

Mapping Document for FAC-014-3

Project 2015-09 Establish and Communicate System Operating Limits

Standard: FAC-014-2 Establish and Communicate System Operating Limits		
Requirement in Approved Standard	Translation to New Standard or Other Action	Description and Change Justification
R1. The Reliability Coordinator shall ensure that SOLs, including Interconnection Reliability Operating Limits (IROLs), for its Reliability Coordinator Area are established and that the SOLs (including Interconnection Reliability Operating Limits) are consistent with its SOL mMethodology.	Requirements R1, R2, and R4 of FAC-014-3 R1. Each Reliability Coordinator shall establish Interconnection Reliability Operating Limits (IROLs) for its Reliability Coordinator Area in accordance with its System Operating Limit Mmethodology (SOL Mmethodology). R2. Each Transmission Operator shall establish System Operating Limits (SOLs) for its portion of the Reliability Coordinator Area in accordance with its Reliability Coordinator's SOL Mmethodology. R4. Each Reliability Coordinator shall establish stability limits to be used in operations when the limitan identified instability impacts adjacent Reliability Coordinator Areas or more than one Transmission Operator in its Reliability Coordinator Area in accordance with its SOL Mmethodology.	Requirements R1, R2, and R4 of FAC-0143 ensure that SOLs are established in accordance with the Reliability Coordinator's (RC's) SOL Mmethodology Requirement R1 was changed to address an issue with the existing language in FAC-014-2, Requirement R1. With the original language, the RC is responsible for ensuring that SOLs established by the Transmission Operator (TOP) per FAC-014-2, Requirement R2 are consistent with the RC's SOL Mmethodology. This creates a situation where the RC is responsible for "ensuring" the actions of the TOP. Accordingly, if the TOP does not establis SOLs per its RC's SOL Mmethodology, then 1) the TOP is in violation of Requirement R2, and 2) the RC by defau is in violation of Requirement R1 because

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		the RC did not ensure that the TOP's SOL was consistent with its SOL Mmethodology .
		The proposed revision addresses this issue and clarifies the appropriate responsibilities of the respective functional entities.
		Additionally, this requirement carries forward the obligation of the RC to establish IROLs for its RC Area. The RC maintains primary responsibility for establishment of IROLs because these limits have the potential to impact a Wide-area.
		FAC-011-4 requirement R4 further addresses the RC responsibilities (beyond IROL establishment) for stability limit establishment where more than one TOP is impacted.
FAC-014-2, Requirement R2 R2. The Transmission Operator shall establish SOLs (as directed by its Reliability Coordinator) for its portion of the Reliability	FAC-014-3, Requirement R2 R2. Each Transmission Operator shall establish System Operating Limits (SOLs) for its portion of the Reliability Coordinator Area in accordance	The language from the existing FAC-014-2, Requirement R2 that states the TOP, "(as directed by its Reliability Coordinator)" was removed because it causes confusion and may be incorrectly

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Coordinator Area that are consistent with its Reliability Coordinator's SOL Mmethodology.	with its Reliability Coordinator's SOL Mmethodology.	understood to mean that the TOPs are only required to establish SOLs if they have been "directed to by their RC." This is not the intended meaning of the requirement, thus, the drafting team has removed the unnecessary and potentially confusing language. The proposed language makes clear that the TOP is the entity responsible for establishing SOLs, and that these SOLs must be established in accordance with the RC's SOL Mmethodology.
R3. The Planning Authority shall establish SOLs, including IROLs, for its Planning Authority Area that are consistent with its SOL Mmethodology. R4. The Transmission Planner shall establish SOLs, including IROLs, for its Transmission Planning Area that are consistent with its Planning Authority's SOL Mmethodology.	FAC-011-4, Requirement R9, Part 9.2, Subpart 9.2.2 FAC-014-3015-1, Requirements R7R6 R1 - R3 FAC-011-4, Requirement R9, Part 9.2: R9. Each Reliability Coordinator shall provide its SOL Mmethodology to: [Violation Risk Factor: Lower] [Time Horizon: Operations Planning] 9.2 Each of the following entities 30 days-prior to the effective date of the SOL methodology or as soon as practicable if a change must be	The SDT is proposing a construct that does not make use of an SOL Mmethodology applicable to the planning horizon or the establishment of SOLs consistent with the PC's SOL Mmethodology. The PCs and TOPs responsible for planning any portion of the RC's Area are made aware of the RC's SOL Mmethodology through FAC-011-4, Requirement R9, Part 9.2.2. By having the RC's SOL Mmethodology, PCs and TPs who plan any portion of the System in the



