

## 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.
5. Standards re-posted in September 2010.
- 4-6. Re-ballotted in December 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 11<sup>th</sup> 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 11<sup>th</sup> 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.

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

These changes were balloted and received approval but several commenters requested clarifications of the SDT’s intent. The SDT responded to these requests by re-ordering the items in footnote ‘b’ to make it clear exactly what the intent of the changes were.

**Future Development Plan:**

Anticipated Actions	Anticipated Date
<del>1. 30-day posting</del>	<del>September 2010</del>
<del>2. 30-day pre-ballot period</del>	<del>November 2010</del>
<del>3. Initial ballot</del>	<del>December 2010</del>
<del>1.4.</del> Recirculation ballot	January 2011
<del>2.5.</del> Submit to BOT for approval	January 2011
<del>3.6.</del> File with FERC	February 2011

## A. Introduction

1. **Title:** System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
2. **Number:** TPL-003-1a
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 systems is planned such that the network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand Levels over the range of forecast system demands, under the contingency conditions as defined in Category C of Table I (attached). The controlled interruption of customer Demand, the planned removal of generators, or the Curtailment of firm (non-recallable reserved) power transfers may be necessary to meet this standard. To be valid, the Planning Authority and Transmission Planner assessments shall:
  - R1.1. Be made annually.
  - R1.2. Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.
  - 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 C of Table 1 (multiple contingencies). The specific elements selected (from 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 C 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.



- M2.** The Planning Authority and Transmission Planner shall have evidence it reported documentation of results of its reliability assessments and corrective plans per Reliability Standard TPL-003-1\_R3.

**D. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Monitoring Responsibility**

Compliance Monitor: Regional Reliability Organizations.

**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:** Not applicable.

**2.2. Level 2:** A valid assessment and corrective plan for the longer-term planning horizon is not available.

**2.3. Level 3:** Not applicable.

**2.4. Level 4:** A valid assessment and corrective plan for the near-term planning horizon is not available.

**E. Regional Differences**

- 1.** None identified.

**Version History**

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	October 23, 2008	Added Appendix 1 – Interpretation of TPL-002-0 Requirements R1.3.2 and R1.3.12 and TPL-003-0 Requirements R1.3.2 and R1.3.12 for Ameren and MISO	Revised
1a	TBD	Revised footnote ‘b’ pursuant to FERC Order RM06-16-009.	Revised

Table I. Transmission System Standards – Normal and Emergency Conditions

Category	Contingencies	System Limits or Impacts		
	Initiating Event(s) and Contingency Element(s)	System Stable and both Thermal and Voltage Limits within Applicable Rating <sup>a</sup>	Loss of Demand or Curtailed Firm Transfers	Cascading <sup>c</sup> Outages
<b>A</b> No Contingencies	All Facilities in Service	Yes	No	No
<b>B</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 <sup>b</sup> No <sup>b</sup> No <sup>b</sup> No <sup>b</sup>	No No No No
	Single Pole Block, Normal Clearing <sup>c</sup> : 4. Single Pole (dc) Line	Yes	No <sup>b</sup>	No
<b>C</b> Event(s) resulting in the loss of two or more (multiple) elements.	SLG Fault, with Normal Clearing <sup>c</sup> : 1. Bus Section	Yes	Planned/ Controlled <sup>c</sup>	No
	2. Breaker (failure or internal Fault)	Yes	Planned/ Controlled <sup>c</sup>	No
	SLG or 3Ø Fault, with Normal Clearing <sup>c</sup> , Manual System Adjustments, followed by another SLG or 3Ø Fault, with Normal Clearing <sup>c</sup> : 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 <sup>c</sup>	No
	Bipolar Block, with Normal Clearing <sup>c</sup> : 4. Bipolar (dc) Line Fault (non 3Ø), with Normal Clearing <sup>c</sup> :	Yes	Planned/ Controlled <sup>c</sup>	No
	5. Any two circuits of a multiple circuit towerline <sup>f</sup>	Yes	Planned/ Controlled <sup>c</sup>	No
	SLG Fault, with Delayed Clearing <sup>c</sup> (stuck breaker or protection system failure): 6. Generator	Yes	Planned/ Controlled <sup>c</sup>	No
7. Transformer	Yes	Planned/ Controlled <sup>c</sup>	No	
8. Transmission Circuit	Yes	Planned/ Controlled <sup>c</sup>	No	
9. Bus Section	Yes	Planned/ Controlled <sup>c</sup>	No	

