NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Mapping Document for Reliability Standards Impacted by the Retirement of FAC-010-3

Project 2015-09 Establish and Communicate System Operating Limits

The Project 2015-09 standard drafting team (SDT) is proposing the retirement of the NERC FAC-010-3 Reliability Standard. The SDT further proposes a new paradigm regarding the coordination of the Planning Assessment (TPL-001-4) with the establishment of System Operating Limits (SOLs) used in operations. Along with the retirement of FAC-010-3, this new paradigm consists of a new FAC-015-1 Reliability Standard and revisions to the existing FAC-011-3 and FAC-014-2 Reliability Standards. The SDT proposal for a new FAC-015-1 Reliability Standard, along with the proposed revisions contained in FAC-011-4 and FAC-014-3, represent an improvement for planning and operations to better coordinate analysis input assumptions and System performance criteria to address the reliability issues that are ultimately faced in Real-time operations.

The proposed construct does not make use of an SOL Methodology applicable to the planning horizon as required by the currently-effective FAC-010-3 due to its overall redundancy with TPL-001-4. However, FAC-015-1, Requirements R1 – R3 ensure that Planning Assessments performed for the Near-Term Transmission Planning Horizon, are bounded by modeling data and performance criteria that are equally limiting or more limiting than those established in accordance with the Reliability Coordinator's (RC's) SOL Methodology. FAC-015-1, Requirements R1 – R3 respectively address Facility Ratings, System steady state voltage limits, and stability performance criteria used in the development of Planning Assessments. These requirements focus on the three components of SOLs used in operations and facilitate continuity between operations and planning. Implementing the processes required in FAC-015-1 Requirements R1 – R3 ensures Planning Coordinators (PC) and Transmission Planners (TP) use Facility Ratings, System steady-state voltage limits, and stability performance criteria that are equally limiting or more limiting than the Facility Ratings, System Voltage Limits, and stability performance criteria established in accordance with the Reliability Coordinator's SOL Methodology.

FAC-015-1, Requirement R4 requires PCs and TPs to communicate any instability, Cascading or uncontrolled separation, along with key supporting information, identified in the Planning Assessments to the RCs and to impacted Transmission Operators (TOPs). This information may be useful to RC and TOPs in the establishment of stability limits and IROLs that will ultimately be used in Real-time operations.

By implementing Requirements R1 – R4 of FAC-015, Facility Ratings, System steady-state voltage limits and stability criteria used in the development of the Planning Assessment are effectively bounded by the Facility Ratings, System Voltage Limits, and stability performance criteria define and established in accordance with the RC's SOL Methodology (FAC-011-4 & FAC-014-3). Furthermore, potentially critical stability information is communicated by planners to operators. The result is an improvement in reliability by ensuring continuity between planning and operations.

The remainder of this document provides a mapping of the existing requirements in the body of NERC Reliability Standards that are affected by the proposed retirement of FAC-010-3 and the proposed action by the SDT.

NERC Reliability Standard Requirements Affected by the Retirement of FAC-010-3		
Requirement in Approved Standard	**Translation to New Standard or Other Action**	**Description and Change Justification**
CIP-002-5.1a **Attachment 1 (Section 2 – Medium Impact):** **2.6.** Generation at a single plant location or Transmission Facilities at a single station or substation location that are identified by its Reliability Coordinator, Planning Coordinator, or Transmission Planner as critical to the derivation of Interconnection Reliability Operating Limits (IROLs) and their associated contingencies.	**CIP-002-5.1a Revision** **Attachment 1 (Section 2 – Medium Impact):** **2.6.** Generation at a single plant location or Transmission Facilities at a single station or substation location that are identified by the Planning Coordinator or Transmission Planner, 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 instances of instability, Cascading, or uncontrolled separation.	The proposed retirement of FAC-10-3 will result in PCs and TPs no longer being required to establish IROLs in accordance with a PC SOL Methodology. Therefore, the SDT is proposing a modification to criterion 2.6 of Attachment 1 to: • Remove the IROL reference, • Limit the relevant functional entities to the PC and TP, and • Incorporate Contingency events included in the Planning Assessment that result in instability, Cascading, or uncontrolled separation as a replacement for the use of IROLs in the identification of medium impact Facilities. IROLs established by the RC is not an appropriate qualifier in the determination of Facilities that require cyber-related hardening. These limits are determined in operational and real-time horizons and may be highly specific, temporary, or sudden onset types of events. The identification of these Facilities is more

