

**Compliance Questionnaire and**

**Reliability Standard Audit Worksheet**

**TPL-004-0a — System Performance Following Extreme Events Resulting in**

**the Loss of Two or More Bulk Electric System Elements (Category D)**

**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.

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# 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)***

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| --- | --- | --- | --- |
| **SME Name** | **Title** | **Organization** | **Requirement** |
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# Reliability Standard Language

**TPL-004-0 — System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Events (Category D)**

**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 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 thefollowing 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.

**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)***

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| --- | --- |
|  |   **Provide the following:** **Document Title and/or File Name, Page & Section, Date & Version** |
| **Title** | **Date** | **Version** |
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| *Audit Team: Additional Evidence Reviewed:* |  |  |
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***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to TPL-004-0 R1.**

NOTE: Table D states that the number of extreme contingencies that are judged to be critical by the transmission planning entities will be selected for evaluation. It is not expected that all possible facility outages under each listed contingency of Category D of Table I will be evaluated.

**\_\_\_\_\_\_** Determine if entity has completed an Assessment that studies if its portion of the interconnected transmission system is evaluated to meet Requirement 1.

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

**\_\_\_\_\_\_ (R1.2)** Confirm that the Assessment looks at 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 D of Table 1:

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

**\_\_\_\_\_\_ (R1.4)** Confirm that the Assessment considers all contingencies applicable to Category D of Table I.

**Note to Auditor:**

Regarding R1.3.9,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.Iif 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.** 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.

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

# R2 Supporting Evidence and Documentation

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

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| --- | --- |
|  |   **Provide the following:** **Document Title and/or File Name, Page & Section, Date & Version** |
| **Title** | **Date** | **Version** |
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| *Audit Team: Additional Evidence Reviewed:* |  |  |
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***This section must be completed by the Compliance Enforcement Authority.***

**Compliance Assessment Approach Specific to TPL-004-0 R2.**

 Determine if entity has documented the results of its reliability Assessments per TPL-004-0 Requirement 2.

**\_\_\_\_\_\_**Review the evidence provided to 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)

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

**Excerpts From FERC Orders—For Reference Purposes Only**

**Updated as of March 31, 2009**

**TPL- 004-0**

**Order 693**

P 1826. The goal of Reliability Standard TPL-004-0 is to ensure that the future Bulk-Power System is evaluated to assess the risks and consequences of an extreme event involving the loss of multiple elements. It seeks to do this by requiring the transmission planner and the planning authority to evaluate and document annually the risks and consequences of Category D contingencies (i.e., extreme events resulting in loss of two or more elements or cascading) for the near-term (five-year) planning horizon.

P 1827. TPL-004-0 applies to each planning authority and transmission planner. Each must demonstrate annually through valid assessments that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies of Category D with all transmission facilities in service over a planning horizon that takes into account lead times for corrective plans. TPL-004-0 also requires that planned outages of transmission equipment be considered for those demand levels for which planned outages are performed. It defines various categories of conditions to be simulated. The associated regional reliability organization must approve the specific study elements selected from each of the categories for assessment, including the subset of Category D contingencies to be evaluated.

P 1831. The Commission approves proposed Reliability Standard TPL-004-0 as mandatory and enforceable.…

P 1832. The Commission notes that, like Requirement R1.3.1 of TPL-001-0, Requirement R1.3.2 of TPL-004-0 requires an entity assessing system performance to cover “critical system conditions and study years” as deemed appropriate by the entity performing the study.…

P 1834. All commenters that responded on the issue opposed the Commission’s proposal to modify TPL-004-0 to require that, in determining the range of the extreme events to be assessed, the contingency list of Category D be expanded to include recent events such as hurricanes and ice storms. The Commission is not persuaded by the commenters’ contention that expansion of the extreme events list will lead to an endless list of possibilities. The two that the Commission used are examples from the general news media. While the NOPR referred to two recent events, other examples include: (1) loss of a large gas pipeline into a region or multiple regions that have significant gas-fired generation; (2) a successful cyber attack; (3) regulation that restricts or eliminates the use of a river or lake or other body of water as the cooling source for generation; (4) shutdown of a nuclear power plant and other facilities a day or more prior to a hurricane, tornado or wildfire, or other event and (5) the loss of older transmission lines, which may not be constructed to meet an entity’s present radial ice loading requirements, while the newer or stronger transmission lines remain in service. The above examples are not an exhaustive list, however, the Commission would not expect the range of scenarios to be much more extensive than this, either….

P 1836. Accordingly, the Commission approves Reliability Standard TPL-004-0 as mandatory and enforceable….

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

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| --- |
| 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**

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| --- | --- | --- | --- |
| **Version** | **Date** | **Reviewers** | **Revision Description** |
| 1 | May 5, 2010 | Craig Struck | Added Revision History. Modified compliance assessment approach for R1 & R2. |
| 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 updates for 2012. |
| 1.2 | October 2013 | NERC Compliance | Added FERC-approved interpretation. Formatting edits. Legal review. |
| 1.3 | March 2014 | RSAW Task Force | Updated with compliance guidance from CAN-0020. |
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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)