NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Rationale for FAC-015-1

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Requirement R1

Each Planning Coordinator~~,~~ (PC) and each of its Transmission Planners (TPs), 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 ~~those established~~the owner-provided Facility Ratings used in ~~accordance with its~~ operations per the Reliability Coordinator's (RCs) System Operating Limit (SOL) Methodology. ~~If~~ The process may allow the ~~Planning Coordinator uses~~use of less limiting Facility Ratings ~~than the Facility Ratings established in accordance with its Reliability Coordinator's SOL methodology, the Planning Coordinator shall provide a technical justification to its Reliability Coordinator.~~if:

- 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 PC provided a technical rationale for using a less limiting Facility Rating to each affected TP and RC, or
- The TP provided a technical rationale for using a less limiting Facility Rating to each affected PC and RC.

Rationale R1

Requirement R1 was drafted to ensure the appropriate use of applicable Facility Ratings in planning models. Analysis of these models determines System needs, potential future transmission expansion, and other Corrective Action Plans for reliable System operations. Therefore, it is imperative that the System is planned in such a way to support the successful operation of facilities when they are placed in service.

Requirement R1 provides a mechanism for the coordination of Facility Ratings in planning models to those established in accordance with the ~~Reliability Coordinator's (~~RC's~~) System Operating Limit (~~ SOL~~)~~ Methodology. Since the analysis of planning models determines what facilities are constructed or modified, Facility Ratings used in these analyses should be equally limiting or more limiting than those established in accordance with the RC's SOL Methodology. Otherwise, operators could be unduly limited by thermal constraints that were not identified in preceding planning studies.

Reliability Standard MOD-032 requires the modeling data in a ~~Planning Coordinator (~~PC~~)~~ area be coordinated between the PC and applicable ~~Transmission Planners (TPs).~~TP. It is the opinion of the standard drafting team (SDT) that the resulting coordination is the appropriate means to ensure Facility Ratings included in planning models are equally limiting or more limiting than the Facility Ratings

established in accordance with the RC's SOL Methodology, since Planning Assessments and Corrective Action Plans are developed based on analysis of these models (TPL-001).

The Near-Term Transmission Planning Horizon is specified because planning assumptions tend to be more certain earlier in the Planning Horizon. Additionally, construction activities or other Corrective Action Plans are more likely to be finalized in this period.

The intent of Requirement R1 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. This is accomplished by requiring the PC and each of its TPs to use the owner-provided Facility Ratings that are equally limiting or more limiting than those established in accordance with the RC's SOL Methodology. ~~If less limiting Facility Ratings are used by the PC, a technical justification~~ This is ~~required~~not intended to ~~be documented and provided to~~imply the RC~~. This does not give the RC~~ has authority over the ~~PC~~PCs and TPs planning a portion of the RC area in the development of the Planning Assessment. It does, however, facilitate communication between planning and operating entities so that analysis of the System by these entities are coordinated.

The SDT recognizes there are instances where it may be appropriate for planning models to have less limiting Facility Ratings than those established in accordance with the RC's SOL Methodology. Requirement R1 explicitly allows for the following exceptions:

- The Facility has higher Facility Rating as a result of a planned upgrade, addition, or Corrective Action Plan,
- Facility Rating differences are due to variations in ambient temperature assumptions,
- The PC provided a technical rationale for using a less limiting Facility Rating to each affected TP and RC, or
- The TP provided a technical rationale for using a less limiting Facility Rating to each affected PC and RC.

It is not the SDT's intent to unduly burden planning entities with documentation requirements to justify or explain Facility Ratings that result from the implementation of Corrective Action Plans or the use of ambient temperature assumptions in seasonal planning models versus those assumptions used in operational analyses and monitoring in real time. However, the SDT's intent is to require that planning entities not use shorter duration Emergency Ratings than what the RC's SOL Methodology allows absent a documented rationale.

