

**Compliance Questionnaire and**

**Reliability Standard Audit Worksheet**

**TPL-003-0b — System Performance Following   
Loss of Two or More Bulk Electric System Elements (Category C)**

**Registered Entity:** *(Must be completed by the Compliance Enforcement Authority)*

**NCR Number:** *(Must be completed by the Compliance Enforcement Authority)*

**Applicable Function(s): PA, TP**

**Auditors:**

**Disclaimer**

NERC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate NERC’s and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The NERC RSAW language is written to specific versions of each NERC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that NERC has elected to use to assess compliance with the requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. NERC’s Reliability Standards can be found on NERC’s website. Additionally, NERC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status.

The NERC RSAW language contained within this document provides a non‑exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and NERC and the Regional Entity using this RSAW reserves the right to request additional evidence from the registered entity that is not included in this RSAW. Additionally, this RSAW includes excerpts from FERC Orders and other regulatory references. The FERC Order cites are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail.

# Subject Matter Experts

Identify your company’s subject matter expert(s) responsible for this Reliability Standard. Include the person's title, organization and the requirement(s) for which they are responsible. Insert additional lines if necessary.

**Response: *(Registered Entity Response Required)***

|  |  |  |  |
| --- | --- | --- | --- |
| **SME Name** | **Title** | **Organization** | **Requirement** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Reliability Standard Language

**TPL-003-0a — System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

**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.

**Applicability:**

Planning Authority

Transmission Planner

**NERC BOT Approval Date: 2/8/2005**

**FERC Approval Date: 3/16/2007**

**Reliability Standard Enforcement Date in the United States: 6/18/2007**

**Requirements**:

**R1.** The Planning Authority and Transmission Plannershall each demonstrate through a valid assessment that its portion of the interconnected transmission system 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.

**R1.3.3.** Be conducted annually unless changes to system conditions do not warrant such analyses.

**R1.3.4.** Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.

**R1.3.5.** Have all projected firm transfers modeled.

**R1.3.6.** Be performed and evaluated for selected demand levels over the range of forecast system demands.

**R1.3.7.** Demonstrate that System performance meets Table 1 for Category C contingencies.

**R1.3.8.** Include existing and planned facilities.

**R1.3.9.** Include Reactive Power resources to ensure that adequate reactive resources are available to meet System performance.

**R1.3.10.** Include the effects of existing and planned protection systems, including any backup or redundant systems.

**R1.3.11.** Include the effects of existing and planned control devices.

**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.

**R1.4.** Address any planned upgrades needed to meet the performance requirements of Category C.

**R1.5.** Consider all contingencies applicable to Category C.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R1 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Provide the following:**  **Document Title and/or File Name, Page & Section, Date & Version** | | |
| **Title** | | **Date** | **Version** | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |
| *Audit Team: Additional Evidence Reviewed:* | |  |  | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |

***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to TPL-003-0a R1.**

**\_\_\_\_\_** Determine if entity has completed an Assessment that studies if its portion of the interconnected transmission system is planned to meet the requirements of R1.

**\_\_\_\_\_\_ (R1.1)** Confirm that the above Assessment is conducted annually.

**\_\_\_\_\_\_ (R1.2)** Confirm that the Assessment is both for the:

**\_\_\_\_\_\_** 1-5 year planning horizon range.

**\_\_\_\_\_\_** 6-10 year planning horizon range.

**\_\_\_\_\_\_ (R1.3)** Confirm that the Assessment is supported by one or more current Study(ies) or past Studies and/or system simulations testing that address(es) the following categories showing system performance following Category C of Table I (multiple contingencies)

**\_\_\_\_\_\_ (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.

**\_\_\_\_\_\_ (R1.3.3)** Be conducted annually unless changes to system conditions do not warrant such analyses.

**\_\_\_\_\_\_ (R1.3.4)** Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.

**\_\_\_\_\_\_ (R1.3.5)** Have all projected firm transfers modeled.

**\_\_\_\_\_\_ (R1.3.6)** Be performed and evaluated for selected demand levels over the range of forecast system Demands.