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	implemented in less than 30 days to address a reliability issue:	RC Area have knowledge of the methods and criteria for establishing SOLs,
	9.2.2 Each Planning Coordinator and Transmission Planner that is responsible for	including the stability performance criteria used for establishing stability limits in the operations horizon.
	planning any portion of the Reliability Coordinator Area;	New Reliability Standard FAC 015 1 along with the changes in the Pproposed FAC-
	FAC-014-3 015-1 Requirement R 76R1 - R3 :	011-4 and FAC-014-3 represent an improvement for planning and operations
	R76. Each Planning Coordinator and each Transmission Planner shall implement a	to better work together to address the reliability issues that are ultimately faced
	documented process to use Facility Ratings, voltage criteriaSystem steady-state voltage limits	in Real-time operations. FAC- <u>014-3015-1</u> ,
	and stability criteria in its Planning Assessment of	Requirements R76 R1 — R3 ensures that Planning Assessments performed for the
	the Near-Term Transmission Planning Horizon that are equally limiting or more limiting than the	Near-Term Transmission Planning Horizor (required by TPL-001-4), are bounded by
	<u>criteria for Facility Ratings, System Voltage Limits</u> <u>and stability criteria specified described in its</u>	modeling data and performance criteria that are equally limiting or more limiting
	respective Reliability Coordinator's SOL methodology.	than those established in accordance
	 The Planning Coordinator may use less 	described within the RC's SOL Mmethodology.
	limiting Facility Ratings, voltage criteriaSystem steady-state voltage limits and stability criteria if it provides a technical rationale Each Planning	FAC-015-1, Requirement R1 addresses Facility Ratings, Requirement R2
	Coordinator shall provide a technical rationale for	addresses the System steady state voltage limits, and Requirement R3



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	any exceptions to each affected Transmission Planner, Transmission Operator and Reliability Coordinator. • The Transmission Planner may use less limiting Facility Ratings, voltage criteria System steady-state voltage limits and stability criteria if it provides a technical rationale Each Transmission Planner shall provide a technical rationale for any exceptions to each affected Planning Coordinator, Transmission Operator and Reliability Coordinator. 1. Each Planning Coordinator and each of its Transmission Planners, when developing its steady-state modeling data requirements, shall implement a process to ensure that Facility Ratings used in its Planning Assessment of the Near Term Transmission Planning Horizon are equally limiting or more limiting than the owner provided Facility Ratings used in operations per the Reliability Coordinator's SOL Methodology. The process may allow the use of less limiting Facility Ratings if: [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]	addresses the stability performance criteria used in Planning Assessments. These requirements-FAC-014-3, Requirement R76 addresses the three components of SOLs used in operations and thus facilitates continuity between operations and planning, which is conducive to improved reliability. By implementing Requirements R1 — R3 of FAC-015-1, equally limiting or more limiting Facility Ratings, System steady state voltage limits and stability criteria that are established in accordance with the RC's SOL Methodology are ultimately implemented in the Planning Assessments performed by the PCs and TPs, thus improving reliability by ensuring continuity between planning and operations.