Requirement R2

Each ~~Planning Coordinator~~PC and each of its TPs 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 ~~established~~used in ~~accordance with its Reliability Coordinator's~~operations per the RCs SOL Methodology. ~~If~~The process may allow the Planning Coordinator uses~~use of less limiting System steady-state voltage limits than the System Voltage Limits established in accordance with its Reliability Coordinator's SOL methodology, the Planning Coordinator shall provide a technical justification to its Reliability Coordinator.~~if:

- The PC may use less limiting System steady state voltage limits if it provides~~d~~ a technical rationale for using a less limiting System steady-state voltage limit to each affected TP and RC.
- The TP may use less limiting System steady state voltage limits if it provides~~d~~ a technical rationale for using a less limiting System steady-state voltage limit to each affected PC and RC.

Rationale R2

The purpose of TPL-001 is to "…develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies." Because the Planning Assessment (including the Corrective Action Plan) is the primary output of TPL-001, planning criteria used in developing the Planning Assessment should support the eventual operation of BES Facilities.

Requirement R2 was drafted to ensure the use of appropriate System steady-state voltage limits when performing studies in support of developing the Planning Assessment. These studies determine System needs, potential future transmission expansion, and other Corrective Action Plans for reliable System operation. Therefore, it is imperative that the System is planned in such a way to support the successful operation of facilities when they are placed in service.

Since the analysis of planning models determines what Facilities are constructed or modified, the application of System steady-state voltage limits used in studies that support the development of the Planning Assessment should be equally limiting or more limiting than those established in accordance with the RC's SOL Methodology. Otherwise, operators could be unduly limited by voltage constraints that were not identified in preceding planning studies. Requirement R2 provides a mechanism for the coordination of System steady-state voltage limits evaluated in planning studies with the System Voltage Limits established in accordance with the RC's SOL Methodology.

The Near-Term Transmission Planning Horizon is specified because planning assumptions tend to be more certain earlier in the planning horizon. Additionally, construction activities or other Corrective Action Plans are more likely to be finalized in this period.

The intent of Requirement R2 is to supplement Requirement R5 of TPL-001-4 which states, "Each ~~Transmission Planner and Planning Coordinator~~TP and PC shall have criteria for acceptable System steady state voltage limits, post-Contingency voltage deviations, and the transient voltage response for its System. For transient voltage response, the criteria shall at a minimum, specify a low voltage level and a maximum length of time that transient voltages may remain below that level." When determining the criteria for System steady-state voltage limits in accordance with TPL-001-4 Requirement R2, ~~the PC is~~PCs and TPs are required to implement the process described in FAC-015-1 Requirement R2.

Requirement R2 requires the PC and each of its TPs to use System steady-state voltage limits that are equally limiting or more limiting than the System Voltage Limits established in accordance with the RC's SOL methodology. ~~If less limiting System steady-state voltage limits are used by the PC, a technical justification is required to be documented and provided to the RC.~~ This does not give the RC authority over the ~~PC~~PCs and TPs for planning a portion of the RC area in the development of the Planning Assessment. It does, however, facilitate communication between planning and operating entities so that analysis of the System by these entities are coordinated.

The SDT recognizes there are instances where it may be appropriate for planning models to have less limiting System steady state voltage limits than the System Voltage Limits established in accordance with the RC's SOL Methodology. Requirement R2 explicitly allows for the following exceptions:

- The PC provided a technical rationale for using a less limiting System steady-state voltage limit to each affected TP and RC.
- The TP provided a technical rationale for using a less limiting System steady-state voltage limit to each affected PC and RC.

Requirement R3

Each ~~Planning Coordinator~~PC and each of its TPs 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 ~~established~~used in ~~its Reliability Coordinator's~~operations per the RC's SOL ~~methodology. If the Planning Coordinator uses~~Methodology. ~~The process may allow the use of less limiting stability performance criteria than the stability performance criteria specified in its Reliability Coordinator's SOL methodology, the Planning Coordinator shall provide a technical justification to its Reliability Coordinator.~~if:

- The PC may use less limiting stability performance criteria if it provides~~d~~ a technical rationale for using a less limiting stability performance criterion to each affected TP and RC, or
- The TP may us less limiting stability performance criteria if it provides~~d~~ a technical rationale for using a less limiting stability performance criterion to each affected PC and RC.

