UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. RD13-_____**

PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION FOR APPROVAL OF AN INTERPRETATION TO RELIABILITY STANDARDS TPL-003-0a AND TPL-004-0

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In accordance with Section 215(d)(1) of the Federal Power Act ("FPA")[1] and Section 39.5 of the Commission's regulations,[2] the North American Electric Reliability Corporation ("NERC")[3] hereby requests Federal Energy Regulatory Commission ("FERC" or the "Commission") approval of a proposed interpretation to certain Requirements of two Reliability Standards:[4]

- TPL-003-0a (System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)); and
- TPL-004-0 (System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)).

The interpretation, requested by the NERC Planning Committee's System Protection & Control Subcommittee ("SPCS"),[5] was approved by the NERC Board of Trustees on February 7, 2013.

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1 16 U.S.C. § 824o(d)(1) (2006).
2 18 C.F.R. § 39.5 (2012).
3 The Commission certified NERC as the electric reliability organization ("ERO") in accordance with Section 215 of the FPA on July 20, 2006. *N. Amer. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 (2006).
4 Unless otherwise designated, all capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards*, available at http://www.nerc.com/files/Glossary_of_Terms.pdf.
5 The purpose of the SPCS is to promote the reliable and efficient operation of the North American power system through technical excellence in protection system and control system design, coordination, and practices. *See System Protection and Control Subcommittee (SPCS) Scope*, available at http://www.nerc.com/docs/pc/spctf/Scope_SPCS_revised_20111214.pdf.

The interpretation request and response are included as **Exhibits A and B** respectively. **Exhibit H** contains the complete development record of the interpretation to the Reliability Standard requirement. **Exhibit I** contains the interpretation development team roster. The Reliability Standards with the appended interpretation are contained in **Exhibits C and D**.

I. <u>EXECUTIVE SUMMARY</u>

The interpretation response in **Exhibit B** addresses Commission concerns documented in Order No. 754 regarding protection system single points of failure. The interpretation involves two Reliability Standards – TPL-003-0a and TPL-004-0. The interpretation responds to two questions. The first question asks if an entity has the option of evaluating either of two conditions presented in Table 1 of the standards that are separated by "or." The interpretation response states that an entity must evaluate both conditions on the basis of a structured reading of the text and information found in an associated footnote. The second question asks to what extent an entity must model a single point of failure of a protection system. To this question, the interpretation response states that an entity is permitted to use "engineering judgment" to select the protection system component failures for evaluation, which includes addressing all protection systems affected by the selected component.

The interpretation represents a reasonable reading of the Requirements and associated reference materials attached to the Reliability Standard and is just, reasonable, not unduly discriminatory or preferential, and in the public interest. The interpretation supports the stated purpose of the TPL-003 and TPL-004 Reliability Standards, which is to periodically conduct "[s]ystem simulations and associated assessments needed 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."

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[6]

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III. BACKGROUND

A. Regulatory Framework

By enacting the Energy Policy Act of 2005,[7] Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Nation's Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)[8] of the FPA states that all users, owners, and operators of the Bulk-Power System in the United

[6] Persons to be included on the Commission's service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203 (2012), to allow the inclusion of more than two persons on the service list in this proceeding.

[7] *Energy Policy Act of 2005*, Pub. L. No. 109-58, §§ 1211 et seq., 119 Stat. 941-46 (2005) (codified at 16 USC 824o).

[8] 16 U.S.C.§ 824o(b)(1) (2006).

States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)[9] of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard. Section 39.5(a)[10] of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission has the regulatory responsibility to approve Reliability Standards that protect the reliability of the Bulk-Power System and to ensure that such Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. Pursuant to Section 215(d)(2) of the FPA[11] and Section 39.5(c)[12] of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard.

B. NERC Reliability Standards Development Procedure

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC Standard Processes Manual.[13] In its ERO certification order, the Commission found that NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus satisfies certain of the criteria for approving Reliability Standards. The development process is open to any person or entity with a legitimate interest in the reliability of the Bulk-Power System. NERC considers the comments

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9 *Id.* § 824o(d)(5).

10 18 C.F.R. § 39.5(a) (2012).

11 16 U.S.C. § 824o(d)(2).

12 18 C.F.R. § 39.5(c)(1).