**\_\_\_\_\_\_ (R1.3.7)** Demonstrate that system performance meets Category C of Table I contingencies.

**\_\_\_\_\_\_ (R1.3.8)** Include existing and planned facilities.

**\_\_\_\_\_\_ (R1.3.9)** Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

**\_\_\_\_\_\_ (R1.3.10)** Include the effects of existing and planned protection systems, including any backup or redundant systems.

**\_\_\_\_\_\_ (R1.3.11)** Include the effects of existing and planned control devices.

**\_\_\_\_\_\_ (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. See note to auditor section.

**\_\_\_\_\_\_ (R1.4)** Confirm that the Assessment addressed planned upgrades needed to meet the performance requirements of Category C of Table I.

**\_\_\_\_\_\_ (R1.5)** Confirm that the Assessment considers all contingencies applicable to Category C of Table I.

**Note to Auditor:**

Regarding R1.3.12,Outages to be included in TPL assessments:

A Compliance Enforcement Authority (CEA) is to verify that a registered entity’s TPL assessments include all “planned” equipment outages, including Protection System outages, that are to occur within the near-term (years one through five) and longer-term (years six through 10) planning horizons.

A CEA is to use the following to determine whether the outage is “planned” in the TPL planning horizon as required by the standard:

1. If it is included on an approved, applicable TOP or BA outage schedule; and

2. If the outage was included on the approved, applicable TOP or BA outage schedule more than 12 months from the time the TPL assessment was concluded; and

3. If it is an outage of a Protection System, it affects the reliability performance of transmission system.

**Detailed notes:**

**R2.** When System simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-003-0\_R1, the Planning Authority and Transmission Planner shall each:

**R2.1.** Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon:

**R2.1.1.** Including a schedule for implementation.

**R2.1.2.** Including a discussion of expected required in-service dates of facilities.

**R2.1.3.** Consider lead times necessary to implement plans.

**R2.2.** Review, in subsequent annual assessments, (where sufficient lead time exists), the continuing need for identified system facilities. Detailed implementation plans are not needed.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

**Question**: Have your planning assessments ever indicated an inability of the systems to respond as prescribed in Requirement 1 of this standard? If yes, please describe the actions taken.

**Entity** **Response: *(Registered Entity Response Required)***

# R2 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Provide the following:**  **Document Title and/or File Name, Page & Section, Date & Version** | | |
| **Title** | | **Date** | **Version** | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |
| *Audit Team: Additional Evidence Reviewed:* | |  |  | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |

***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to TPL-003-0a R2.**

**\_\_\_\_\_\_** Determine if system simulations indicate an inability of the system to respond as prescribed in Reliability Standard TPL-003-0\_R1.

**\_\_\_\_\_\_ (R2.1)**Determine if a written summary of plans to achieve the required system performance has been provided.

**\_\_\_\_\_\_** Determine if the above summary includes:

**\_\_\_\_\_\_ (R2.1.1)** A schedule for implementation.

**\_\_\_\_\_\_ (R2.1.2)** A discussion of expected required in-service dates of facilities.

**\_\_\_\_\_\_ (R2.1.3)** Consideration of the lead times necessary to implement the plans.

**\_\_\_\_\_\_ (R2.2)** Determine if the current assessment has reviewed the continuing need for previously identified system facilities.

**Detailed notes:**

**R3.** The Planning Authority and Transmission Planner shall each document the results of these Reliability Assessments and corrective plans and shall annually provide these results to its respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

**Describe, in narrative form, how you meet compliance with this requirement: *(Registered Entity Response Required)***

# R3 Supporting Evidence and Documentation

**Response: *(Registered Entity Response Required)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Provide the following:**  **Document Title and/or File Name, Page & Section, Date & Version** | | |
| **Title** | | **Date** | **Version** | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |
| *Audit Team: Additional Evidence Reviewed:* | |  |  | |
|  | |  |  | |
|  | |  |  | |
|  | |  |  | |

***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to TPL-003-0a R3.**

**\_\_\_** Determine if entity has documented the results of its Reliability Assessments and Corrective Plans per TPL-003-0 Requirement 3.

