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Category	( ) Regional Reliability Standard ( ) Regional Criteria (X) Regional Business Practice ( ) Policy ( ) Guideline ( ) Report or other
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Version Control

Version	Date	Action	Change Highlights
1	March 6, 2008	Planning Coordination Committee approved TPL-(001 thru 004) WECC -1-CR.	Reliability Subcommittee translates existing WECC components of NERC/WECC Planning Standards into criterion.
1	April 16, 2008	WECC Board of Directors	No substantive changes.
2	October 13, 2011	Planning Coordination Committee	Clarifies corridor issues.
2	December 1,	WECC Board of Directors	No substantive change
2	January 16, 2013	Format Change	No substantive change. Conformed to RBP Template

2.1	August 6, 2013	Errata	Measures were moved to align with their Requirements. WM2 moved to WM3. WM3 moved to WM4. WM4 moved to WM2.

A. Introduction

1. Title: System Performance Criterion Under Normal Conditions, Following Loss of a Single BES Element, and Following Extreme BES Events

2. Number: TPL-001-WECC-RBP-2.1
Regional Business Practice

3. Purpose: System simulations and associated assessments are needed periodically to ensure that reliable systems are developed that meet specified performance requirements with sufficient lead time, and that systems continue to be modified or upgraded as necessary to meet present and future system needs

4. Applicability

4.1. Functional Entities

4.1.1 Planning Coordinator

4.1.2 Transmission Planner

4.2. Facilities

4.2.1 Part 1.1 applies to only Adjacent Transmission Circuits where both circuits are greater than or equal to 300 kV.

4.2.2 Requirement R1 only applies to effects on facilities external to a Transmission Planner area.

4.2.3 Part 1.1 of Requirement R1 does not apply to Adjacent Transmission Circuits that share a common right-of-way for a total of three miles or less, including – but not limited to – substation entrances, pinch points, and river crossings.

5. Effective Date: April 1, 2012

B. Requirements and Measures

WR1. In addition to NERC Table 1[1], each Planning Coordinator and Transmission Planner shall comply with WECC's Disturbance- Performance Table (Table W-1) of Allowable Effects on Other Systems and Part 1.1–1.4, contained in this section, when planning the Transmission System in the Western Interconnection.

1.1. The NERC Category C.5[2] initiating event of a single-line-to- ground fault with normal clearing shall also apply to the common mode contingency of two Adjacent Transmission Circuits on separate towers — unless the Mean Time Between Failure (MTBF)[3] is determined to be greater than 30 years (i.e., outage frequency is less than 0.033 outages per year).

1.2. The common mode simultaneous outage of two generator units connected to the same switchyard, not addressed by the initiating events in NERC Category C, shall not result in cascading.

1.3. The loss of multiple bus sections, as a result of a failure or delayed clearing of a bus tie or bus sectionalizing breaker, shall meet the performance specified for Category D of Table W-1.

1.4. For contingencies involving existing or planned facilities, the Table W-1 performance category can be adjusted based on actual or expected performance (e.g., event outage frequency and consideration of impact) after receiving Board approval to change the Performance Level Adjustment Record.

WM1. Planning Coordinator or Transmission Planner has documentation that it complies with WECC's Disturbance- Performance Table (Table W-1) of Allowable Effects on Other Systems as required by WR1.

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[1] NERC TPL-001-0 through TPL-004-0 Planning Standards
[2] NERC Table 1

[3] WECC Seven Step Process for Performance Category Upgrade Request at: http://www.wecc.biz/committees/StandingCommittees/PCC/RS/RPEWG/Shared%20Documents/Seven_Step_Process_BOD_Approved_12-7-04.pdf

WR2. Individual systems or a group of systems may apply requirements that differ from specific requirements in Table W-1 for internal impacts. If the individual requirements are less stringent, other systems are permitted to have the same impact on that part of the individual system for the same category of disturbance. If these requirements are more stringent, these requirements may not be imposed on other systems. This does not relieve the system or group of systems from WECC requirements for impacts on other systems.

WM2. The Planning Coordinator or Transmission Planner, with less stringent individual requirements than these WECC requirements, has documentation that other Planning Coordinators or Transmission Planners performance are permitted to have the same impact on that part of the individual system for the same category of disturbance, as required in WR2.

