

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development Steps Completed:

1. SAR submitted to SC in April 2010.
2. SAR approved by SC in April 2010.
3. 30-day pre-ballot period completed in May 2010.
4. Initial ballot completed in May 2010.

Proposed Action Plan and Description of Current Draft:

The SAR for this project proposed changes to TPL Table 1 in response to FERC's Order RM06-16-009 which required the ERO to clarify TPL-002-0, Table 1 - footnote 'b', regarding the planned or controlled interruption of electric supply where a single contingency occurs on a transmission system. Such clarification was originally required by June 30, 2010. Table 1 is used in TPL-001, TPL-002, TPL-003, and TPL-004 – and any change to Table 1 needs to be reflected in all four of these TPL standards. (Note: FERC issued a clarifying order on June 11, 2010 which extended the deadline for clarifying Table 1 until March 31, 2011.)

Based on stakeholder comments, the drafting team has made changes from the initial ballot posting to Footnote 'b' in Table 1 of TPL-001, TPL-002, TPL-003, and TPL-004. The changes include the following:

Stakeholders identified that the terminology used in Footnote 'b' didn't match the terminology used in the associated column heading of Table 1 – 'Loss of Demand or Curtailed Firm Transfers.' For additional clarity, the team made the following terminology changes:

- The term 'Load' was replaced with 'Demand'
- The term 'Firm Transmission Service' was replaced with 'firm transfers'

While the initial ballot results came close to the required approval percentage, it was clear to the SDT that there were still a number of concerns with the proposed clarification. In particular, entities were concerned that the proposal was still unclear and too limiting on the proposed conditions when Demand could be interrupted. Also, there were numerous concerns raised on jurisdictional issues with regard to interrupting Demand. In short, the needed clarification hadn't been achieved. Therefore, the SDT continued discussions on different alternatives to address the needed clarification. This led the SDT to focus on identifying constraining parameters such as the amount of Demand that could be interrupted, annual amount of exposure, etc.

In order to receive additional industry feedback on the new approach, a Technical Conference was held on August 10, 2010 to address four specific questions arising from the FERC June 11, 2010 clarification order. These 4 questions were:

1. Under what circumstances do you believe the existing footnote ‘b’ allows an entity to plan to shed non-consequential firm load for a single contingency (Category B)? Please provide specific information to the extent possible.
2. The June 11th order from FERC suggested that planning to shed non-consequential firm load for a single contingency (Category B) could be applied at the fringes of a system. Is this limitation appropriate and if so, please define it? What other specific criteria could be applied to limit the planned use of non-consequential firm load loss for a single contingency (Category B)?
3. If footnote ‘b’ were re-stated such that there would be no planned loss of non-consequential firm load allowed for a single contingency event (Category B), what changes to your transmission plan would be required? Please quantify your response to the extent possible.
4. The June 11th order from FERC suggested that planning to shed non-consequential firm load for a single contingency (Category B) could be handled on a case-by-case basis with affected entities asking for an exception from the ERO. Could you support such a process? If your response is no, then what process would you suggest? If your response is yes, then what technical criteria should be developed to identify and evaluate cases?

In summary, the SDT heard that:

- Industry feels that interrupting non-consequential Demand was appropriate in certain limited circumstances and that such usage was not widespread.
- Use of the term ‘fringes’ was seen as problematic and application at the ‘fringes’ could possibly be discriminatory.
- If interruption of non-consequential Demand was not allowed, such a policy would result in significant costs to customers for limited benefits.
- A case-by-case exception process that required ERO or FERC approval was not viewed as an acceptable approach due to possible inconsistencies in approach and potential unacceptable delays.

The SDT took in all of these inputs and returned to their deliberations attempting to leverage the existing work with the industry comments to develop an acceptable clarification to footnote ‘b’. This led to the approach shown in this posting where the SDT has taken the concept of allowing interruption of Demand without numerical constraints in an open and transparent stakeholder process to review and accept such plans. This open and transparent stakeholder process is seen as an enhancement of existing entity processes without the problems associated with an ERO or FERC case-by-case exception process.

The SDT believes that this approach addresses industry concerns and FERC Order 693 directives (and subsequent orders) concerning clarification to footnote ‘b’ in a way that is an equal and effective method and that should be acceptable to all concerned parties.