**\_\_\_** Determine if documentation has been submitted to the entity’s Regional Reliability Organization/Regional Entity per the Regional Reliability Organization’s/Regional Entity’s submission requirements.

**Detailed notes:**

# Supplemental Information

**Other ‑** The list of questions above is not all inclusive of evidence required to show compliance with the Reliability Standard. Provide additional information here**, as necessary that** demonstrates compliance with this Reliability Standard.

**Entity** **Response: *(Registered Entity Response)***

# Compliance Findings Summary (to be filled out by auditor)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req.** | **NF** | **PV** | **OEA** | **NA** | **Statement** |
| **1** |  |  |  |  |  |
| **2** |  |  |  |  |  |
| **3** |  |  |  |  |  |

**Excerpts from FERC Orders -- For Reference Purposes Only**

**Updated Through March 31, 2009**

**TPL-003-0**

**Order 693**

P 1683. The Transmission Planning (TPL) group of Reliability Standards consists of six Reliability Standards that are applicable to transmission planners, planning authorities and regional reliability organizations. These Reliability Standards are intended to ensure that the transmission system is planned and designed to meet an appropriate and specific set of reliability criteria. Transmission planning is a process that involves a number of stages including developing a model of the Bulk-Power System, using this model to assess the performance of the system for a range of operating conditions and contingencies, determining those operating conditions and contingencies that have an undesirable reliability impact, identifying the nature of potential options, and the need to develop and evaluate a range of solutions and selecting the preferred solution, taking into account the time needed to place the solution in service. The proposed TPL Reliability Standards address: (1) the types of simulations and assessments that must be performed to ensure that reliable systems are developed to meet present and future system needs and (2) the information required to assess regional compliance with planning criteria and for self-assessment of regional reliability.

P 1684. The TPL group of Reliability Standards contains a table designated “Table 1” (Transmission System Standards – Normal and Emergency Conditions), which is a key part of this group of Reliability Standards. It lays out the system performance requirements for a range of contingencies grouped according to the number of elements forced out of service as a result of the contingency. For example: Category A applies to the normal system with no contingencies; Category B applies to contingencies resulting in the loss of a single element, defined as a generator, transmission circuit, transformer, single DC pole with or without a fault; Category C applies to a contingency resulting in loss of two or more elements, such as any two circuits on a multiple circuit tower line or both poles of a bi-polar DC line; while Category D applies to extreme contingencies resulting in loss of multiple elements, such as a substation or all lines on a right-of-way. The system performance expectations for Category C contingencies are lower than those for Category B contingencies, in that they allow unspecified amounts of planned or controlled loss of load.

P 1798. Reliability Standard TPL-003-0 seeks to ensure that the future Bulk-Power System is planned to meet the system performance requirements of a system with the loss of multiple elements. It does this by requiring that the transmission planner and the planning authority annually evaluate and document the ability of its transmission system to meet the performance requirements of Category C contingencies specified in Table 1 (i.e., events resulting in the loss of two or more elements) for both the near-term and the longer-term planning horizons. TPL-003-0 requires the preparation of a documented plan to achieve the necessary performance requirements if the system is unable to meet the Category C performance criteria.

P 1799. TPL-003-0 applies to each planning authority and transmission planner. They must demonstrate annually through valid assessments that their portion of the interconnected transmission system is planned to meet the performance requirements of Category C with all transmission facilities in service over a planning horizon that takes into account lead times for corrective plans. The Reliability Standard also requires the applicable entities to consider planned outages of transmission equipment for those demand levels for which they perform such outages. The Reliability Standard defines various categories of conditions to be simulated. The specific study elements selected from each of the categories for assessments, including the subset of Category C contingencies to be evaluated, require approval by the associated regional reliability organization.

P 1816. The Commission approves proposed Reliability Standard TPL-003-0 as a mandatory and enforceable Reliability Standard…

P 1817. The Commission notes that, like Requirement R1.3.1 of TPL-001-0, Requirement R1.3.2 of TPL-003-0 requires an entity assessing system performance to cover “critical system conditions and study years” as deemed appropriate by the entity performing the study.