Rationale R3

The purpose of TPL-001-4 is to "…develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probably Contingencies." Because the Planning Assessment (including the Corrective Action Plan) is the primary output of TPL-001-4, planning criteria used in developing the Planning Assessment should support the eventual operation of BES facilities.

Requirement R3 was drafted to ensure the use of appropriate stability performance criteria when performing studies in support of developing the Planning Assessment. These studies determine System needs, potential future transmission expansion and other Corrective Action Plans for reliable System

operation. Therefore, it is imperative that the System is planned in such a way to support the successful operation of facilities when they are placed in service.

Since the analysis of planning models determines what facilities are constructed or modified, the application of stability performance criteria used in studies that support the development of the Planning Assessment should be equally limiting or more limiting than the criteria specified in the ~~RCs~~RC's SOL Methodology. Otherwise, operators could be unduly limited by stability constraints that were not identified in preceding planning studies. Requirement R3 provides a mechanism for the coordination of stability performance criteria evaluated in planning studies with the ~~Reliability Coordinator's~~RC's SOL Methodology.

The Near-Term Planning Horizon is specified because planning assumptions tend to be more certain earlier in the Planning Horizon. Additionally, construction activities or other Corrective Action Plans are more likely to be finalized in this period.

The intent of Requirement R3 is to address the stability performance criteria used by PCs and TPs when performing the required stability analysis per TPL-001. When ~~the PC performs~~PCs and TPs perform the relevant stability analyses in accordance with TPL-001, they are required to implement the process in FAC-015-1 Requirement R3, which requires the PC and each of its TPs to use stability performance criteria that are equally limiting or more limiting than the criteria established in accordance with the RC's SOL Methodology. ~~If less limiting stability performance criteria are used by the PC, a technical justification is required to be documented and provided to the RC.~~ This does not give the RC authority over the ~~PC~~PCs and TPs for planning a portion of the RC area in the development of the Planning Assessment. It does, however, facilitate communication between planning and operating entities so that analysis of the System by these entities are coordinated.

The SDT recognizes there are instances where it may be appropriate for planning studies to utilize less limiting stability performance criteria than those established in accordance with the RC's SOL Methodology. Requirement R3 explicitly allows for the following exceptions:

- The PC provided a technical rationale for using a less limiting stability performance criterion to each affected TP and RC.
- The TP provided a technical rationale for using a less limiting stability performance criterion to each affected PC and RC.

Requirement R4

~~Each Planning Coordinator shall provide the Facility Ratings, System steady-state voltage limits, and stability performance criteria for use in its Planning Assessment to its Transmission Planners and to requesting Planning Coordinators.~~

~~Requirement R5~~

~~Each Transmission Planner shall use Facility Ratings, System steady-state voltage limits, and stability performance criteria in its Planning Assessment that are equally limiting or more limiting than the Facility Ratings, System steady-state voltage limits, and stability criteria provided by its Planning Coordinator.~~

~~Rationale R4 and R5~~

~~Requirements R4 and R5 provide for the explicit coordination between PCs and TPs of Facility Ratings, System steady-state voltage limits, and stability performance criteria used to develop Planning Assessments of the PC area. Additionally, Requirement R4 provides a mechanism for other PCs to obtain this same information, as needed. Requirement R5 also allows the TP to use more conservative Facility Ratings, System steady-state voltage limits, and stability performance criteria than those the PC provides where the TP deems appropriate~~

~~These requirements supplement TPL-001-4 Requirements R1, R5, and R6 by ensuring Facility Ratings, System steady-state voltage limits, and stability performance criteria are consistently applied in Planning Assessments of the PC area.~~