13 The NERC Rules of Procedure are available at http://www.nerc.com/page.php?cid=1%7C8%7C169. The current NERC Standard Processes Manual is available at http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf.

of all stakeholders, and a vote of stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard before the Reliability Standard is submitted to the Commission for approval.

C. Interpretations of Reliability Standards

All persons who are directly or materially affected by the reliability of the North American Bulk-Power System are permitted to request an interpretation of a Reliability Standard, as discussed in NERC's *Reliability Standards Development Procedure*, which is incorporated into the Rules of Procedure as Appendix 3A. Upon request, NERC will assemble a team with the relevant expertise to address the interpretation request and present an interpretation for industry ballot. If approved by the ballot pool and the NERC Board of Trustees, the interpretation is appended to the Reliability Standard and filed for approval with the Commission and other Applicable Governmental Authorities to be made effective when approved. When the affected Reliability Standard is next revised using the *Reliability Standards Development Procedure*, the interpretation will then be incorporated into the Reliability Standard.

D. Historical Background

In a November 17, 2009 filing, NERC submitted to the Commission a proposed interpretation to Requirement R1.3.10 in Reliability Standard TPL-002-0 (System Performance Following Loss of a Single Bulk Electric System Element (Category B)).[14] In a subsequent Notice of Proposed Rulemaking ("NOPR") issued on March 18, 2010, the Commission proposed to remand NERC's interpretation.[15] In Order No. 754,[16] and in response to comments received,

[14] *Petition of the North American Electric Reliability Corporation for Approval of Interpretation to Reliability Standard TPL-002-0 — System Performance Following Loss of a Single Bulk Electric System Element (Category B)*, Docket No. RM10-6-000 (Nov. 17, 2009).

[15] *Interpretation of Transmission Planning Reliability Standard*, Notice of Proposed Rulemaking, 130 FERC ¶ 61,208 (2010).

[16] *Interpretation of Transmission Planning Reliability Standard*, Order No. 754, 136 FERC ¶ 61,186 (2011).

the Commission reversed its NOPR proposal and approved NERC's proposed interpretation of Requirement R1.3.10 of TPL-002-0. However, in the final rule, the Commission also directed NERC to submit an informational filing explaining "whether there is a further system protection issue that needs to be addressed and, if so, what forum and process should be used to address that issue and what priority it should be accorded relative to other reliability initiatives planned by NERC."[17]

A technical conference, titled "Staff Meeting on Single Point of Failure on Protection Systems", was held by the Commission on October 24-25, 2011 to discuss the issue. The technical conference was attended by representatives of Commission staff, NERC staff, and industry stakeholders with subject matter expertise in system protection and planning. The attendees focused on the Commission's concern in Order No. 754 regarding assessment of protection system failures.

Presentations given at the Technical Conference addressed: the voluntary transmission planning Reliability Standards from 1997 (pre-version 0 NERC Reliability Standards); the 2009 NERC Advisory to Industry;[18] current mandatory Reliability Standards; an account of a June 14, 2004 outage event; and practices applied by entities in the Reliability*First* Corporation, Midwest Reliability Organization, Southwest Power Pool, Inc., Northeast Power Coordinating Council and Western Electricity Coordinating Council Regions. Altogether, NERC identified five events between 2004 and 2010 in which a single point of failure on a protection system caused, in whole or in part, an event on the Bulk-Power System.

At the technical conference, the attendees narrowed their concerns into four (4) consensus points:

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17 Order No. 754 at P 20.

18 *Industry Advisory, Protection System Single Point of Failure*, (Mar. 30, 2009), available at http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf.

- the concern with the study of a single point of failure is a performance-based issue, not a full redundancy issue;
- the existing approved Reliability Standards address assessments of single points of failure;
- the assessments need to be sufficiently comprehensive regarding single points of failure of non-redundant primary protection (including backup) systems; and
- the lack of sufficiently comprehensive assessments of non-redundant primary protection systems is a reliability concern.

From the four consensus points, the technical conference attendees developed a problem statement to be used to address the Commission's concern and "next steps" were determined for NERC to be responsive to the Commission's directive.

Three individual processes were identified to address the Commission's concern:

- a request for interpretation of the applicable and currently enforceable transmission planning standard(s), potentially including Reliability Standards TPL-001, TPL-002, TPL-003, and TPL-004;
- a request for data or information, as allowed by the NERC Rules of Procedure, Section 1600, that could be used to determine the potential exposure to and reliability risk associated with the single point of failure concern; and
- use of NERC's Project 2009-07, Reliability of Protection Systems, as necessary, to develop an appropriate new reliability standard that addresses the single point of failure concern.