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	 The Facility has higher Facility Ratings as a result of a planned upgrade, addition, or Corrective Action Plan, 	
	 Facility Rating differences are due to variations in ambient temperature assumptions, 	
	 The Planning Coordinator provided a technical rationale for using a less limiting Facility Rating to each affected Transmission Planner and Reliability Coordinator, or 	
	 The Transmission Planner provided a technical rationale for using a less limiting Facility Rating to each affected Planning Coordinator and Reliability Coordinator. 	
	2. Each Planning Coordinator and each of its Transmission Planners shall implement a process to ensure that System steady state voltage limits used in its Planning Assessment of the Near-Term Transmission Planning Horizon are equally limiting or more limiting than the System Voltage Limits used in operations per the Reliability	



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	Coordinator's SOL Methodology. The	
	process may allow the use of less limiting	
	System steady state voltage limits if:	
	[Violation Risk Factor: Medium] [Time	
	Horizon: Long term Planning]	
	The Planning Coordinator provides a	
	technical rationale for using a less	
	limiting System steady state voltage limit	
	to each affected Transmission Planner	
	and Reliability Coordinator, or	
	• The Transmission Planner provides a	
	technical rationale for using a less	
	limiting System steady state voltage limit	
	to each affected Planning Coordinator	
	and Reliability Coordinator.	
	3. Each Planning Coordinator and each of its	
	Transmission Planners shall implement a	
	process to ensure the stability performance	
	criteria used in its Planning Assessment of	
	the Near-Term Transmission Planning	
	Horizon are equally limiting or more limiting	
	than the stability performance criteria used	
	in operations per the Reliability	
	Coordinator's SOL Methodology. The	

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	process may allow the use of less limiting stability performance criteria if: [Violation Risk Factor: Medium] [Time Horizon: Longterm Planning] The Planning Coordinator provides a technical rationale for using a less limiting stability performance criterion to each affected Transmission Planner and Reliability Coordinator, or The Transmission Planner provides a technical rationale for using a less limiting stability performance criterion to each affected Planning Coordinator and Reliability Coordinator.	
FAC-014-2, Requirement R5, R5.1 R5. 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	The communication of SOL and IROL information from the Reliability Coordinator is addressed by: 1. FAC-014-3, Requirement R5 (addresses communication from the Reliability Coordinator to other entities)	Reference the description above for Requirement R3 which describes a different set of roles and responsibilities for the PC and TP as defined in FAC-015 1. While the existing requirements in FAC 014-2, Requirement R5 are preserved in FAC-014-3, Requirement R5, FAC-014-3

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includes a schedule for delivery of those limits as follows: R5.1. The Reliability Coordinator shall provide its SOLs (including the subset of SOLs that are IROLs) to adjacent Reliability Coordinators and Reliability Coordinators who indicate a reliability-related need for those limits, and to the Transmission Operators, Transmission Planners, Transmission Service Providers and Planning Authorities within its Reliability Coordinator Area. For each IROL, the Reliability Coordinator shall provide the following supporting information: R5.1.1. Identification and status of the associated Facility (or group of Facilities) that is (are) critical to the derivation of the IROL. R5.1.2. The value of the IROL and its associated Tv. R5.1.3. The associated Contingency(ies). R5.1.4. The type of limitation represented by the IROL (e.g., voltage collapse, angular stability).	 IRO-014-3, Requirement R1 (addresses communication between Reliability Coordinators to support reliable operations) FAC-014-3, Requirement R5: R5. Each Reliability Coordinator shall provide: 5.1. Each Planning Coordinator and each Transmission Planner within its Reliability Coordinator Area, SOLs for its Reliability Coordinator Area (including the subset of SOLs that are IROLs) at least once every twelve calendar months. 5.2. Each impacted Planning Coordinator and each impacted Transmission Planner within its Reliability Coordinator Area, the following information for each established stability limit and each established IROL at least once every twelve calendar months: 5.2.1. The value of the stability limit or IROL; 5.2.2. Identification of the Facilities that are critical to the deriviation of the stability limit or the IROL; 5.2.3. The associated IROL Tv for any IROL; 5.2.4. The associated critical Contingency(ies); 	Requirement R5 more specifically address the communications requirements for the RC. Each recipient of the RC communications is addressed in a separate subpart because each recipient has a slightly different need. This approach represents an improvement over the former approach. IRO-014-3, Requirement R1 and subparts addresses RC communication of critical operational information to adjacent RCs, which addresses RC-to-RC communication and coordinated operations issues.

