BALANCING AUTHORITY OF NORTHERN CALIFORNIA

FAC-014-3, R6 Process Document

Final

Version 1.1

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Table of Contents

Terms

BA	-	Balancing Authority
BANC	-	Balancing Authority of Northern California
BANC PC Assessment	-	The BANC PC Annual Transmission Planning Assessment that covers Near-Term Transmission Planning Horizon for years 2 and 5.
BANC PC Participants	-	MID, RDNG, RE, and SMUD
BES	-	Bulk Electric System
MID	-	Modesto Irrigation District
Near-Term Transmission Planning Horizon	-	The transmission planning period that covers Year One through Five
NERC	-	North American Electric Reliability Corporation
PC	-	Planning Coordinator
RC West	-	California Independent System Operator Reliability Coordinator
RDNG	-	Redding Electric Utility
RE	-	Roseville Electric
SMUD	-	Sacramento Municipal Utility District
SOL	-	System Operating Limit. SOLs are defined as : All Facility Ratings, System Voltage Limits, and stability limits, applicable to specified System configurations, used in Bulk Electric System operations for monitoring and assessing pre- and post-Contingency operating states.
Steady-state System Voltage Limits	-	The maximum and minimum steady-state voltage limits (both normal and emergency) that provide acceptable System performance.
SVL	-	Steady-state System Voltage Limit
WASN	-	Western Area Power Administration Sierra Nevada Region
WECC	-	Western Electricity Coordinating Council

1. Introduction

The Balancing Authority of Northern California (BANC) is a Joint Powers Authority (JPA) consisting of the Sacramento Municipal Utility District (SMUD), Modesto Irrigation District (MID), Roseville Electric (RE), Redding Electric Utility (RDNG), Trinity Public Utilities District, and the City of Shasta Lake utilities. BANC assumed the Balancing Authority (BA) responsibilities on May 1, 2011, with SMUD providing the BA operator services on a contract basis.

On January 1, 2017, BANC registered as the NERC Planning Coordiantor (PC) for four of its members with the goal of becoming fully compliant with all PC-related reliability standards by January 1, 2018. The four BANC members that are in the BANC PC area are SMUD, MID, RE, and RDNG (individually "PC Participant" and collectively "PC Participants"). The City of Shasta Lake and Trinity Public Utility District are BANC members, but are not part of the BANC PC.[1] SMUD provides the PC services for BANC on a contract basis.

The NERC FAC-014-3 reliability standard, requirement R6 states:

R6. Each Planning Coordinator and each Transmission Planner shall implement a documented process to use Facility Ratings, System steady-state voltage limits and stability criteria in its Planning Assessment of Near-Term Transmission Planning Horizon that are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits and stability described in its respective Reliability Coordinator's SOL methodology.

This document is to comply with R6 of the FAC-014-3 standard for BANC PC. To meet requirement R6 of FAC-014-3, this documented process documents the methodology and criteria which will be used for the Planning Assessment of the Near-Term Transmission Planning Horizon, which are the same methodology and criteria used in the BANC PC Annual TPL-001-5.1 Assessment of the Near-Term Transmission Planning Horizon (BANC PC Assessment).

In addition, this document lists the California Independent System Operator (RC WEST) Reliablity Coordinator (RC) System Operating Limit (SOL) Methodology (RC WEST SOL Methodology) and performance requirements for Facility Ratings, System steady-state voltage limits, stability criteria, and compares them with the criteria in this document for required Planning Assessment of Near-Term Transmission Planning Horizon. This comparison process demonstrates that the Facility Ratings, System steady-state voltage limits, stability criteria used in the Planning Assessment of Near-Term Transmission Planning Horizon are equally limiting or more limiting than the criteria described in the RC WEST SOLs Methodology for the Operations Horizon. The criteria used for the Planning Assessment of Near-Term Transmission Planning Horizon required by the R6 of the FAC-014-3 is the same as the BANC PC Annual TPL-001-5.1 Assessment for the Near-Term Transmisison Planning Horizon (BANC PC Assessment), so the annual BANC PC Assessment will be used as BANC's Near-Term horizon planning assesment to comply with FAC-014-3, R6.

This document will be effective on 12/31/24, and could be revised as needed to ensure continual compliance with FAC-014-3, R6.

