission Operators to communicate SOLs it established to its RC(s).~~

Rationale R7

The two IROL related requirements in FAC-011-3 were preserved under Requirement R7.

Requirement R8

R8. Each Reliability Coordinator shall include in its SOL Methodology the method for Transmission Operators to communicate their established SOLs to the Reliability Coordinator(s). The method shall address the periodicity for communicating established SOLs.

Rationale R8

Requirement R7 serves as a companion to FAC-014-3 Requirement R3 which states, *"The Transmission Operator shall provide its SOLs to its Reliability Coordinator in accordance with its Reliability Coordinator's SOL Methodology."*

The language in Requirement ~~R7~~R8 is written to provide clarity that the TOP is responsible for communicating only those SOLs that it established for its own ~~Transmission Operator~~TOP Area. The TOP is not responsible for communicating SOLs established by other TOPs that it uses in its analyses.

While it is possible to address communication of SOLs through TOP-003-3 and IRO-010-2, the standard drafting team determined that the communication of SOLs was of such importance to the reliability of the BES that it should be addressed specifically in the RC's SOL Methodology and in FAC-014-3. Additionally, the aforementioned Reliability Standards address the data specifically necessary for performing OPA, Real-time monitoring, and RTA. SOL information may be necessary for other uses beyond these analyses, for example in outage coordination assessments.

Requirement ~~R8~~R9

~~R7.~~R9. Each Reliability Coordinator shall provide its ~~new or revised~~ SOL Methodology to:

9.1. ~~8.1~~ Each Reliability Coordinator that requests and indicates it has a reliability-related need within 30 days of a request

9.2. Each of the following entities prior to the effective date of the SOL methodology:

~~7.1.1.~~9.2.1. Each adjacent Reliability Coordinator within ~~its~~the same Interconnection ~~prior to the effective date of the SOL Methodology~~;

~~7.1.2.~~9.2.2. ~~8.2~~ Each Planning Coordinator and Transmission Planner that is responsible for planning any portion of the Reliability Coordinator Area ~~prior to the effective date of the SOL Methodology~~;

~~7.1.3.~~9.2.3. ~~8.3~~ Each Transmission Operator within its Reliability Coordinator Area ~~prior to the effective date of the SOL Methodology;~~; and

~~7.1.4.~~9.2.4. ~~8.4~~ Each ~~requesting~~ Reliability Coordinator that ~~indicates~~has requested to receive updates and indicated it had a reliability-related need ~~and is not considered adjacent in Part 8.1, within 30 calendar days of receiving the request~~.

~~Rationale R8~~

Rationale R9

Requirement ~~R8~~R9 preserves the reliability objective of providing the SOL Methodology to the appropriate entities from Requirement R4 of FAC-011-3. ~~Requirement R8 Part 8.1 mandates that an RC provide its SOL Methodology to each adjacent RC within its Interconnection. In Requirement R8 Part 8.2, PC, not Planning Authority, was used to be consistent with the Functional Model as well as to be consistent with TPL-001. Requirement R8 Part 8.2 also uses "responsible for planning" instead of "models any portion of" to identify those PCs and TPs who have a reliability related need rather than a PC/TP who simply has acquired a model that contains a portion of the Reliability Coordinator Area, but does not plan for that area. Requirement R8 Part 8.4 differs from Requirement R8 Parts 8.1 through 8.3 in that it~~Requirement R9 Part 9.1 mandates that an RC provide its SOL Methodology to any requesting RC that indicates a reliability-related need within 30 calendar days of such request rather than prior to the effective date of the SOL Methodology. Additionally, requirement 9 Part 9.2 enforces provision to those entities that would require notification of an update or change to the RC's SOL Methodology.

In Requirement R9 Sub-part 9.2.2, Planning Coordinator (PC), not Planning Authority, was used to be consistent with the Functional Model as well as to be consistent with TPL-001. Requirement R9 Sub-part 9.2.2 also uses "responsible for planning" instead of "models any portion of" to distinguish those PCs and Transmission Planners (TPs) who have a reliability-related need from a PC/TP who simply has acquired a model that contains a portion of the RC Area, but does not plan for that area. Requirement R9 Sub-part 9.2.4 differs from Requirement R9 Sub-parts 9.2.1 through 9.2.3 in that it mandates provision of the SOL Methodology to non-adjacent RCs that have specifically requested to receive updates, and indicated they had a reliability-related need.