P 1825. Accordingly, the Commission approves Reliability Standard TPL-003-0 as mandatory and enforceable...

**FERC Approved Interpretations Related to TPL-003-0b**

**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 standard1?*

**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.*

|  |  |
| --- | --- |
| Interpretation 2012-INT-02: Response to Request for Interpretation of TPL-003-0a, Requirements R1.3.1, R1.3.10 and R1.5 and TPL-004-0, Requirements R1.3.1, R1.3.7 and R1.4 for the System Protection and Control Subcommittee | |
| **Date submitted:** | December 12, 2011 |
| The following interpretations of TPL-003-0a, System Performance Following Loss of Two or More Bulk Electric System Elements (Category C), Requirements R1.3.1, R1.3.10 and R1.5 and TPL-004-0, System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D), Requirements R1.3.1, R1.37 and R1.4 were developed by members of the Assess Transmission Future Needs Standard Drafting Team (ATFNSTD), Protection System Misoperations Standard Development Team (PSMSDT), and Protection System Maintenance and Testing Standard Drafting Team (PSMTSDT). | |
| Standard | Requirement (and text) |
| TPL-003-0a | **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. |
| TPL-003-0a | **R1.3.10.** Include the effects of existing and planned protection systems, including any backup or redundant systems. |
| TPL-003-0a | **R1.5.** Consider all contingencies applicable to Category C. |
| TPL-004-0 | **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. |
| TPL-004-0 | **R1.3.7.** Include the effects of existing and planned protection systems, including any backup or redundant systems. |
| TPL-004-0 | **R1.4.** Consider all contingencies applicable to Category D. |
| Please explain the clarification needed (as submitted). | |
| This interpretation request has been developed to address Commission concerns related to the term “Single Point of Failure” and how it relates to system performance and contingency planning clarification regarding the following questions about the listed standards, requirements and terms. More specifically, clarification is needed about the comprehensive study of system performance relating to Table 1’s, Category C and D contingency of a “protection system failure” and specifically the impact of failed components (i.e., “Single Point of Failure”). It is not entirely clear whether a valid assessment of a protection system failure includes evaluation of shared or non-redundant protection system components. Protection systems that have a shared protection system component are not two independent protection systems, because both protection systems will be mutually impacted for a failure of a single shared component. A protection system component evaluation would include the evaluation of the consequences on system performance for the failure of any protection system component that is integral to the operation of the protection system being evaluated and to the operation of another protection system.  On March 30, 2009, NERC issued an [Industry Advisory — Protection System Single Point of Failure](http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)[[1]](#footnote-1) (i.e., NERC Alert) for three significant events. One of which, the Westwing outage (June 14, 2004) was caused by failure of a single auxiliary relay that initiated both breaker tripping and the breaker failure protection. Since breaker tripping and breaker failure protection both shared the same auxiliary relay, there was no independence between breaker tripping and breaker failure protection systems, therefore causing both protection systems to not operate for the single component failure of the auxiliary relay. The failure of this auxiliary relay is known as a “single point of failure.” It is not clear whether this situation is comprehensively addressed by the applicable entities when making a valid assessment of system performance for both Category C and D contingencies.  **Question 1:** For the parenthetical “(stuck breaker or protection system failure)” in TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4), does an entity have the option of evaluating the effects[[2]](#footnote-2) of either “stuck breaker” or “protection system failure” contingency[[3]](#footnote-3), or does an applicable entity have to evaluate the contingency that produces the more severe system results or impacts as identified in R1.3.1 of both standards?  There is a lack of clarity whether R1.3.1[[4]](#footnote-4) requires an entity to assess which contingency causes the most severe system results or impacts (R1.3.1) and this ambiguity could result in a potential reliability gap. Whether the simulation of a stuck breaker or protection system failure will produce the worst result depends on the protection system design. For example when a protection system is fully redundant, a protection system failure will not affect fault clearing; therefore, a stuck breaker would result in more severe system results or impacts. However, when a protection system failure affects fault clearing, the fault clearing time may be longer than the breaker failure protection clearing time for a stuck breaker contingency and may result in tripping of additional system elements, resulting in a more severe system response.  **Question 2:** For the phrase “Delayed Clearing[[5]](#footnote-5)” used in Category C[[6]](#footnote-6) contingencies 6-9 and Category D[[7]](#footnote-7) contingencies 1-4, to what extent does the description in Table 1, footnote (e)[[8]](#footnote-8) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system, including other protection systems impacted by that failed component based on the as-built design of that protection system?  