~~Requirement R6~~

~~Each Planning Coordinator~~Each PC and each TP 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 (PC only) to each impacted ~~Reliability Coordinator and~~ RC, Transmission Operator~~.~~ (TOP), Transmission Owner (TO) and Generator Owner (GO). This communication shall include:

- ~~6~~4.1 The type of instability identified (e.g., voltage collapse, angular instability, transient voltage dip criteria violation);
- ~~6~~4.2 The associated stability criteria used as part of determining the instability;
- ~~6~~4.3 The associated Contingency(ies) ~~which result(s) in~~and any Facilities critical to the instability, Cascading or uncontrolled separation;
- ~~6.4~~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; and
- 4.6~~.5~~ Any Corrective Action Plan associated with the instability, Cascading or uncontrolled separation.

Rationale ~~R6~~R4

IRO-017-1 Requirement R3 requires PCs and TPs to provide their Planning Assessments to impacted RCs. However, Requirement R2 Part 2.4 and Requirement R4 in TPL-001-4, which outline the Stability analysis portion of the Planning Assessment, do not provide for the level of detail prescribed in FAC-015-1 Requirement ~~R6~~R4. Therefore this requirement was drafted to ensure the appropriate details regarding

potential instability, Cascading, or uncontrolled separation identified in the Stability portion of the Planning Assessment for the Near-Term Transmission Planning Horizon are provided to impacted RC and ~~Transmission Operators (~~TOPs~~).~~.

The information itemized in Requirement ~~R6~~R4 is a key consideration for ~~RC~~RCs and TOPs in the establishment of SOLs. Of particular importance is the identification of potential risks of instability, Cascading conditions and uncontrolled separation that warrant establishment of an IROL by the RC. The details required by Requirement ~~R6~~R4 will supplement the severe System conditions identified ~~Requirements~~in Requirement R4 Parts 4.4 ~~&~~and 4.5 of TPL-001-4.

Requirement R4 Part 4.3 also supports the proposed changes made in the CIP-002, CIP-014, and FAC-003 that require the PC and TP to provide information regarding instability, Cascading, and uncontrolled separation to the TO and GO. Of particular importance is the identification of Facilities that are elements of a Contingency event or are otherwise critical to the instability, Cascading, or uncontrolled separation. The TO or GO may consider those Facilities for higher levels of cyber protection, physical security, or vegetation management. The changes to CIP-002, CIP-014, and FAC-003 and the material discussed below uses the term "System instability" to clarify that the focus for the TO and GO is on Facilities that impact the BES, and not necessarily on a single generation unit instability. The applicable Facilities for cyber security, physical security, and vegetation management do not have to be the same.

Examples of Facilities that might be relevant to the TO and GO for higher levels of cyber protection, physical security, and vegetation management include:

- The Contingencies that result in System instability, Cascading, or uncontrolled separation
- A SVC that, if compromised, would result in a more severe System response to the Contingency event
- The line(s) identified as the first lost by Cascading

Examples of Facilities that may not be relevant to the TO and GO for higher levels of cyber protection, physical security, and vegetation management include:

- An individual generator that experiences unit instability
- All generators within the area impacted by System instability, Cascading, or uncontrolled separation
- All the lines that are impacted by Cascading
- A phase shifter that, while impacted by the event, does not significantly change the System's response to the event

Part 4.5 and Part 4.6 are intended to identify those measures that were employed in the planning studies to mitigate or prevent instability, Cascading, or uncontrolled separation. For example, a study might indicate that instability was avoided through the implementation of an operational measure, Remedial Action Scheme (RAS) or a UVLS. i.e., if the operational measure, RAS or the UVLS were not employed, the

study would indicate instability in response to the associated Contingency. This information is critical for operator awareness of any automatic or manual actions that are required to prevent the instability, Cascading, or uncontrolled separation. Without this information, operators may be unaware of these risks and the measures required to address them.