E. Interpretation 2012-INT-02

A request for interpretation, as noted above, was prepared with input from Commission staff and industry stakeholders, which identified Reliability Standards TPL-003-0a and TPL-004-0 as the Standards that address potential single points of failure issues. More specifically, Requirements R1.3.7, R1.3.10, and R1.5 in TPL-003-0a and Requirements R1.3.7 and R1.4 in TPL-004-0 were identified as the specific Requirements that pertain to the issue of protection system failure. The request for interpretation was brought before the SPCS and the Transmission Issues Subcommittee at a joint meeting on December 6-8, 2011. The two groups jointly reviewed the work of the interpretation team. The SPCS agreed to sponsor the request for interpretation in accordance with the NERC Standards Process Manual. The finalized request for interpretation was submitted to NERC on January 27, 2012, and subsequently accepted by the NERC Standards Committee Executive Committee on February 3, 2012. The Standards Committee Executive Committee directed NERC staff to assemble an interpretation drafting team and designate the request for interpretation as a high priority. By directing NERC staff to address the request for interpretation as a "high priority," the Standards Committee Executive Committee addressed the Commission's directive to determine the appropriate priority for responding to the single point of failure concern.[19]

The request for interpretation sought to address the second and fourth consensus points from the technical conference, described above. Specifically, the SPCS requested clarification of Requirements R1.3.1, R1.3.10, and R1.5 of TPL-003-0a and Requirements R1.3.7 and R1.4 of TPL-004-0. The interpretation request reads as follows and is also included in **Exhibit A**:

> 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

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[19] *See* Order No. 754 at P 20.

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 (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 of either "stuck breaker" or "protection system failure" contingency, 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 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" used in Category C contingencies 6-9 and Category D contingencies 1-4, to what extent does the description in Table 1, footnote (e) 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.[20]

[20] *See* **Exhibit A** (footnotes omitted).

In its interpretation request, the SPCS states that there is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The SPCS states that lack of clarity in defining the required studies impacts entities by causing:

- potential non-compliance if the correct contingencies are not studied;
- inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required; and
- potential negative impact to grid reliability if the correct contingencies are not assessed.

IV. JUSTIFICATION FOR APPROVAL

A. Basis for Approval of the Interpretation and Purpose of Reliability Standards TPL-003-0a and TPL-004-0

The interpretation was developed by members of the Assess Transmission Future Needs Standard Drafting Team, Protection System Misoperations Standard Development Team, and Protection System Maintenance and Testing Standard Drafting Team (collectively, the "Interpretation Drafting Team"). This section presents and explains the responses to both questions posed by the SPCS. NERC requests that the Commission find that the interpretation is just, reasonable, not unduly discriminatory or preferential, and in the public interest. The interpretation is consistent with the purposes of both TPL-003 and TPL-004, which is to periodically conduct system simulations and associated assessments needed 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. The interpretation also reasonably reads the text of the Reliability Standards to provide clarity to entities complying with the currently effective Reliability Standards.

1. Response to SPCS Question #1

In response to Question 1 above from the SPCS, the interpretation response reads:

> 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.

To explain the conclusion above that the Planning Authority and Transmission Planner must evaluate the situation that produces the more severe system results or impacts, NERC provides the following explanatory "walk through" of the Requirements in TPL-003-0a. Requirement R1 of TPL-003-0a requires that the Planning Authority and Transmission Planner each demonstrate, through a valid assessment, that its portion of the interconnected transmission systems is planned to meet specific operation needs. To be valid, the assessment must meet a list of sub-Requirements within Requirement R1 (*see* R1.1-R1.5). Requirement R1.3 states that a valid assessment must "[b]e 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)." There are twelve subcategories in Requirement R1.3 that explain what the current or past study must address. Subcategory R1.3.1 requires the study:

> 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.

Turning to the Category C contingencies in Table 1 of the Reliability Standard, Table I, Category C contingencies 6-9 involve an assessment of the effects of a single line ground fault with delayed clearing due to a stuck breaker or a protection system failure. Because the study must be performed and *evaluated* only for those Category C contingencies that would produce the more severe system results or impacts, both conditions (*i.e.* a stuck breaker or protection system failure) must be considered for evaluation when selecting delayed clearing contingencies to evaluate. The one which creates the more severe system result or impact must be evaluated. The same sequence and conclusion follows for the identical Requirements in TPL-004-0 for category D contingencies.