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In addition, the following bullet was added to Footnote ‘b’ to clarify that it is always acceptable to use Interruptible Demand and Demand-Side Management:

- Interruptible Demand or Demand-Side Management

Future Development Plan:

Anticipated Actions	Anticipated Date
1. 30-day posting	September 2010
2. 30-day pre-ballot period	November 2010
3. Initial ballot	December 2010
4. Recirculation ballot	January 2011
5. Submit to BOT for approval	January 2011
6. File with FERC	February 2011

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)
2. **Number:** TPL-004-1
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 continue to be modified or upgraded as necessary to meet present and future System needs.
4. **Applicability:**
 - 4.1. Planning Authority
 - 4.2. Transmission Planner
5. **Effective Date:** The application of revised Footnote ‘b’ in Table 1 will take effect on the first day of the first calendar quarter, 60 months after applicable regulatory approval. In those jurisdictions where no regulatory approval is required, the effective date will be the first day of the first calendar quarter, 60 months after Board of Trustees adoption. All other requirements remain in effect per previous approvals. The existing Footnote ‘b’ remains in effect until the revised Footnote ‘b’ becomes effective

B. Requirements

- R1.** The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority’s and Transmission Planner’s assessment shall:
- R1.1. Be made annually.
- R1.2. Be conducted for near-term (years one through five).
- R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).
- R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.
- R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.
- R1.3.3. Be conducted annually unless changes to system conditions do not warrant such analyses.
- R1.3.4. Have all projected firm transfers modeled.
- R1.3.5. Include existing and planned facilities.

- R1.3.6.** Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.
- R1.3.7.** Include the effects of existing and planned protection systems, including any backup or redundant systems.
- R1.3.8.** Include the effects of existing and planned control devices.
- R1.3.9.** Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.
- R1.4.** Consider all contingencies applicable to Category D.
- R2.** The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

C. Measures

- M1.** The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-1_R1.
- M2.** The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-1_R1.

D. Compliance

- 1. Compliance Monitoring Process**
 - 1.1. Compliance Monitoring Responsibility**

Compliance Monitor: Regional Reliability Organization.
Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.
 - 1.2. Compliance Monitoring Period and Reset Timeframe**

Annually.
 - 1.3. Data Retention**

None specified.
 - 1.4. Additional Compliance Information**

None.
- 2. Levels of Non-Compliance**
 - 2.1. Level 1:** A valid assessment, as defined above, for the near-term planning horizon is not available.
 - 2.2. Level 2:** Not applicable.
 - 2.3. Level 3:** Not applicable.
 - 2.4. Level 4:** Not applicable.

B. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	TBD	Revised footnote 'b' pursuant to FERC Order RM06-16-009.	Revised

Standard TPL-004-1 — System Performance Following Extreme BES Events

Table I. Transmission System Standards – Normal and Emergency Conditions

Category	Contingencies	System Limits or Impacts		
		System Stable and both Thermal and Voltage Limits within Applicable Rating ^a	Loss of Demand or Curtailed Firm Transfers	Cascading Outages
A No Contingencies	All Facilities in Service	Yes	No	No
B Event resulting in the loss of a single element.	Single Line Ground (SLG) or 3-Phase (3Ø) Fault, with Normal Clearing: 1. Generator 2. Transmission Circuit 3. Transformer Loss of an Element without a Fault.	Yes Yes Yes Yes	No ^b No ^b No ^b No ^b	No No No No
	Single Pole Block, Normal Clearing ^e : 4. Single Pole (dc) Line	Yes	No ^b	No
C Event(s) resulting in the loss of two or more (multiple) elements.	SLG Fault, with Normal Clearing ^e : 1. Bus Section 2. Breaker (failure or internal Fault)	Yes Yes	Planned/ Controlled ^d Planned/ Controlled ^c	No No
	SLG or 3Ø Fault, with Normal Clearing ^e , Manual System Adjustments, followed by another SLG or 3Ø Fault, with Normal Clearing ^e : 3. Category B (B1, B2, B3, or B4) contingency, manual system adjustments, followed by another Category B (B1, B2, B3, or B4) contingency	Yes	Planned/ Controlled ^c	No
	Bipolar Block, with Normal Clearing ^e : 4. Bipolar (dc) Line Fault (non 3Ø), with Normal Clearing ^e : 5. Any two circuits of a multiple circuit towerline ^f	Yes Yes	Planned/ Controlled ^c Planned/ Controlled ^c	No No
	SLG Fault, with Delayed Clearing ^e (stuck breaker or protection system failure): 6. Generator	Yes	Planned/ Controlled ^c	No
	7. Transformer	Yes	Planned/ Controlled ^c	No
	8. Transmission Circuit	Yes	Planned/ Controlled ^d	No
	9. Bus Section	Yes	Planned/ Controlled ^c	No