2. Purpose

The purpose of this document is to demonstrate that the Facility Ratings, System steady-state voltage limits and stability criteria used in the BANC PC Planning Assessment of the Near-Term Transmission Planning Horizon (BANC TP Assessment) are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits and stability criteria described in its

[1] The Western Area Power Administration – Sierra Nevada Region (WASN) is also inside the BANC BA, however, it is not a member of the BANC JPA. WAPA-SNR is an active participant in BANC activities. Additionally, WASN is a registered PC and serves as the PC for the Trinity Public Utilities District and the City of Shasta Lake. Thus, all BANC members are covered under either the BANC or WASN PC registrations.

respective Reliability Coordinator's (RC West) System Operation Limits (SOL) methodology for the Operations Horizon (RC610).

3. Relevant NERC Reliability Standards

This documented process documents the criteria and methodology used in the BANC PC Assessment that is performed for NERC Reliability Standard TPL-001-5.1 to comply with the following NERC Reliability Standard Requirements from FAC-014-3:

- FAC-014-3 System Operating Limits (R6)

  FAC-014-3 R6 states: Each Planning Coordinator and each Transmission Planner shall implement a documented process to use Facility Ratings, System steady-state voltage limits and stability criteria in its Planning Assessment of Near-Term Transmission Planning Horizon that are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits and stability described in its respective Reliability Coordinator's SOL methodology.

  - The Planning Coordinator may use less limiting Facility Ratings, System steady-state voltage limits and stability criteria if it provides a technical rationale to each affected Transmission Planner, Transmission Operator and ReliabilityCoordinator.
  - The Transmission Planner may use less limiting Facility Ratings, System steady-state voltage limits and stability criteria if it provides a technical rationale to each affected Planning Coordinator, Transmission Operator and ReliabilityCoordinator.

- FAC-014-3 System Operating Limits (R7)

  FAC-014-3 R7 states: 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 Operating Procedures);

  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 and/or unacceptable damping);

  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.

- FAC-014-3 System Operating Limits (R8)

  FAC-014-3 R8 states: Each Planning Coordinator and each Transmission Planner shall annually communicate to each impacted Transmission Owner and Generation Owner a list of their Facilities that comprise the planning event Contingency(ies) that would cause instability, Cascading or uncontrolled separation that adversely impacts the reliability of the BES as identified in its Planning Assessment of the Near-Term Transmission Planning Horizon.

4. Criteria for the BANC PC Assessment and TOPs within BANC PC Footprint SOL Study

The BANC PC Assessment uses the same methodology and criteria as the BANC PC Transmission Planning Annual TPL-001-5.1 Assessment which is conducted to ensure the BANC PC area transmission system is in compliance with the TPL-001-5.1 NERC standard, WECC regional criteria TPL-001-WECC-CRT-4, and each BANC PC Participant's individual planning standards. The criteria used for the BANC PC Assessment are documented below in Sections 4.1 and 4.2. Section 4.3 documents criteria used by TOPs within the BANC PC Footprint when performing operation horizon studies including establishing SOLs to comply with NERC FAC-014-3.

4.1 NERC Criteria

The BANC PC Assessment is conducted annually to ensure that performance of the BANC PC area will meet or exceed the criteria specified in NERC TPL-001-5.1. Transmission System Planning Performance Requirements.

4.2 WECC Regional Criteria and BANC PC Planning Criteria

The BANC PC Assessment uses the default planning criteria specified in WECC Criterion TPL-001-WECC-CRT-4, Transmission System Planning Performance [1] for acceptable facility ratings, voltages, voltage deviations, and transient voltage responses. However, the BANC PC Assessment uses more stringent steady-state system voltage limits than the default WECC voltage limits, except where noted. Table 1 below lists steady-state system voltage limits for WECC and BANC PC participants including MID, RE, RDNG and SMUD.

BANC PC notifies adjacent Transmission Planners and Planning Coordinators that BANC PC participants' steady-state system voltage limits different from WECC were used by sending them the BANC PC Assessment Report annually and will make the different voltage limits available within 30 days of a request.