2.9. Each Remedial Action Scheme (RAS) or automated switching System that operates BES Elements, that, if destroyed, degraded, misused or otherwise rendered unavailable, would cause one or more Interconnection Reliability Operating Limits (IROLs) violations for failure to operate as designed or cause a reduction in one or more IROLs if destroyed, degraded, misused, or otherwise rendered unavailable.	2.9. Each Remedial Action Scheme (RAS) or automated switching System that operates BES Elements, that, if destroyed, degraded, misused or otherwise rendered unavailable, would result in instability, Cascading or uncontrolled.	appropriately based on long-term planning studies where their criticality to the System can be determined in a more consistent and practical manner. Contingency events included in the Planning Assessment that result in instability, Cascading, or uncontrolled separation, incorporate the severe impacts currently associated with IROLs so the intent of the criterion is preserved. These events are required to be documented in the PC's and TP's Planning Assessments and identify Facilities that, when compromised, potentially result in severe impacts and thus, may require certain levels of CIP protection. TPL-001-4 Table 1 requires that the PC consider events experienced in operations in its Planning Assessments (item 2f and 3b for stability and steady state, respectively). Accordingly, the removal of the IROL term from this standard does not preclude the PC and RC from working together to identify Facilities that may warrant a higher level of CIP protection.
Current CIP-014-2 **A. Introduction (Section 4 – Applicability):** **4.1.1.3** Transmission Facilities at a single station or substation location that are identified by its Reliability Coordinator, Planning Coordinator, or Transmission Planner as critical to the derivation of Interconnection Reliability Operating Limits (IROLs) and their associated contingencies.	**CIP-014-2 Revision** **A. Introduction (Section 4 – Applicability):** **4.1.1.3** Transmission Facilities at a single station or substation location that are identified by the Planning Coordinator or Transmission Planner, 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 instances of instability, Cascading, or uncontrolled separation.	The proposed retirement of FAC-10-3 will result in PCs and TPs no longer being required to establish IROLs in accordance with a PC SOL Methodology. Therefore, the SDT is proposing a modification to criterion 4.1.1.3 of the Applicability section to: • Remove the IROL reference, • Limit the relevant functional entities to the PC and TP, and • Incorporate Contingency events included in the Planning Assessment that result in instability, Cascading, or uncontrolled separation as a replacement for the use of IROLs in the identification of medium impact Facilities. IROLs established by the RC is not an appropriate qualifier in the determination of Facilities that require cyber-related hardening. These limits are determined in operational and real-time horizons and may be highly specific, temporary, or sudden onset types of events. The identification of these Facilities is more appropriately based on long-term planning studies where their criticality to the System can be determined in a more consistent and practical manner.

		Contingency events included in the Planning Assessment that result in instability, Cascading, or uncontrolled separation, incorporate the severe impacts currently associated with IROLs so the intent of the criterion is preserved. These events are required to be documented in the PC's and TP's Planning Assessments and identify Facilities that, when compromised, potentially result in severe impacts and thus, may require certain levels of CIP protection. TPL-001-4 Table 1 requires that the PC consider events experienced in operations in its Planning Assessments (item 2f and 3b for stability and steady state, respectively). Accordingly, the removal of the IROL term from this standard does not preclude the PC and RC from working together to identify Facilities that may warrant a higher level of CIP protection.
Current FAC-003-4 **A. Introduction (Section 4 – Applicability):** **4.2.2.** Each overhead transmission line operated below 200kV identified as an element of an IROL under NERC Standard FAC-014 by the Planning Coordinator. **4.3.1.2.** Operated below 200kV identified as an element of an IROL under NERC Standard FAC-014 by the Planning Coordinator; or …	**FAC-003-4 Revision** **Introduction (Section 4 – Applicability):** **4.2.2.** Each overhead transmission line, operated below 200kV, identified by the Planning Coordinator or Transmission Planner, 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. **4.3.1.2.** Operated below 200kV and are identified by the Planning Coordinator or Transmission Planner, 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; or …	The Applicability section (4) of the Introduction defines the use of the term "applicable lines" that is used in the requirements of this standard. These "applicable lines" are specified for the identification of overhead transmission lines that require the levels of vegetation management required by the standard. It is important to note the following: • All overhead transmission lines that operate at 200 kV and above are included as "applicable lines" (4.2.1 & 4.3.1.2). The implication is that higher voltage transmission lines tend to be more critical to the bulk electric infrastructure and thus require higher level of right-of-way maintenance to ensure encroachments are mitigated. • Qualifications are then made to include < 200 kV overhead transmission lines (4.2.2 & 4.2.3) that have a high enough level of criticality to require the same vegetative management requirements as higher voltage transmission lines. The IROL designation (as identified by the PC) is used as one such qualifier. The actual limit is not the focus, but rather, the identification of transmission lines that, when compromised, present the risk of potentially severe consequences and therefore should be subject to stricter vegetation management requirements.