2. Response to SPCS Question #2

In response to Question 2 above from the SPCS, the interpretation response reads:

> 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.

In short, the interpretation asked whether footnote (e) requires 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 answer is yes. 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. Had the definition of "Protection System" been referenced, a specific set of protection system components would have had to be addressed. Because the examples given in footnote (e) include a component not mentioned in the defined term, the lowercase use of protection system was determined to be intentional and the conclusion of the interpretation team follows from this determination. Therefore, studying of faults with delayed clearing includes "failure of any protection system component such as a relay, circuit breaker, or current transformer, and not because of an intentional design delay" as noted in footnote (e).

B. Timing of Commission Approval and Version Numbering

On February 28, 2013, NERC submitted a petition for approval of certain modified Transmission Planning Reliability Standards to the Commission.[21] In the Feb. 28 Petition, NERC requests that the Commission approve a proposed consolidated TPL Reliability Standard, TPL-001-4, and retire four Version 0 TPL Reliability Standards including, TPL-003-0a andTPL-004-0, which are the subject of this interpretation. If the Commission does not approve the proposed consolidated TPL Reliability Standard, NERC alternatively requests approval in the Feb. 28 Petition of, among other things, Version 2 of TPL-003 and TPL-004 (TPL-003-2a and TPL-004-2).

NERC asks the Commission to approve the interpretation as appended to the Version 0 Reliability Standards in **Exhibits C and D.** If the Commission approves this interpretation prior to ruling on the Feb. 28 Petition, the Reliability Standards will be referred to as TPL-003-0b[22] and TPL-004-0a. If the Commission acts first to approve the Feb. 28 Petition and approves either the consolidated TPL Reliability Standard or the proposed Version 2 TPL-003 and -004 Reliability Standards, and retires Version 0 of TPL-003 and TPL-004, NERC still asks that the Commission approve the interpretation as appended to the Version 0 Reliability Standards in **Exhibits C and D** for use in determining compliance with the Version 0 Reliability Standards until the retirements are effective. Because the interpretation is not subsumed into the succeeding Version 2 Reliability Standards, the interpretation would be carried forward and

[21] NERC Feb. 28, 2013 Petition, Docket Nos. RM12-1-000 and RM13-9-000 ("Feb. 28 Petition").

[22] *See* NERC Standards Numbering Convention at 2 ("If a standard has an approved Interpretation, the standard identification will also have a lower case letter after the version number."), available at http://www.nerc.com/files/NERC_Standards_Numbering_Convention_2009Sept14.pdf.

appended to the Version 2 Standards proposed in the Feb. 28 Petition as shown in **Exhibits E and F** if the Commission does not approve the consolidated TPL Reliability Standard and instead opts to approve the proposed Version 2 TPL-003 and -004 Reliability Standards in the Feb. 28 Petition.

V. SUMMARY OF THE RELIABILITY STANDARD DEVELOPMENT PROCEEDINGS

A. Development History

The development record for the proposed interpretation to TPL-003-0a and TPL-004-0 is summarized below. **Exhibit H** contains the complete record of development for the proposed interpretation.

1. The First Posting

The initial draft response of the request for interpretation was posted from June 20, 2012 to July 19, 2012 for a 30-day public comment period. Thirty-one sets of comments were received from 102 different individuals representing 69 companies and 9 of the 10 industry segments. In response to comments, the Interpretation Drafting Team made several changes to the draft interpretation including:

- clarifying references to Table 1 to show that the reference encompasses both standards;
- adding "Planning Authority" to the interpretation to ensure that the interpretation identifies both registered entities to which the Standards apply;
- providing additional clarity about the failure of a protection system component that impacts one or more protection systems where the total fault clearing time increases to address confusion on phrase "Delayed Clearing";
- adding substantive language for clarity on what protection system components are to be evaluated; and

- noting that applicable entities are permitted to use "engineering judgment" in their evaluation of Category C and D assessments on those components that would produce the more severe system impacts.