Table 1 – WECC and BANC PC Participants' Steady-State System Voltage Limits

System	Nominal Voltage	Normal Conditions		Contingency Conditions		Voltage Deviation
		Vmin (pu)	Vmax (pu)	Vmin (pu)	Vmax (pu)	P1 & P2.1
WECC	230 kV	0.950	1.050	0.900	1.100	≤ 8%
	115 kV	0.950	1.050	0.900	1.100	≤ 8%
SMUD	230 kV	0.948[2]	1.052[3]	0.900[4]	1.052	≤ 8%
MID	230 kV	0.950	1.050	0.900	1.052	≤ 8%
	115 kV	0.950	1.050	0.900	1.052	≤ 8%
RE	230 kV	1.000	1.057	0.948	1.100	≤ 8%
RDNG	115 kV	0.974	1.078	0.923	1.100	≤ 8%

4.3 Criteria Used by TOPs within the BANC PC footprint SOL Study

Each individual TOP within the BANC PC footprint (MID, RE, RDNG and SMUD), establishes its own SOLs in accordance with NERC FAC-014-3, R2 requirements and RC West SOL methodology described in Section 5 of this documented process

Facility Ratings within BANC PC's footprint are established in accordance with each individual TOP's Facility Rating Methodology which meets or exceeds the RC West Facility Rating Methodology that was developed for FAC-008-3. Facility Rating are communicated to RC West and other TOP entities via the RC West Portal. Also, each individual TOPs within the BANC PC footprint has an agreement with RC West that determines the dates when they all switch from summer ratings to winter ratings on November 1st and switches back to summer ratings on April 1st.

Steady-state System Voltage Limits (SVLs) are established by individual TOP's system operators within the BANC PC footprint and are communicated to RC West and other TOP entities via the RC West Portal. These SVLs are defined in detail in its own operation procedures as followings:

- MID Operating Bulletin No. 48: Voltage and Reactive Power Control, (Table 1. Voltage Range and Limits)
- WASN OP-050: There is a Letter Of Agreement (LOA) between WASN and RE which requires that WASN is contracted to perform reliability duties on behalf of Roseville. Therefore, RE uses WASN operation procedure for its steady-state system voltage limits. WASN is responsible for monitoring and controlling the 230 kV voltage at Roseville and Flanagan substations which are interconnection points between WASN and Roseville system. WASN has a procedure OP-050 Transmission Voltage Control (Reactive Resources) listing the steady-state system voltage limits for both WASN and RE system.
- RDNG SOP-07: BES Operations (Section 7.2 Voltage Limit),
- SMUD's OP-204: Voltage and Reactive Controls

[2] SMUD 230 kV buses that have a UVLS scheme associated with it are limited to Vmin of 0.948 PU under the normal operating conditions, these buses include Carmichael, Elk Grove, Elverta, Foothill, Hurley, Orangevale, and Pocket.
[3] SMUD Vmax for normal conditions is set per OP-204 and the same Vmax as contingency conditions.
[4] SMUD 230 kV buses that have a UVLS scheme associated with it are limited to Vmin of 0.90 PU under the contingency operating conditions, these buses include Carmichael, Elk Grove, Elverta, Foothill, Hurley, Orangevale, and Pocket.

Table 2 below lists SVLs used by four individual TOPs within the BANC PC footprint.

Table 2 Steady-State Voltage Limits used by BANC PC TOPs

Operating Procedure	System	Nominal Voltage	Normal Conditions		Contingency Conditions		Voltage Deviation
			Vmin (pu)	Vmax (pu)	Vmin (pu)	Vmax (pu)	P1 & P2.1
OP-204	SMUD	230 kV	0.948	1.052	0.900[5]	1.052	≤ 8%
OP No. 48	MID	230 kV	0.950	1.050	0.900	1.052	≤ 8%
		115 kV	0.950	1.050	0.900	1.052	≤ 8%
WASN OP-050	RE	230 kV	1.000	1.057	0.948	1.100	≤ 8%
SOP 07	RDNG	115 kV	0.974	1.078	0.923	1.100	≤ 8%

SMUD uses voltage limits under the contingency operating conditions which are more stringent than the default WECC planning criteria in accordance with its operating procedure, OP-204, except where noted in Table 1. These stricter upper voltage limits are in place for the protection of SMUD's equipment and facilities and will not result in violations of equipment ratings, instability, uncontrolled islanding, or Cascading on its own and adjacent systems.