<p>D^d Extreme event resulting in two or more (multiple) elements removed or Cascading out of service</p>	<p>3Ø Fault, with Delayed Clearing^e (stuck breaker or protection system failure):</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">1. Generator</td><td style="width: 50%;">3. Transformer</td></tr> <tr> <td>2. Transmission Circuit</td><td>4. Bus Section</td></tr> </table> <hr/> <p>3Ø Fault, with Normal Clearing^e:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">5. Breaker (failure or internal Fault)</td><td style="width: 50%;"></td></tr> </table> <hr/> <p>6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.</p>	1. Generator	3. Transformer	2. Transmission Circuit	4. Bus Section	5. Breaker (failure or internal Fault)		<p>Evaluate for risks and consequences.</p> <ul style="list-style-type: none"> ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.
1. Generator	3. Transformer							
2. Transmission Circuit	4. Bus Section							
5. Breaker (failure or internal Fault)								

- a) Applicable rating refers to the applicable Normal and Emergency facility thermal Rating or System Voltage Limit as determined and consistently applied by the system or facility owner. Applicable Ratings may include Emergency Ratings applicable for short durations as required to permit operating steps necessary to maintain system control. All Ratings must be established consistent with applicable NERC Reliability Standards addressing Facility Ratings.
- b) ~~No interruption of firm Load is allowed except An objective of the planning process is to avoid interruption of Demand. Interruption of Demand is discouraged and measures to mitigate such interruption should be pursued within the planning process. However, Demand may need to be interrupted in limited circumstances to address BES performance requirements. When interruption of Demand is utilized within the planning process, such interruption is limited to:~~
- ~~(1) Interruption of LoadDemand~~ that is directly served by the elements that are removed from service as a result of the Contingency, or
 - ~~Interruptible Demand or Demand-Side Management~~
 - ~~(2) Planned or controlled interruption of Load supplied by Transmission Facilities made temporarily radial as a result of the Contingency and where that Load must be interrupted to meet performance requirements only on those now radial Transmission Facilities. FacilitiesDemand that does not adversely impact overall BES reliability when: where the circumstances describing the use of such Demand interruption are documented, including alternatives evaluated; and where the application is subject to review and acceptance in an open and transparent stakeholder process.~~
- ~~No eCurtailment of Firm Transmission ServiceTransfers~~ is allowed, ~~except~~ when coupled with the appropriate re-dispatch of resources obligated to re-dispatch, where it can be demonstrated that Facilities remain within applicable Facility Ratings and ~~those adjustments~~ the re-dispatch does not result in the shedding of any firm ~~LoadDemand~~. Where Facilities external to the Transmission Planner's planning region are relied upon, Facility Ratings in those regions ~~should~~ also be respected.
- c) Depending on system design and expected system impacts, the controlled interruption of electric supply to customers (load shedding), the planned removal from service of certain generators, and/or the curtailment of contracted Firm (non-recallable reserved) electric power Transfers may be necessary to maintain the overall reliability of the interconnected transmission systems.
- d) A number of extreme contingencies that are listed under Category D and judged to be critical by the transmission planning entity(ies) will be selected for evaluation. It is not expected that all possible facility outages under each listed contingency of Category D will be evaluated.

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- e) Normal clearing is when the protection system operates as designed and the Fault is cleared in the time normally expected with proper functioning of the installed protection systems. Delayed clearing of a Fault is due to failure of any protection system component such as a relay, circuit breaker, or current transformer, and not because of an intentional design delay.
- f) System assessments may exclude these events where multiple circuit towers are used over short distances (e.g., station entrance, river crossings) in accordance with Regional exemption criteria.