There is a lack of clarity whether footnote (e) in Table 1 requires the study and/or simulation of a failure of a protection system component (i.e., single point of failure) that may prevent correct operation of the protection system(s) impacted by the component failure. Protection systems that share a protection system component are fully dependent upon the correct operation of that single shared component and do not perform as two independent protection systems. This lack of clarity may result in a potential reliability gap.  Clarity is necessary as to whether (1) a valid assessment should include evaluation of delayed clearing due to failure of the protection system component (i.e., single point of failure), such as the failure of a shared protection system component, that produces the more severe system results or impacts; and (2) the study and/or simulation of the fault clearing sequence and protection system(s) operation should be based on the protection system(s) as-built design.  The lack of clarity is compounded by the similarity between the phrase “Delayed Clearing” used in TPL-003-0a and TPL-004-0, footnote (e), and the NERC glossary term “Delayed Fault Clearing.” While TPL-003-0a and TPL-004-0 do not use the glossary term, the similarity may lead to confusion and inconsistency in how entities apply footnote (e) to “stuck breaker” or “protection system failure” contingency assessments. | |
| Question 1 | |
| For the parenthetical “(stuck breaker or protection system failure)” in TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4), does an entity have the option of evaluating the effects[[9]](#footnote-9) of either “stuck breaker” or “protection system failure” contingency[[10]](#footnote-10), or does an applicable entity have to evaluate the contingency that produces the more severe system results or impacts as identified in R1.3.1 of both standards? | |
| Response 1 | |
| The interpretation drafting team concludes that the Planning Authority and Transmission Planner must evaluate the situation that produces the more severe system results or impacts (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) due to a delayed clearing condition regardless of whether the condition resulted from a stuck breaker or protection system failure. The Reliability Standards TPL-003-0a (Table I, Category C contingencies 6-9) and TPL-004-0 (Table I, Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. The single line ground (SLG) (TPL-003-0a, Table I, Category C) Fault and 3-phase (3ø) (TPL-004-0, Table I, Category D) Fault contingencies with delayed clearing are further defined by footnote (e) and the parenthetical phrase “(stuck breaker or protection system failure).” Footnote (e) explains that “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.” The parenthetical further emphasizes that the failure may be a “stuck breaker or protection system failure” that causes the delayed clearing of the fault. The text in Table 1 in either standard explains that when selecting delayed clearing contingencies to evaluate, both conditions “(stuck breaker or protection system failure)” must be considered. | |
| Question 2 | |
| For the phrase “Delayed Clearing[[11]](#footnote-11)” used in Category C[[12]](#footnote-12) contingencies 6-9 and Category D[[13]](#footnote-13) contingencies 1-4, to what extent does the description in Table 1, footnote (e)[[14]](#footnote-14) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system, including other protection systems impacted by that failed component based on the as-built design of that protection system? | |
| Response 2 | |
| The term “Delayed Clearing” that is described in Table I, footnote (e) refers to fault clearing that results from a failure to achieve the protection system’s normally expected clearing time. For Category C or D contingencies, each Planning Authority and Transmission Planner is permitted engineering judgment in its selection of the protection system component failures for evaluation that would produce the more severe system results or impact (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1). The evaluation would include addressing all protection systems affected by the selected component.  A protection system component failure that impacts one or more protection systems and increases the total fault clearing time requires the Planning Authority and Transmission Planner to simulate the full impact (clearing time and facilities removed) on the Bulk Electric System performance.  The interpretation drafting team bases this conclusion on the footnote (e) example “…any protection system component such as, relay, circuit breaker, or current transformer...” because the component “circuit breaker” is not addressed in the current or previously defined NERC glossary term. The interpretation drafting team initially believed the lowercase usage of “protection system” inferred the NERC glossary term and the components described therein; however, based on the interpretation drafting team’s further assessment of footnote (e), it concludes that the existing TPL standards (TPL-003-0a and TPL-004-0) do not implicitly use the NERC glossary term. Without an explicit reference to the NERC glossary term, “Protection System,” the two standards do not prescribe the specific protection system components that must be addressed by the Planning Authority and Transmission Planner in performing the studies required in TPL-003-0a and TPL-004-0. | |