		The proposed revisions to the "Applicability" section improves on the ambiguity associated with using the IROL term. This proposal replaces the phrase "identified as an element of an IROL" with "identified by the Planning Coordinator or Transmission Planner, pursuant to FAC-015-1 Requirement R4, that identify instances of instability, Cascading, or uncontrolled separation." This proposal preserves the intent of the current criteria with the inclusion of the elements associated with IROLS (instability, Cascading, or uncontrolled separation). The proposed FAC-015-1 includes Generation Owners and Transmission Owners as recipients of this information so the mechanism for the appropriate communication is addressed.
Current FAC-003-4 **R1.** Each applicable Transmission Owner and applicable Generator Owner shall manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance (MVCD) of its applicable line(s) which are either an element of an IROL, or an element of a Major WECC Transfer Path; operating within their Rating and all Rated Electrical Operating Conditions of the types shown below…	**FAC-003-4 Revision** **R1.** Each applicable Transmission Owner and applicable Generator Owner shall manage vegetation to prevent encroachments into the Minimum Vegetation Clearance Distance (MVCD) of its applicable line(s), operating within their Rating and all Rated Electrical Operating Conditions of the types shown below…	As stated in the FAC-003 rationale, "Content-wise, R1 and R2 are the same requirements; however, they apply to different Facilities." The rationale further explains the separation of the two requirements as follows: "The separation of applicability (between R1 and R2) recognizes that inadequate vegetation management for an applicable line that is an element of an IROL or a Major WECC Transfer Path is a greater risk to the interconnected electric transmission system than applicable lines that are not elements of IROLs or Major WECC Transfer Paths. Applicable lines that are not elements of IROLs or Major WECC Transfer Paths do require effective vegetation management, but these lines are comparatively less operationally significant." As a result, the Violation Risk Factor (VRF) was set at "high" for R1 and "medium" for R2. In FERC Order 777 (2013), FERC directed NERC to change the VRF for R2 from "medium" to "high" (paragraph 77) based on transmission lines that were not part of an IROL or Major WECC Transfer Path contributing to cascading outages in the past. This removed the only difference between the two Requirements R1 and R2, resulting in complete redundancy between the two requirements. Therefore, the identification as "an element of an IROL, or an element of a Major WECC Transfer Path" wording in Requirements R1 and R2 is not necessary since all "applicable lines" are subject to the same MVCD criteria and have the same level of criticality. The resulting proposed language simplifies the requirement by removing this unnecessary verbiage.

Current FAC-003-4 **R2.** Each applicable Transmission Owner and applicable Generator Owner shall manage vegetation to prevent encroachments into the MVCD of its applicable line(s) which are not either an element of an IROL, or an element of a Major WECC Transfer Path.	**FAC-003-4 Revision** **R2.** Retire	As stated in the FAC-003 rationale, "Content-wise, R1 and R2 are the same requirements; however, they apply to different Facilities." The rationale further explains the separation of the two requirements as follows: "The separation of applicability (between R1 and R2) recognizes that inadequate vegetation management for an applicable line that is an element of an IROL or a Major WECC Transfer Path is a greater risk to the interconnected electric transmission system than applicable lines that are not elements of IROLs or Major WECC Transfer Paths. Applicable lines that are not elements of IROLs or Major WECC Transfer Paths do require effective vegetation management, but these lines are comparatively less operationally significant." As a result, the Violation Risk Factor (VRF) was set at "high" for R1 and "medium" for R2. In FERC Order 777 (2013), FERC directed NERC to change the VRF for R2 from "medium" to "high" (paragraph 77) based on transmission lines that were not part of an IROL or Major WECC Transfer Path contributing to cascading outages in the past. This removed the only difference between the two Requirements R1 and R2, resulting in complete redundancy between the two requirements. Therefore, the SDT is proposing the retirement of Requirement R2 with the modifications to Requirement R1.
FAC-013-2 **R1.2.** A statement that the assessment shall respect known System Operating Limits (SOLs). **R1.3** A statement that the assumptions and criteria used to perform the assessment are consistent with the Planning Coordinator's planning practices.	**Proposed FAC-013-2** **R1.2 –** Retire **R1.3** A statement that the assumptions and criteria used to perform the assessment are consistent with the Planning Coordinator's Planning Assessment. **Proposed FAC-011-4** **R9.** Each Reliability Coordinator shall provide its SOL Methodology to: **R9.2** Each of the following entities prior to the effective date of the SOL methodology: **R9.2.2** Each Planning Coordinator and Transmission Planner that is	Requirement R1.2 is not specific to Planning Horizon SOLs but the applicability of the overall standard is for PCs. The use of SOLs, used in operations, may not be applicable here unless there is a known operating condition that has been communicated by the RC or TOP that is likely to recur on a somewhat regular basis. Otherwise, performance criteria should be consistent with that outlined in TPL-001-4. Requirement R1 Part 1.3 in FAC-013-2 states that "assumptions and criteria" in the TCA should be consistent with PC's "planning practices". These planning practices are governed by the requirements of TPL-001. Therefore, the SDT is proposing a modification to clarify Requirement R1 Part 1.3 by replacing "planning practices" with "Planning Assessment". With the SDT's proposed FAC-015-1, the "assumptions and criteria" involving Facility Ratings, System steady-state voltage limits, and stability performance criteria (the three components of SOLs used in operations) would be bounded by the RC's SOL