WR3. Reactive power resources, with a balance between static and dynamic characteristics, shall be planned and distributed throughout the interconnected transmission systems to ensure system performance as defined below:

3.1. For transfer paths, voltage stability is required with the pre-contingency path flow modeled at a minimum of 105% of the path rating for system normal conditions (Category A) and for single contingencies (Category B). For multiple contingencies (Category C), post-transient voltage stability is required with the pre- contingency transfer path flow modeled at a minimum of 102.5% of the path rating.

3.2. For load areas, voltage stability is required for the area modeled at a minimum of 105% of the reference load level for system normal conditions (Category A) and for single contingencies (Category B). For multiple contingencies (Category C), post- transient voltage stability is required with the area modeled at a minimum of 102.5% of the reference load level. For this criterion, the reference load level is the maximum established planned load limit for the area under study.

3.3. Specific requirements that exceed the minimums specified in 3.1 and 3.2 may be established, to be adhered to by others, provided that technical justification has been approved by WECC's Planning Coordination Committee (PCC).

3.4. R3 applies to internal WECC Member Systems as well as between Member Systems.

WM3. The Planning Coordinator or Transmission Planner has documentation that it has planned for reactive power resource as required by WR3.

WR4. The Planning Coordinators and Transmission Planners shall meet the same performance category for unsuccessful reclosing, as that required for the initiating disturbance without reclosing.

WM4. The Planning Coordinator or Transmission Planner has documentation that it meets the same performance category for unsuccessful reclosing as required by WR4.

WR5. For any event that has actually resulted in cascading, action must be taken so that future occurrences of the event will not result in cascading; or it must demonstrate that the Mean Time Between Failure (MTBF) is greater than 300 years (frequency less than 0.0033 outages/year) and approved by PCC.

5.1. Any contingency adjusted to Category D must not result in a cascading outage unless the MTBF is greater than 300 years (frequency less than 0.0033 outages/year); or the initiating disturbances and corresponding impacts are confined to either a radial system or a local network.

WM5. The Planning Coordinator or Transmission Planner has documentation that it has Planning Coordination Committee (PCC) approval to adjust in Table W-1 the Performance Level Adjustment Record involving existing or planned facilities.

WM6. For any event that has actually resulted in cascading, the Planning Coordinator or Transmission Planner shall have documentation that it has taken action so that future occurrences of the event will not result in cascading, or it must have documentation that it has PCC approval that the Mean Time Between Failure (MTBF) is greater than 300 years (frequency less than 0.0033 outages/year).

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Western Electricity Coordinating Council (WECC)

1.2. Compliance Monitoring Period and Reset

Annual

1.3. Data Retention

Four Years

1.4. Additional Compliance Information

None

WECC DISTURBANCE-PERFORMANCE TABLE
OF ALLOWABLE EFFECTS ON OTHER SYSTEMS

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard (See Note 3)
A	Not Applicable	Nothing in addition to NERC.		
B	≥ 0.33	Not to exceed **25%** at load buses or **30%** at non-load buses. Not to exceed **20% for more than 20 cycles** at load buses.	Not below **59.6** Hz for 6 cycles or more at a load bus.	Not to exceed **5%** at any bus.
C	0.033 – 0.33	Not to exceed **30%** at any bus. Not to exceed **20% for more than 40 cycles** at load buses.	Not below **59.0** Hz for 6 cycles or more at a load bus.	Not to exceed **10%** at any bus.
D	< 0.033	Nothing in addition to NERC.		

Table W-1

Notes:

1. *The WECC Disturbance-Performance Table applies equally to either a system with all elements in service, or a system with one element removed and the system adjusted.*

2. *As an example in applying WECC's Disturbance-Performance Table, a Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.*

3. *If it can be demonstrated that post-transient voltage deviations that are less than the values in the table will result in voltage instability, the system in which the disturbance originated and the affected system(s) shall cooperate in mutually resolving the problem.*

4. *Refer to Figure W-1 for voltage performance parameters.*

5. *Load buses include generating unit auxiliary loads.*

6. *To reach the frequency categories shown in WECC's Disturbance-Performance Table for Category C disturbances, some planned and controlled islanding may occur. Underfrequency load shedding is expected to arrest this frequency decline and assure continued operation within the resulting islands.*

7. *For simulation test cases, the interconnected transmission system steady-state loading conditions prior to a disturbance shall be appropriate to the case. Disturbances shall be simulated at locations on the system that result in maximum stress on other systems. Relay action, fault clearing time, and reclosing practice shall be represented in simulations according to the planning and operation of the actual or planned systems. When simulating post-transient conditions, actions are limited to automatic devices, and no manual action is to be assumed.*

Figure W-1