MID also uses voltage limits under the contingency operating conditions which are more stringent than the default WECC planning criteria in accordance with its Operating procedure, Operating Bulletin No. 48. These stricter upper voltage limits are in place for the protection of MID's facilities and will not result in violations of equipment ratings, instability, uncontrolled islanding, or Cascading on its own and adjacent systems.

RDNG's voltage limits can be found in Redding's Standard Operating Procedure SOP-07 BES Operations. RDNG's voltage criteria of lower voltage limits under both normal and contingency operating conditions are more limiting than the WECC Reliability Criterion from WECC-CRT-4 WR1 because RDNG typically sees a median operating voltage of 117.875 kV, which is higher than the nominal transmission voltage of 115 kV by +2.5%. To accommodate this shift, all substation power transformers have their primary taps set at 117.875. In addition, the established voltage limits are shifted to accommodate the system voltage offset by increasing the per-unit normal condition, the minimum and maximum voltages, and the contingency minimum voltage. However, the WECC contingency high voltage limit is not shifted to eliminate the possibility of exceeding the operating limits of equipment at the point of interconnection.

4.4 Comparison of BANC PC Planning and TOP Criteria

The default NERC and WECC planning criteria defined in Sections 4.1 and 4.2 shall be superseded by the BANC PC participants' own planning steady-state system voltage criteria listed in Table 1 which is more stringent than the default criteria.

[5] SMUD 230 kV buses that have a UVLS scheme associated with it are limited to Vmin of 0.948 PU, these buses include Carmichael, Elk Grove, Elverta, Foothill, Hurley, Orangevale, and Pocket.

This section documents the comparison of the BANC PC planning criteria that the BANC PC Assessment uses with criteria used by each individual TOPs within the BANC PC footprint when performs its own operation horizon studies including establishing its own SOL.

4.4.1 Facility Ratings

Each individual TOP within the BANC PC footprint operational studies (seasonal and next-day), Real-time Assessment and monitoring as well as establishing SOLs are all based on a consistent set of facility ratings that are developed in accordance with individual BANC PC Participants/TOP Facility Rating Methodology pursuant to FAC-008.

Facility Ratings used for the BANC PC Assessment including near-term and long-term planning studies are the same set of facility ratings used for four individual TOPs within the BANC PC footprint except temperature adjust ratings which are higher ratings are used under summer season operating conditions by the TOPs but not by the BANC PC Assessment.

The thermal criteria below in Table 3 is applied for all BANC PC planning studies including the BANC PC Assessment, as well as all TOP seasonal studies, next-day studies, RTA and monitoring as well as establishing SOLs for the operations horizon. The criteria listed in Table 3 are also consistent with TPL-001 WECC CRT4 and TPL-001-5 NERC criteria.

Table 3 – Acceptable Performance Criteria for Planning and Operations Studies

Thermal Loading	Normal Conditions (Pre-contingency)	Emergency Conditions (Post-Contingency)
Contingency	P0	P1-P7[2]
Percentage Loading	≤ 100% of Normal facility Rating	≤ 100% of Emergency facility Rating

In addition, the BANC PC Assessment does not use Emergency Ratings under the pre-contingency conditions to adjust the system to return the flow within its Normal Rating within the specified time duration of those Emergency Ratings. Therefore, the BANC PC Assessment uses facility rating criteria which is more limiting than the criteria used in the RC WEST SOLs Methodology (refer to Section 5) under the pre-contingency conditions.

Refer to Appendix 1 for Comparison of Facility Ratings Usage for operation horizon studies including establishing SOLs and BANC PC planning studies including the BANC PC assessment.

4.4.2 Steady-state System Voltage Limits

The Steady-state System Voltage Limits that shall be used for BANC PC Participant's systems are listed in the Table 1 in Section 4.2. Table 2 in Section 4.3 documents the steady-state system voltage used by four individual TOPs within the BANC PC footprint when perform operation horizon studies including establishing SOLs. Comparing Table 1 with Table 2, the

steady-state system voltage limits are the same used for both the BANC PC assessment and each individual TOPs' to establish their own SOLs.