**June 20, 2013 Letter Order on NERC Petition for Approval of an Interpretation to Reliability Standards TPL-003-0a and TPL-004-0**

The interpretation responds to two questions. The first question asks whether an entity has the option of evaluating the effects of either a stuck breaker or protection system failure contingency as presented in Table 1 of TPL-003-0a and TPL-004-0, or must evaluate the contingency that produces the more severe system results or impacts. The interpretation response states that a planner must evaluate the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless of whether the condition resulted from either a stuck breaker or protection system failure.

The second question asks to what extent does Table 1, footnote (e) of TPL-003-0a and TPL-004-0 require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system, including other protection systems impacted by that failed component based on the as-built design of that protection system. The interpretation response states that a planner is permitted to use engineering judgment to select the protection system component failures for evaluation that would produce the more severe system results or impact, and the evaluation would address all protection systems affected by the selected component. The interpretation response further states that a protection system component failure that impacts one or more protection systems and increases the total fault clearing time requires a planner to simulate the full impact (clearing time and facilities removed) on the bulk electric system performance…

NERC’s uncontested filing is approved pursuant to the relevant authority delegated to the Director, Office of Electric Reliability, under 18 C.F.R. § 375.303(a)(2)(i), effective as of the date of this Order.

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Reviewers** | **Revision Description** |
| 1 | May 5, 2010 | Craig Struck | Added Revision History. Minor editorial changes to reflect Version 0a. Modified compliance assessment approach for R1 & R3. |
| 1 | December 2010 | QRSAW WG | Revised Findings Table and modified Supporting Evidence tables. |
| 1 | January 2011 | Craig Struck | Reviewed for format consistency and content. |
| 1.1 | September 2011 | Craig Struck | Format changes for 2012. |
| 1.2 | October 2013 | NERC Compliance | Updated RSAW title. Minor format changes and addition of FERC-approved interpretations. Legal review. |
| 1.3 | March 2014 | RSAW Task Force | Incorporate compliance guidance from CAN-0020. |
|  |  |  |  |

1. NERC Website: (<http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf>) [↑](#footnote-ref-1)
2. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7. [↑](#footnote-ref-2)
3. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4. [↑](#footnote-ref-3)
4. “*Be performed and evaluated only for those Category (TPL-003-0a Category C and TPL-004-0 Category D) contingencies that would produce the more severe system results or impacts*.” [↑](#footnote-ref-4)
5. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4. [↑](#footnote-ref-5)
6. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. [↑](#footnote-ref-6)
7. As required by NERC Reliability Standard TPL-004-0, Requirement R1.4. [↑](#footnote-ref-7)
8. Footnote (e) Delayed Clearing: “failure of any protection system component such as a relay, circuit breaker, or current transformer, and not because of an intentional design delay,” [↑](#footnote-ref-8)
9. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7. [↑](#footnote-ref-9)
10. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4. [↑](#footnote-ref-10)
11. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4. [↑](#footnote-ref-11)
12. As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. [↑](#footnote-ref-12)
13. As required by NERC Reliability Standard TPL-004-0, Requirement R1.4. [↑](#footnote-ref-13)
14. Footnote (e) Delayed Clearing: “failure of any protection system component such as a relay, circuit breaker, or current transformer, and not because of an intentional design delay,” [↑](#footnote-ref-14)