2. The Second Posting- Formal Comment Period and Initial Ballot

The second draft of the interpretation response was posted for a 30-day formal comment period from October 22, 2012 to December 5, 2012, with an initial ballot held from November 26, 2012 to December 5, 2012. The initial ballot achieved 84.81% quorum, and an approval percentage of 72.75%. The Interpretation Drafting Team received 39 sets of comments from 103 different individuals representing approximately 69 companies and 8 of the 10 industry segments. The Interpretation Drafting Team made minor, non-substantive clarifications to the draft interpretation, including:

- clarifying that "engineering judgment" is permitted;
- addressing the minority concern that an implementation plan would be needed; and
- making minor wording changes to reflect the Requirements being addressed in Response 2.

3. The Third Posting – Recirculation Ballot

The third draft of the interpretation was posted for a recirculation ballot from January 22, 2013 to January 31, 2013. The recirculation ballot achieved 85.67% quorum of and an approval percentage of 77.61%.

4. Board of Trustees Approval of Interpretation to TPL-003-0a and TPL-004-0

The final proposed interpretation to TPL-003-0a and TPL-004-0 was presented to the NERC Board of Trustees on February 7, 2013. NERC staff provided a summary of the proposed interpretation, as well as a summary of minority issues and associated drafting team responses.

The NERC Board of Trustees approved the interpretation, and NERC staff recommended that it be filed with applicable regulatory authorities.

B. Overview of the Interpretation Drafting Team

A detailed set of biographical information for each of the members of the Interpretation Drafting Team is included in **Exhibit I**.

VI. CONCLUSION

For the reasons set forth above, NERC respectfully requests that the Commission approve the interpretation as set forth in **Exhibit B** and appended to the Reliability Standards in **Exhibits C and D**, effective upon Commission approval.

Respectfully submitted,

/s/ William H. Edwards

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Counsel for the North American Electric Reliability Corporation

April 12, 2013

CERTIFICATE OF SERVICE

I hereby certify that I have served a copy of the foregoing document upon all parties listed on the official service list compiled by the Secretary in this proceeding. Dated at Washington, D.C. this 12th day of April, 2013.

/s/ William H. Edwards

William H. Edwards
Counsel for North American Electric Reliability Corporation

Exhibit A

Interpretation Request

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Interpretation Request Form
2012-INT-02 TPL-003-0a and TPL-004-0

When completed, email this form to:
laura.hussey@nerc.net

For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	**Title**
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

☒ Clarify the required performance

☐ Clarify the conditions under which the performance is required

☐ Clarify which functional entity is responsible for performing an action in a requirement

☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

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[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

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.

Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.

There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by:

- Potential non-compliance if the correct contingencies are not studied
- Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required
- Potential negative impact to grid reliability if the correct contingencies are not assessed

[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,"

Exhibit B

Interpretation Response

Response for Interpretation of TPL-003 and TPL-004 for SPCS

When completed, email this form to:
laura.hussey@nerc.net
For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
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Name:	Jonathan Sykes (PG&E), Chairman SPCS		
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Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.
Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.
There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by: • Potential non-compliance if the correct contingencies are not studied • Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required • Potential negative impact to grid reliability if the correct contingencies are not assessed

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	
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.
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] of either "stuck breaker" or "protection system failure" contingency[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.

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.

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Exhibit C

Reliability Standard TPL-003-0b with Proposed Interpretation

A. Introduction

1. **Title:** **System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

2. **Number:** TPL-003-0b

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:** April 23, 2010

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.

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.

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.

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

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-003-0_R1 and TPL-003-0_R2.

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-003-0_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	February 8, 2005	Adopted by NERC Board of Trustees	New
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	July 30, 2008	Adopted by NERC Board of Trustees	
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
0a	April 23, 2010	FERC approval of interpretation of TPL-003-0 R1.3.12	Interpretation
0b	February 7, 2013	Interpretation adopted by NERC Board of Trustees	

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing [e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local Network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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 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.*

Appendix 2

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

response.

Question 2: For the phrase "Delayed Clearing[5]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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] of either "stuck breaker" or "protection system failure" contingency[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?

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[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"
[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"

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.

Exhibit D

Reliability Standard TPL-004-0a with Proposed Interpretation

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

2. **Number:** TPL-004-0a

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:** April 1, 2005

B. Requirements

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

R1.1. Be made annually.

R1.2. Be conducted for near-term (years one through five).

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

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

R1.3.4. Have all projected firm transfers modeled.

R1.3.5. Include existing and planned facilities.