However, the BANC PC Assessment does not use Emergency Steady-state System Voltage Limits under the pre-contingency conditions to adjust the system to return the voltage within its normal System Voltage Limits within the specified time duration of those Emergency System Voltage Limits. Therefore, the BANC PC Assessment uses pre-contingency system Voltage Limits which is more limiting than the normal Steady-state System Voltage Limits used in the RC West SOLs Methodology (refer to Section 5)

4.3.3 Stability Criteria

The stability criteria including transient stability and voltage stability that the BANC PC Assessment uses for each of the PC Participant's systems are listed in WECC Criterion TPL-001-WECC-CRT-4. These criterion are the same as used in the RC WEST SOLs Methodology (refer to Section 5) that stability limits are not exceeded, and the system must demonstrate positive damping as well as no cascading to be considered a stable response to contingencies. Instability, cascading, or uncontrolled separation that adversely impact the reliability of the Bulk Electric System does not occur.

5. RC WEST SOLs Methodology and Criteria

The details of the RC WEST SOLs Methodology for the operations horizon, performance requirements, and contingencies to determine SOLs is available on the RC WEST website and known as the System Operating Limits Methodology for the Operations Horizon (RC WEST SOLs Methodology). (https://www.caiso.com/Documents/RC0610.pdf)

The RC WEST establishes SOLs per it's methodology. For Steady State pre and post contingency, the following system performance are to be observed:

- All facilities normal and emergency ratings.
- System voltage limits.
- Voltage and transient stability limits.

According to the RC WEST methodology: In the pre-contingency state with all facilities in service, the Bulk Electic System (BES) shall demonstrate transient, dynamic and voltage stability; all Facilities shall be within their Facility Ratings and within their thermal, voltage and stability limits. Specifically, Section G of the RC WEST SOLs Methodology stated following:

Pre-Contingency:

Acceptable system performance for the pre-Contingency state in the Operations Horizon is characterized by the following [NERC Standard FAC-011-4 R6.1]:

1. Steady state flow through all facilities shall be within their normal Facility Ratings. 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. [NERC Standard FAC-011-4 R6.1.1].

2. Steady state voltages of all facilities shall be within their normal System Voltage Limits, and 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. [NERC Standard FAC-011-4 R6.1.2].

3. Predetermined stability limits are not exceeded [NERC Standard FAC-011-4 R6.1.3].

4. Instability, Cascading or uncontrolled separation that adversely impact the reliability of the Bulk Electric System does not occur. [NERC Standard FAC-011-4 R6.1.4].

Post-Contingency:

Acceptable system performance for the post-Contingency state for Single Contingencies (SCs) and Credible Multiple Contingencies (MCs) in the Operations Horizon is characterized by the following. [NERC Standard FAC-011-4 R6.2,R6.3]:

1. All facilities shall be within applicable emergency Facility Ratings. Steady state postContingency flow through a facility must not be above the Facility's highest Emergency Rating. [NERC Standard FAC-011-4 R6.2.1]

2. All facilities shall be within their emergency System Voltage Limits. [NERC Standard FAC-011-4 R6.2.2]

3. All facilities shall be within their Stability Limits. [NERC Standard FAC-011-4 R6.2.3]

4. Instability, cascading or uncontrolled separation that adversely impact the reliability of the Bulk Electric System does not occur. [NERC Standard FAC-011-4 R6.2.4]

SOLs that are established by each individual TOPs within the BANC PC footprint are basedon facility ratings, system steady-state voltage limits and stability criteriawhich are consistent with the latest RC West SOL Methodology (RC0610) that was developed for FAC-014-3.

6. Study Contingencies Comparison

This section documents and compares study contingencies required by the BANC PC Assessment and four TOPs within the BANC PC footprint operational studies including the SOL study which follows the RC West SOL Methodology.

6.1 Contingencies required by the BANC PC Assessment

The BANC PC Assessment system performance is evaluated under normal (pre-contingency) conditions and following the loss of single or multiple BES elements (post-contingency) as defined by the TPL-001-5.1 NERC Reliability Standard. Table 4 below summarizes the

contingencies that are studied by the BANC PC Assessment. Contingencies for each BANC PC participants' system are studied, along with neighboring system contingencies. The BANC PC Assessment studies all applicable study contingencies of P1 to P7 as described in TPL-001-5.1.