<p><b>D<sup>d</sup></b></p> <p>Extreme event resulting in two or more (multiple) elements removed or Cascading out of service</p>	<p>3Ø Fault, with Delayed Clearing<sup>e</sup> (stuck breaker or protection system failure):</p> <ol style="list-style-type: none"> <li>1. Generator</li> <li>2. Transmission Circuit</li> <li>3. Transformer</li> <li>4. Bus Section</li> </ol> <hr/> <p>3Ø Fault, with Normal Clearing<sup>e</sup>:</p> <ol style="list-style-type: none"> <li>5. Breaker (failure or internal Fault)</li> <li>6. Loss of towerline with three or more circuits</li> <li>7. All transmission lines on a common right-of way</li> <li>8. Loss of a substation (one voltage level plus transformers)</li> <li>9. Loss of a switching station (one voltage level plus transformers)</li> <li>10. Loss of all generating units at a station</li> <li>11. Loss of a large Load or major Load center</li> <li>12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</li> <li>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</li> <li>14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.</li> </ol>	<p>Evaluate for risks and consequences.</p> <ul style="list-style-type: none"> <li>▪ May involve substantial loss of customer Demand and generation in a widespread area or areas.</li> <li>▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point.</li> <li>▪ Evaluation of these events may require joint studies with neighboring systems.</li> </ul>
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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) An objective of the planning process should be to minimize the likelihood and magnitude of interruption of firm transfers or Firm Demand following Contingency events. Curtailment of firm transfers is allowed when achieved through the appropriate re-dispatch of resources obligated to re-dispatch, where it can be demonstrated that Facilities, internal and external to the Transmission Planner’s planning region, remain within applicable Facility Ratings and the re-dispatch does not result in the shedding of any Firm Demand. However, it is recognized that Firm Demand will be interrupted if it is: (1) directly served by the Elements removed from service as a result of the Contingency, or (2) Interruptible Demand or Demand-Side Management Load. Furthermore, in limited circumstances Firm Demand may need to be interrupted to address BES performance requirements. When interruption of Firm Demand is utilized within the planning process to address BES performance requirements, such interruption is limited to:

~~○ Interruptible Demand or Demand-Side Management~~

~~○ Circumstances where the use of Demand interruption are documented, including alternatives evaluated; and where the Demand interruption is subject to review in an open and transparent stakeholder process that includes addressing stakeholder comments.~~

~~Curtailment of firm transfers is allowed, 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 the re-dispatch does not result in the shedding of any firm Demand. Where Facilities external to the Transmission Planner’s planning region are relied upon, Facility Ratings in those regions would 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.

- 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.

## Appendix 1

### Interpretation of TPL-002-0 Requirements R1.3.2 and R1.3.12 and TPL-003-0 Requirements R1.3.2 and R1.3.12 for Ameren and MISO

NERC received two requests for interpretation of identical requirements (Requirements R1.3.2 and R1.3.12) in TPL-002-0 and TPL-003-0 from the Midwest ISO and Ameren. These requirements state:

#### **TPL-002-0:**

[To be valid, the Planning Authority and Transmission Planner assessments shall:]

- 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 B of Table 1 (single contingencies). The specific elements selected (from each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).
- R1.3.2** Cover critical system conditions and study years as deemed appropriate by the responsible entity.
- R1.3.12** 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.

#### **TPL-003-0:**

[To be valid, the Planning Authority and Transmission Planner assessments shall:]

- 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 C of Table 1 (multiple contingencies). The specific elements selected (from each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).
- R1.3.2** Cover critical system conditions and study years as deemed appropriate by the responsible entity.
- R1.3.12** 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.

### Requirement R1.3.2

#### Request for Interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.2 Received from Ameren on July 25, 2007:

*Ameren specifically requests clarification on the phrase, 'critical system conditions' in R1.3.2. Ameren asks if compliance with R1.3.2 requires multiple contingent generating unit Outages as part of possible generation dispatch scenarios describing critical system conditions for which the system shall be planned and modeled in accordance with the contingency definitions included in Table 1.*

**Request for Interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.2  
Received from MISO on August 9, 2007:**

*MISO asks if the TPL standards require that any specific dispatch be applied, other than one that is representative of supply of firm demand and transmission service commitments, in the modeling of system contingencies specified in Table 1 in the TPL standards.*