	responsible for planning any portion of the Reliability Coordinator Area **Proposed FAC-015-1** **R1.** 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] • 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.	Methodology. The RC's SOL Methodology is provided to PCs and TPs via the SDT's proposed FAC-011-4 Requirement R9.2.2. In addition, it is important to note that coordination of "Contingencies on adjacent Systems" between neighboring planning entities is required in TPL-001-4, Requirements R3.4.1 & R4.4.1. Therefore, the intent of FAC-013-2 Requirement R1.2 has been addressed by more recent requirement language in the current TPL-001-4 and the proposed FAC-015-1 and FAC-011-4 standards. For this reason the SDT proposes the retirement of this requirement due to its redundancy with TPL-001-4 and the proposed FAC-015-1.

	R2. 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 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. **R3.** 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 process may allow the use of less limiting stability performance criteria if: [Violation	

	Risk Factor: Medium] [Time Horizon: Long-term 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. TPL-001-4 **R3.4** Those planning events in Table 1 that are expected to produce more severe System impacts on its portion of the BES, shall be identified, and a list created of those Contingencies to be evaluated in Requirement R3, Part 3.1. The rationale for those Contingencies selected for evaluation shall be available as supporting information. **3.4.1** The Planning Coordinator and Transmission Planner shall coordinate with adjacent Planning Coordinators and Transmission Planners to ensure that Contingencies on adjacent Systems which may impact their Systems are included in the Contingency list. (Requirement **R4.4** & **R4.4.1** contain the same wording)	
FAC-014-2	Requirements **R3** – **R5**	Under revision in conjunction with Project 2015-09

Current PRC-002-2 **A. Introduction (Section 4 – Applicability):** **4.1** The Responsible Entity is: 4.1.1 Eastern Interconnection – Planning Coordinator 4.1.2 ERCOT Interconnection – Planning Coordinator or Reliability Coordinator 4.1.3 Western Interconnection – Reliability Coordinator 4.1.4 Quebec Interconnection – Planning Coordinator or Reliability Coordinator	**PRC-002-2 Revision** **A. Introduction (Section 4 – Applicability):** **4.1** Reliability Coordinator	Removing the Planning Coordinator as an entity responsible for Requirement 5 and placing responsibility solely on the Reliability Coordinator adds clarity and consistency for the task of identifying the BES Elements for which dynamic Disturbance recording (DDR) data is Required. Requirement R5.4 requires a revaluation of the list at least once every 5 calendar years. Reliability Coordinators (RC) have all of the necessary information to address 5.1.1. – 5.1.5. Planning Coordinators lack first-hand information on System Operating Limits or Interconnection Reliability Operating Limits unless provided by the RC. (PCs do not have "operating" limits, but may utilize planning limits and criteria). The RC also receives detailed stability-related information from the PC (and Transmission Planners) via the proposed FAC-015 Requirement R4. This information may be utilized by the RC to establish stability-related SOLs (including IROLs). This facilitates coordination between planning entities and the RC. Moreover, consistency across larger areas (fewer RCs than PCs) will be gained as well.
Current PRC-002-2 **R5.** Each Responsible Entity shall:	**PRC-002-2 Revision** **R5.** Each Reliability Coordinator shall:	Requirement R5 was modified to reflect the proposed changes to the Applicability Section.
Current PRC-023-4 **Attachment B (Criteria Section):** If any of the following criteria apply to a circuit, the applicable entity must comply with the standard for that circuit… **B2.** The circuit is a monitored Facility of an Interconnection Reliability Operating Limit (IROL), where the	**PRC-023 Revision** **Attachment B (Criteria Section):** If any of the following criteria apply to a circuit, the applicable entity must comply with the standard for that circuit… **B2.** The circuit is selected by the Planning Coordinator based on Planning Assessments that identify instances of instability, Cascading, or uncontrolled separation.	The Applicability section (4) of the Introduction identifies the circuits that are subject to the requirements of PRC-023-4. These circuits are defined to be: • Transmission lines operated at 200 kV and above. • Transformers with low voltage terminals connected at 200 kV and above. • Transmission lines/transformers, operated/connected at less than 200 kV, that are identified in accordance with Requirement R6 of PRC-023-4. Requirement R6 of PRC-023-4 requires an annual assessment by the PC to determine the applicable circuits by applying criteria in Attachment B of the