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	5.2.5. A description of the associated 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 its Reliability Coordinator Area, 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.	
	5.4. Each impacted Transmission Operator within its Reliability Coordinator Area, the information identified in Requirement R5 Parts 5.2.2 – 5.2.5–6 for each established stability limit orand 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.	
	5.5. Each requesting Transmission Operator within its Reliability Coordinator Area, requested	



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Requirement in Approved Standard	Translation to New Standard or Other Action SOL information for its Reliability Coordinator Area, on a mutually agreed upon schedule. 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. IRO-014-3, Requirement R1 R1. Each Reliability Coordinator shall have and implement Operating Procedures, Operating Processes, or Operating Plans, for activities that require notification or coordination of actions that may impact adjacent Reliability Coordinator Areas, to support Interconnection reliability. These Operating Procedures, Operating Processes, or Operating Plans shall include, but are not limited to, the following: 1.1. Criteria and processes for notifications. 1.2. Energy and capacity shortages. 1.3. Control of voltage, including the coordination	Description and Change Justification
	of reactive resources.	

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	 1.4. Exchange of information including planned and unplanned outage information to support its Operational Planning Analyses and Real-time Assessments. 1.5. Provisions for periodic communications to support reliable operations. 	
FAC-014-2, Requirement R5, R5.2 R5.2 The Transmission Operator shall provide any SOLs it developed to its Reliability Coordinator and to the Transmission Service Providers that share its portion of the Reliability Coordinator Area.	1. FAC-014-3, Requirement R3 FAC-014-3, Requirement R3 R3. The Transmission Operator shall provide its SOLs to its Reliability Coordinator-in accordance with its Reliability Coordinator's SOL Methodology.	The communication of SOLs from the TOP to its RC is preserved in FAC-014-3, Requirement R3. The revised language represents an improvement on the current standard because the specifics of TOP communication to the RC is now addressed in the RC's SOL Methodology. This revised requirement has a companion Requirement R7 in FAC-011-4 which states:
FAC-014-2, Requirement R5, R5.3 and R5.4 R5.3 The Planning Authority shall provide its SOLs (including the subset of SOLs that are	 FAC-<u>014-3</u>015-1, Requirements <u>R7, R8R6, R7 R1</u> - R4 TPL-001-4, Requirement R8 	Provision of important planning study information to TOPs and RCs is preserved in Reference the Description and Change Justification above for

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IROLs) to adjacent Planning Authorities, and to Transmission Planners, Transmission Service Providers, Transmission Operators and Reliability Coordinators that work within its Planning Authority Area.

R5.4 The Transmission Planner shall provide its SOLs (including the subset of SOLs that are IROLs) to its Planning Authority, Reliability Coordinators, Transmission Operators, and Transmission Service Providers that work within its Transmission Planning Area and to adjacent Transmission Planners.

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FAC-014-3015-1 Requirements R76, R87 R1 - R3
(Also See the t∓ranslation above for Requirements R3 and R4-section above.)

- 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:
 - 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 other planned mitigation actions);
 - 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, or unacceptable damping);

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Requirements R3 and R4, which describes a different set of roles and responsibilities for the PC and TP as defined in FAC <u>014</u> <u>3</u>015-1, <u>R7</u>.

FAC <u>014 3</u>015 1, Requirements <u>R76 R1 — R3 results</u> in PCs and TPs using Facility Ratings, System steady state voltage limits <u>criteria</u>, and stability performance criteria in their Planning Assessments <u>of the Near-Term Transmission Planning Horizon</u> that are equally limiting or more limiting than the <u>crtieria for Facility Ratings</u>, System Voltage Limits, and stability performance criteria established in accordance <u>described</u> with<u>in</u> the RC's SOL Methodology.