R1.3.6. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

R1.3.8. Include the effects of existing and planned control devices.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

R1.4. Consider all contingencies applicable to Category D.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-0_R1.

M2. The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-0_R1.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

1.2. Compliance Monitoring Period and Reset Timeframe

Annually.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: A valid assessment, as defined above, for the near-term planning horizon is not available.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Not applicable.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0a	February 7, 2013	Interpretation adopted by NERC Board of Trustees	

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing[e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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 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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)
[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[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*."
[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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] of either "stuck breaker" or "protection system failure" contingency[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

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"
[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"

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.

Exhibit E

Reliability Standard TPL-003-2b with Proposed Interpretation

A. Introduction

1. **Title:** **System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

2. **Number:** TPL-003-2b

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 approval by applicable regulatory authorities. In those jurisdictions where regulatory approval is not required, the effective date will be the first day of the first calendar quarter, 60 months after Board of Trustees adoption or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities. 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.

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.

R2. When system simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-003-2_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.

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

B. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-003-2_R1 and TPL-003-2_R2.

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-003-2_R3.

C. 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.

D. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	Adopted by NERC Board of Trustees	New
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	July 30, 2008	Adopted by NERC Board of Trustees	
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
0a	April 23, 2010	FERC approval of interpretation of TPL-003-0 R1.3.12	Interpretation

1a	February 17, 2011	Approved by the Board of Trustees; revised footnote ‘b’ pursuant to FERC Order RM06-16-009.	Revised (Project 2010-11)
1a	April 19, 2012	FERC issued Order 762 remanding TPL-001-1, TPL-002-1b, TPL-003-1a, and TPL-004-1. FERC also issued a NOPR proposing to remand TPL-001-2. NERC has been directed to revise footnote 'b' in accordance with the directives of Order Nos. 762 and 693.	
2a	February 7, 2013	Adopted by NERC Board of Trustees. Revised footnote ‘b’.	
2b	February 7, 2013	Interpretation adopted by NERC Board of Trustees.	

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing [e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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 is 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. For purposes of this footnote, the following are not counted as Firm Demand: (1) Demand directly served by the Elements removed from service as a result of the Contingency, and (2) Interruptible Demand or Demand-Side Management Load. In limited circumstances, Firm Demand may be interrupted throughout the planning horizon to ensure that BES performance requirements are met. However, when interruption of Firm Demand is utilized within the Near-Term Transmission Planning Horizon to address BES performance requirements, such interruption is limited to circumstances where the use of Firm Demand interruption meets the conditions shown in Attachment 1. In no case can the planned Firm Demand interruption under footnote 'b' exceed 75 MW for US registered entities. The amount of planned Non-Consequential Load Loss for a non-US Registered Entity should be implemented in a manner that is consistent with, or under the direction of, the applicable governmental authority or its agency in the non-US jurisdiction.

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.

Attachment 1

I. Stakeholder Process

During each Planning Assessment before the use of Firm Demand interruption under footnote ‘b’ is allowed as an element of a Corrective Action Plan in the Near-Term Transmission Planning Horizon of the Planning Assessment, the Transmission Planner or Planning Coordinator shall ensure that the utilization of footnote ‘b’ is reviewed through an open and transparent stakeholder process. The responsible entity can utilize an existing process or develop a new process. The process must include the following:

1. Meetings must be open to affected stakeholders including applicable regulatory authorities or governing bodies responsible for retail electric service issues
2. Notice must be provided in advance of meetings to affected stakeholders including applicable regulatory authorities or governing bodies responsible for retail electric service issues and include an agenda with:
    a. Date, time, and location for the meeting
    b. Specific location(s) of the planned Firm Demand interruption under footnote ‘b’
    c. Provisions for a stakeholder comment period
3. Information regarding the intended purpose and scope of the proposed Firm Demand interruption under footnote ‘b’ (as shown in Section II below) must be made available to meeting participants
4. A procedure for stakeholders to submit written questions or concerns and to receive written responses to the submitted questions and concerns
5. A dispute resolution process for any question or concern raised in #4 above that is not resolved to the stakeholder’s satisfaction

An entity does not have to repeat the stakeholder process for a specific application of footnote ‘b’ utilization with respect to subsequent Planning Assessments unless conditions spelled out in Section II below have materially changed for that specific application.