IROL was determined in the planning horizon pursuant to FAC-010.		standard. The criteria in the attachment are to be applied to circuits in the PC area to determine if any sub 200 kV circuits are critical enough to merit the same protection requirements of higher (200 kV +) voltage circuits. The IROL designation (as identified by the PC) is used as one such criteria (B2). The actual limit is not the focus, but rather, the identification of circuits that merit the same protection procedures of higher voltage lines. The SDT's proposal to modify criterion B2, in conjunction with the retirement of FAC-010, does not create a reliability gap for the following reasons. • The comprehensive requirements in TPL-001-4 are better suited to address the potential criticality of Transmission Facilities including those that, when compromised, potentially result in instability, Cascading, or uncontrolled separation. • TPL-001-4 Table 1 requires that the PC consider events experienced in operations in its Planning Assessments (item 2f and 3b for stability and steady state, respectively). Accordingly, the removal of the IROL term from this standard does not preclude the PC and RC from working together to identify Facilities that are applicable to this standard. • The proposed revision to criterion B2 improves on the ambiguity associated with using the IROL term. This proposal preserves the intent of the current criterion by specifying circuits identified by the PC that, when compromised, could be associated with instability, Cascading, or uncontrolled separation. The proposal also incorporates coordination with the Facility Owner (similar to criterion B5) in the identification of these Facilities.
Current PRC-026-1 **R1.** Each Planning Coordinator shall, at least once each calendar year, provide notification of each generator, transformer, and transmission line BES Element in its area that meets one or more of the following criteria, if any, to the respective Generator Owner and Transmission Owner:	**Revised PRC-026-1** **R1.** Each Planning Coordinator shall, at least once each calendar year, provide notification of each generator, transformer, and transmission line BES Element in its area that meets one or more of the following criteria, if any, to the respective Generator Owner and Transmission Owner: Criteria:	The proposed retirement of FAC-010 necessitates an update of the language in Requirement R1 (and the associated footnote) of PRC-026-1 since a Planning Coordinator SOL methodology will no longer be required. The SDT's proposed modification to R1 is to replace the SOL reference with updated language that ties to Elements associated with an angular instability identified in the Planning Assessment. This proposed modification maintains the intent of the requirement in that Elements that fit the criteria of R1 are to be communicated appropriately.

Criteria: 1. Generator(s) where an angular stability constraint exists that is addressed by a System Operating Limit (SOL) or a Remedial Action Scheme (RAS) and those Elements terminating at the Transmission station associated with the generator(s). 2. An Element that is monitored as part of an SOL identified by the Planning Coordinator's methodology[1] based on an angular stability constraint. *{[1] NERC Reliability Standard FAC-014-2 – Establish and Communicate System Operating Limits, Requirement R3.}*	1. Generator(s) where an angular stability constraint exists that, is addressed by limiting the output of a generator or a Remedial Action Scheme (RAS), and those Elements terminating at the Transmission station associated with the generator(s). 2. Elements associated with angular instability identified in Planning Assessments.	
BAL Standards	No Action Required	
COM Standards	No Action Required	
EOP Standards	No Action Required	
INT Standards	No Action Required	
IRO Standards	No Action Required	
MOD Standards	No Action Required	

NUC Standards	No Action Required
PER Standards	No Action Required
TOP Standards	No Action Required
TPL Standards	No Action Required
VAR Standards	No Action Required