FAC-<u>014-3</u>015-1, Requirement R<u>7</u>, which 4 requires the PC and TP to <u>annually</u> communicate <u>information for Corrective</u>
<u>Action Plans developed to address</u> any instability <u>Cascading or uncontrolled</u>
<u>separation</u> identified in <u>the-its</u> Planning
<u>Assessments and Transfer Capability</u>
<u>assessments</u> to <u>each</u> impacted <u>RCs</u>, <u>TOPs</u>,
<u>TOs</u>, <u>and GOs</u> <u>TOP</u> and <u>RC</u>. The subparts

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	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. R4. Each Planning Coordinator and each Transmission Planner shall communicate any instability, Cascading or uncontrolled separation identified in either its Planning Assessment of the Near Term Transmission Planning Horizon or its Transfer Capability assessment (Planning Coordinator only) to each impacted Reliability Coordinator, Transmission Operator, Transmission Owner, and Generation Owner. This communication shall include: 4.1 The type of instability identified (e.g., voltage collapse, angular instability, transient voltage dip criteria violation);	of Requirement R74 require the communication of key information that can be useful to the RC and TOP to establish stability limits and IROLs that will ultimately be used in real-time operations. This information is also necessarily communicated to TOs and GOs for their use in identifying Facilities that require higher levels of vegetative management or cyber protection. TPL-001-4, Requirement R8 requires each PC and TP to distribute its Planning Assessment results to adjacent PCs and adjacent TPs within 90 calendar days of completing its Planning Assessment, and to any functional entity that has a reliability related need and submits a written request for the information within 30 days of such a request. With this requirement, any functional entity with a reliability-related need for a PC's or TP's Planning Assessment can obtain that Planning Assessment. Requesting entities are then made aware	

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	4.2 The associated stability criteria used as part of determining the instability;	of any system performance issues identified by these Planning Assessments.	
	4.3 The associated Contingency(ies) and any Facilities critical to the instability, Cascading or uncontrolled separation;		
	4.4 A description of the studied system conditions when the instability, Cascading or uncontrolled separation was identified;		
	4.5 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 required to address the instability, Cascading or uncontrolled separation;		
	4.6 Any Corrective Action Plan associated with the instability, Cascading or uncontrolled separation.		
	TPL-001-4, Requirement R8:		
	R8. Each Planning Coordinator and Transmission Planner shall distribute its Planning Assessment results to adjacent Planning Coordinators and adjacent Transmission Planners within 90 calendar days of completing its Planning		

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	Assessment, and to any functional entity that has a reliability related need and submits a written request for the information within 30 days of such a request. 8.1. If a recipient of the Planning Assessment results provides documented comments on the results, the respective Planning Coordinator or Transmission Planner shall provide a documented response to that recipient within 90 calendar days of receipt of those comments.	
FAC-014-2, Requirement R6 R6. The Planning Authority shall identify the subset of multiple contingencies (if any), from Reliability Standard TPL-003 which result in stability limits. R6.1 The Planning Authority 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. R6.2 If the Planning Authority does not identify any stability-related multiple	FAC-014-3015-1, Requirement R4 R8R7 (See the Translation above for Requirements R5.3 and R5.4 section above.)	FAC-014-3015-1, Requirement R6-R87 covers the content of FAC-014-2, Requirement R6.1 and improves upon it as follows: • FAC-014-3015-1, Requirement R4 R87 addresses not only the identification of multiple contingencies that result in stability criteria violation limits, but also address the key information RCs need to establish stability limits and IROLs used in operations. Unlike FAC-014-2, Requirement R6.1, the FAC-014-3015-1, Requirement R4-R87

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contingencies, the Planning Authority shall so notify the Reliability Coordinator.		ensures the type of instability, relevant the associated stability criteria, the associated planning event contingencies, the associated system conditions & Facilities, and Corrective Action Plans developed for its mitigation assumptions used by the PC are communicated by the PC to the appropriate TOP and RC. Additionally, FAC-015-1, Requirement R4 includes all planning events (single and multiple contingencies) that result in instability, Cascading, or uncontrolled separation. FAC-014-2, Requirement R6, R6.2 is addressed by FAC-014-3015-1, Requirement R4-R87 because all instances of instability identified by the PC are to be communicated to the impacted TOP and RC in accordance with FAC-015-1,
		Requirement R4In additionFurther, it may be noted that FAC-014-2, Requirement R6,



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		R6.2 is administrative in nature, given that the existing FAC-014-2, Requirement R6, R6.1 and proposed FAC-014-3015-1, Requirement R4s-R87 both require communication of a defined set of stability related data. The absence of any communication of stability related data inherently implies the PC has not identified any instability and therefore has nothing to communicate.