II. Information for Inclusion in Item #3 of the Stakeholder Process

The responsible entity shall document the planned use of Firm Demand interruption under footnote ‘b’ which must include the following:

1. Conditions under which Firm Demand interruption under footnote ‘b’ would be necessary:
    a. System Load level and estimated annual hours of exposure at or above that Load level
    b. Applicable Contingencies and the Facilities outside their applicable rating due to that Contingency
2. Amount of Firm Demand MW to be interrupted with:
    a. The estimated number and type of customers affected

   b. An explanation of the effect of the use of Firm Demand interruption under footnote ‘b’ on the health, safety, and welfare of the community

3. Estimated frequency of Firm Demand interruption under footnote ‘b’ based on historical performance
4. Expected duration of Firm Demand interruption under footnote ‘b’ based on historical performance
5. Future plans to alleviate the need for Firm Demand interruption under footnote ‘b’
6. Verification that TPL Reliability Standards performance requirements will be met following the application of footnote ‘b’
7. Alternatives to Firm Demand interruption considered and the rationale for not selecting those alternatives under footnote ‘b’
8. Assessment of potential overlapping uses of footnote ‘b’ including overlaps with adjacent Transmission Planners and Planning Coordinators

III. Instances for which Regulatory Review of Interruptions of Firm Demand under Footnote ‘b’ is Required

Before a Firm Demand interruption under footnote ‘b’ is allowed as an element of a Corrective Action Plan in Year One of the Planning Assessment, the Transmission Planner or Planning Coordinator must ensure that the applicable regulatory authorities or governing bodies responsible for retail electric service issues do not object to the use of Firm Demand interruption under footnote ‘b’ if either:

1. The voltage level of the Contingency is greater than 300 kV
   a. If the Contingency analyzed involves BES Elements at multiple System voltage levels, the lowest System voltage level of the element(s) removed for the analyzed Contingency determines the stated performance criteria regarding allowances for Firm Demand interruptions under footnote ‘b’, or
   b. For a non-generator step up transformer outage Contingency, the 300 kV limit applies to the low-side winding (excluding tertiary windings). For a generator or generator step up transformer outage Contingency, the 300 kV limit applies to the BES connected voltage (high-side of the Generator Step Up transformer)
2. The planned Firm Demand interruption under footnote ‘b’ is greater than or equal to 25 MW

Once assurance has been received that the applicable regulatory authorities or governing bodies responsible for retail electric service issues do not object to the use of Firm Demand interruption under footnote ‘b’, the Planning Coordinator or Transmission Planner must submit the information outlined in items II.1 through II.8 above to the ERO for a determination of whether there are any Adverse Reliability Impacts caused by the request to utilize footnote ‘b’ for Firm Demand interruption.

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 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.*

Appendix 2

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)
[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[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*."

response.

Question 2: For the phrase "Delayed Clearing[5]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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] of either "stuck breaker" or "protection system failure" contingency[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

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[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"
[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"

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.

Exhibit F

Reliability Standard TPL-004-2a with Proposed Interpretation

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

2. **Number:** TPL-004-2a

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 approval by applicable regulatory authorities. In those jurisdictions where regulatory approval is not required, the effective date will be the first day of the first calendar quarter, 60 months after Board of Trustees adoption or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities. All other requirements remain in effect per previous approvals. The existing Footnote 'b' remains in effect until the revised Footnote 'b' becomes effective.

B. Requirements

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

R1.1. Be made annually.

R1.2. Be conducted for near-term (years one through five).

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

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

R1.3.4. Have all projected firm transfers modeled.

R1.3.5. Include existing and planned facilities.

R1.3.6. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

R1.3.8. Include the effects of existing and planned control devices.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

R1.4. Consider all contingencies applicable to Category D.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

B. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-2_R1.

M2. The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-2_R1.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

1.2. Compliance Monitoring Period and Reset Timeframe

Annually.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: A valid assessment, as defined above, for the near-term planning horizon is not available.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Not applicable.

D. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	February 17, 2011	Approved by the Board of Trustees; revised footnote ‘b’ pursuant to FERC Order RM06-16-009.	Revised (Project 2010-11)
1	April 19, 2012	FERC issued Order 762 remanding TPL-001-1, TPL-002-1b, TPL-003-1a, and TPL-004-1. FERC also issued a NOPR proposing to remand TPL-001-2. NERC has been directed to revise footnote 'b' in accordance with the directives of Order Nos. 762 and 693.	
2	February 7, 2013	Adopted by NERC Board of Trustees. Revised footnote ‘b’.	
2a	February 7, 2013	Interpretation adopted by NERC Board of Trustees.	