Table 4 - Study Contingencies of the BANC PC Assessment

Contingencies	Description
P0 (No contingency)	All Elements in Service
P1 (Single Contingency)	• Loss of one generator (P1.1) • Loss of one transmission circuit (P1.2) • Loss of one transformer (P1.3) • Loss of one shunt or SVC/STATCOM device (P1.4) • Loss of a single pole of DC lines (P1.5)
P2 (Single Contingency)	• Loss of one transmission circuit without a fault (P2.1) • Loss of one bus section (P2.2) • Loss of one breaker (internal fault) (non-bus-tie-breaker) (P2.3) • Loss of one breaker (internal fault) (bus-tie-breaker) (P2.4)
P3 (Multiple Contingency)	Loss of a generator unit followed by system adjustments and the loss of the followings: • Loss of one transmission circuit (P1.2) • Loss of one transformer (P1.3) • Loss of one shunt or SVC/STATCOM device (P1.4) • Loss of a single pole of DC lines (P1.5)
P4 (Multiple Contingency)	Loss of multiple elements caused by a study breaker attempting to clear a fault on one of the following: • Loss of one generator (P4.1) • Loss of one transmission circuit (P4.2) • Loss of one transformer (P4.3) • Loss of one shunt device (P4.4) • Loss of one bus section (P4.5) • Loss of a bus-tie-breaker (P4.6)
P5 (Multiple Contingency)	Contingencies with delayed fault clearing due to the failure of a non-redundant component of the protection system protecting the faulted element to operate as designed for one of the following: • Loss of one generator (P5.1) • Loss of one transmission circuit (P5.2) • Loss of one transformer (P5.3) • Loss of one shunt device (P5.4) • Loss of one bus section (P5.5)
P6 (Multiple Contingency)	Loss of two or more (non-generator unit) elements with system adjustment between them, which produce the more severe system results
P7 (Multiple Contingency)	Loss of a common structure as follows: • Any two adjacent circuits on common structure (P7.1) • Loss of a bipolar DC lines (P7.2)
Extreme	Steady State & Stability events as defined in Table 1 of TPL-001-5.1 or by specific request of BANC PC members

6.2 Contingencies required by the RC WEST SOLs Methodology

According to the RC WEST SOLs Methodology for the Operations Horizon, Section F of Selection of Applicable Contingencies, the following Contingencies, at a minimum, are applicable to TOP assessments within the Operations Horizon [NERC Standard FAC-011-4 5]:

1. Single Contingencies internal to the TOP Area [NERC Standard FAC-011-4 5.1],
2. Credible Multiple Contingencies[6] (MCs) internal to the TOP Area [NERC Standard FAC-011-4 5.2],
3. Any single Contingencies and Credible MCs external to the TOP Area that are known to impact the TOP Area or system under study, as determined by the TOP or RC. TOPs are responsible for determining the external modeling necessary to support the evaluation of those Contingencies [NERC Standard FAC-011-4 5.2], and
4. Any contingencies provided by Planning Coordinators/Transmission Planner according to [NERC Standard FAC-014-3 R7] that are also deemed credible based on the RC SOL methodology for the Operations Horizon [NERC Standard FAC-011-4 5.3].
5. The single Contingencies that shall be studied for assessments within the Operations Horizon include the following [NERC Standard FAC-011-4 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, or without a Fault:

   i. generator;

   ii. transmission circuit;

   iii. transformer;

   iv. shunt device; or

   v. single pole block in a monopolar or bipolar high voltage direct current system.
6. The Credible MCs that shall be studied for assessments within the Operations Horizon include the following two types [NERC Standard FAC-011-4 5.2]:

   a. Always Credible MCs, and

   b. Conditionally Credible MCs. [7]

6.3 Comparison of Contingencies required by the RC WEST SOLs Methodology and the BANC PC Assessment

Comparing the study contingencies required between the BANC PC Assessment and the RC WEST SOLs Methodology, the BANC PC Assessment performs all P1 to P7 contingencies

[6] Credible Multiple Contingencies (As defined in the CAISO RC SOL Methodology) – a MC whose Credibility is considered sufficiently high to warrant protecting against.

[7] Conditionally Credible Multiple Contingencies (As defined in the CAISO RC SOL Methodology) - a MC whose Credibility is a function of Observable System Conditions. Conditionally Credible MCs are only Credible when the Observable System Conditions are present. When the Observable System Conditions are not present, the MC is not Credible.

while the RC WEST SOLs Methodology requires equivalent P1 and some of P7 contingencies which are deemed credible MCs and conditionally credible MCs. Refer to Table 5 below for comparison of required contingencies for Steady-State, Transient and Voltage Stability Analyses between RC WEST SOL Methodology and the BANC PC Assessment.