*MISO then asks if a variety of possible dispatch patterns should be included in planning analyses including a probabilistically based dispatch that is representative of generation deficiency scenarios, would it be an appropriate application of the TPL standard to apply the transmission contingency conditions in Category B of Table 1 to these possible dispatch pattern.*

**The following interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.2 was developed by the NERC Planning Committee on March 13, 2008:**

The selection of a credible generation dispatch for the modeling of critical system conditions is within the discretion of the Planning Authority. The Planning Authority was renamed “Planning Coordinator” (PC) in the Functional Model dated February 13, 2007. (TPL -002 and -003 use the former “Planning Authority” name, and the Functional Model terminology was a change in name only and did not affect responsibilities.)

- Under the Functional Model, the Planning Coordinator “Provides and informs Resource Planners, Transmission Planners, and adjacent Planning Coordinators of the methodologies and tools for the simulation of the transmission system” while the Transmission Planner “Receives from the Planning Coordinator methodologies and tools for the analysis and development of transmission expansion plans.” A PC’s selection of “critical system conditions” and its associated generation dispatch falls within the purview of “methodology.”

Furthermore, consistent with this interpretation, a Planning Coordinator would formulate critical system conditions that may involve a range of critical generator unit outages as part of the possible generator dispatch scenarios.

Both TPL-002-0 and TPL-003-0 have a similar measure M1:

- M1.** The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-002-0\_R1 [or TPL-003-0\_R1] and TPL-002-0\_R2 [or TPL-003-0\_R2].”

The Regional Reliability Organization (RRO) is named as the Compliance Monitor in both standards. Pursuant to Federal Energy Regulatory Commission (FERC) Order 693, FERC eliminated the RRO as the appropriate Compliance Monitor for standards and replaced it with the Regional Entity (RE). See paragraph 157 of Order 693. Although the referenced TPL standards still include the reference to the RRO, to be consistent with Order 693, the RRO is replaced by the RE as the Compliance Monitor for this interpretation. As the Compliance Monitor, the RE determines what a “valid assessment” means when evaluating studies based upon specific sub-requirements in R1.3 selected by the Planning Coordinator and the Transmission Planner. If a PC has Transmission Planners in more than one region, the REs must coordinate among themselves on compliance matters.

## Requirement R1.3.12

### **Request for Interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.12 Received from Ameren on July 25, 2007:**

*Ameren also asks how the inclusion of planned outages should be interpreted with respect to the contingency definitions specified in Table 1 for Categories B and C. Specifically, Ameren asks if R1.3.12 requires that the system be planned to be operated during those conditions associated with planned outages consistent with the performance requirements described in Table 1 plus any unidentified outage.*

### **Request for Interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.12 Received from MISO on August 9, 2007:**

*MISO asks if the term “planned outages” means only already known/scheduled planned outages that may continue into the planning horizon, or does it include potential planned outages not yet scheduled that may occur at those demand levels for which planned (including maintenance) outages are performed?*

*If the requirement does include not yet scheduled but potential planned outages that could occur in the planning horizon, is the following a proper interpretation of this provision?*

*The system is adequately planned and in accordance with the standard if, in order for a system operator to potentially schedule such a planned outage on the future planned system, planning studies show that a system adjustment (load shed, re-dispatch of generating units in the interconnection, or system reconfiguration) would be required concurrent with taking such a planned outage in order to prepare for a Category B contingency (single element forced out of service)? In other words, should the system in effect be planned to be operated as for a Category C3 n-2 event, even though the first event is a planned base condition?*

*If the requirement is intended to mean only known and scheduled planned outages that will occur or may continue into the planning horizon, is this interpretation consistent with the original interpretation by NERC of the standard as provided by NERC in response to industry questions in the Phase I development of this standard?*

### **The following interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.12 was developed by the NERC Planning Committee on March 13, 2008:**

This provision was not previously interpreted by NERC since its approval by FERC and other regulatory authorities. TPL-002-0 and TPL-003-0 explicitly provide that the inclusion of planned (including maintenance) outages of any bulk electric equipment at demand levels for which the planned outages are required. For studies that include planned outages, compliance with the contingency assessment for TPL-002-0 and TPL-003-0 as outlined in Table 1 would include any necessary system adjustments which might be required to accommodate planned outages since a planned outage is not a “contingency” as defined in the *NERC Glossary of Terms Used in Standards*.