Table 5 Comparison of Contingencies Required by RC WEST and the BANC PC Assessment

Contingencies	Requirement by the RC West SOL Methodology	Required by the BANC PC Assessment
P1	Yes	Yes
P2	No	Yes
P3	No	Yes
P4	No	Yes
P5	No	Yes
P6	No	Yes
P7	Credible MCs and conditionally credible MCs	Yes
Extreme	No	Yes

7. Conclusion

In conclusion, this document serves as compliance with NERC Standard FAC-014-3, requirement R6, demonstrating that Facility Ratings and System steady-state voltage limits under the pre-contingency conditions in the BANC PC Assessment of the Near-Term Transmission Planning Horizon are equal or more limiting than the criteria for Facility Ratings and System Voltage Limits as well as study contingencies described in its respective Reliability Coordinator's SOL methodology.

In addition, under the post-contingency conditions, Facility Ratings, System steady-state voltage limits and stability criteria in the BANC PC Assessment of the Near-Term Transmission Planning Horizon are equal or more limiting when comparing to the criteria for Facility Ratings, System Voltage Limits and stability described in its respective Reliability Coordinator's SOL methodolog.

Last, the BANC PC Assessment requires to perform all NERC defined P1 through P7 contingecies analysis. The RC WEST SOL Methodology requires equivalent P1 and some of P7 contingencies which are deemed credible MCs and conditionally credible MCs.

Therefore, this document concludes the BANC PC Assessment of the Near-Term Transmission Planning Horizon uses Facility Ratings, System steady-state voltage limits and stability criteria that are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage

Limits and stability described in its respective Reliability Coordinator's SOL methodology. Since the BANC PC's Planning Assessment of the Near-Term Transmission Planning Horizon uses the same criteria and methodology as the BANC PC TPL-001-5.1 Assessment, the BANC PC TPL-001-5.1 Assessment will be used as BANC PC Planning Assessment of Near-Term Transmission Planning Horizon to comply with the FAC-014-3, R6 reliability standard.

Version History

Version	Change	By	Effective Date
1.0	Initial	Prabal Singh	04/01/2024
1.1	Updates based on Mock Audit recommendations	Prabal Singh	12/31/2024

References

[1] *WECC Criterion TPL-001-WECC-CRT-4.* Transmission System Planning Performance. https://www.wecc.org/Reliability/TPL-001-WECC-CRT-4.pdf

[2] *RC WEST SOL Methodology*. System Operating Limits Methodology for the Operations Horizon https://www.RC West.com/Documents/RC0610-040124.pdf

[3] *FAC-014-3 SOLs*. Establish System Operating Limits for the Planning Horizon https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-014-3.pdf

[4] *TPL-001-5.1*. Transmission System Planning Performance Requirements https://www.nerc.com/pa/Stand/Reliability%20Standards/TPL-001-5.1.pdf

[5] *SMUD OP-204*. SMUD Operating Procedures (Voltage Limits)

[6] *RDNG SOP-07*. RDNG BES Operations (Voltage Limits)

[7] *MID Operating Bulletin No. 48*. MID Operating Bulletin Number 48 (Voltage Limits)

[8] *WASN OP-50* used for RE 230 kV Buses (Voltage Limits)

Appendix 1 - Comparison of Facility Ratings Usage for operation horizon studies including establishing SOLs and BANC PC planning studies including the BANC PC assessment.

Facility Name	Rating Type	Used by TOPs to establish SOLs	Used by the BANC PC Assessment
Transmission Lines	Summer Normal	Yes	Yes
	Summer Emergency	Yes	Yes
	Summer Season Temperature Adjusted Ratings	Yes	No
	Winter Normal	Yes	Yes
	Winter Emergency	Yes	Yes
Transformers	Summer Normal	Yes	Yes
	Summer Emergency	Yes	Yes
	Winter Normal	Yes	Yes
	Winter Emergency	Yes	Yes
Substation Terminal Related Facilities	Summer Normal	Yes	Yes
	Summer Emergency	Yes	Yes
	Winter Normal	Yes	Yes
	Winter Emergency	Yes	Yes