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing[e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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 is 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. For purposes of this footnote, the following are not counted as Firm Demand: (1) Demand directly served by the Elements removed from service as a result of the Contingency, and (2) Interruptible Demand or Demand-Side Management Load. In limited circumstances, Firm Demand may be interrupted throughout the planning horizon to ensure that BES performance requirements are met. However, when interruption of Firm Demand is utilized within the Near-Term Transmission Planning Horizon to address BES performance requirements, such interruption is limited to circumstances where the use of Firm Demand interruption meets the conditions shown in Attachment 1. In no case can the planned Firm Demand interruption under footnote 'b' exceed 75 MW for US registered entities. The amount of planned Non-Consequential Load Loss for a non-US Registered Entity should be implemented in a manner that is consistent with, or under the direction of, the applicable governmental authority or its agency in the non-US jurisdiction.

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.

Attachment 1

I. Stakeholder Process

During each Planning Assessment before the use of Firm Demand interruption under footnote 'b' is allowed as an element of a Corrective Action Plan in the Near-Term Transmission Planning Horizon of the Planning Assessment, the Transmission Planner or Planning Coordinator shall ensure that the utilization of footnote 'b' is reviewed through an open and transparent stakeholder process. The responsible entity can utilize an existing process or develop a new process. The process must include the following:

1. Meetings must be open to affected stakeholders including applicable regulatory authorities or governing bodies responsible for retail electric service issues
2. Notice must be provided in advance of meetings to affected stakeholders including applicable regulatory authorities or governing bodies responsible for retail electric service issues and include an agenda with:
    a. Date, time, and location for the meeting
    b. Specific location(s) of the planned Firm Demand interruption under footnote 'b'
    c. Provisions for a stakeholder comment period
3. Information regarding the intended purpose and scope of the proposed Firm Demand interruption under footnote 'b' (as shown in Section II below) must be made available to meeting participants
4. A procedure for stakeholders to submit written questions or concerns and to receive written responses to the submitted questions and concerns
5. A dispute resolution process for any question or concern raised in #4 above that is not resolved to the stakeholder's satisfaction

An entity does not have to repeat the stakeholder process for a specific application of footnote 'b' utilization with respect to subsequent Planning Assessments unless conditions spelled out in Section II below have materially changed for that specific application.

II. Information for Inclusion in Item #3 of the Stakeholder Process

The responsible entity shall document the planned use of Firm Demand interruption under footnote 'b' which must include the following:

1. Conditions under which Firm Demand interruption under footnote 'b' would be necessary:
    a. System Load level and estimated annual hours of exposure at or above that Load level
    b. Applicable Contingencies and the Facilities outside their applicable rating due to that Contingency
2. Amount of Firm Demand MW to be interrupted with:
    a. The estimated number and type of customers affected

   b. An explanation of the effect of the use of Firm Demand interruption under footnote ‘b’ on the health, safety, and welfare of the community

3. Estimated frequency of Firm Demand interruption under footnote ‘b’ based on historical performance
4. Expected duration of Firm Demand interruption under footnote ‘b’ based on historical performance
5. Future plans to alleviate the need for Firm Demand interruption under footnote ‘b’
6. Verification that TPL Reliability Standards performance requirements will be met following the application of footnote ‘b’
7. Alternatives to Firm Demand interruption considered and the rationale for not selecting those alternatives under footnote ‘b’
8. Assessment of potential overlapping uses of footnote ‘b’ including overlaps with adjacent Transmission Planners and Planning Coordinators

<u>III. Instances for which Regulatory Review of Interruptions of Firm Demand under Footnote ‘b’ is Required</u>

Before a Firm Demand interruption under footnote ‘b’ is allowed as an element of a Corrective Action Plan in Year One of the Planning Assessment, the Transmission Planner or Planning Coordinator must ensure that the applicable regulatory authorities or governing bodies responsible for retail electric service issues do not object to the use of Firm Demand interruption under footnote ‘b’ if either:

1. The voltage level of the Contingency is greater than 300 kV
   a. If the Contingency analyzed involves BES Elements at multiple System voltage levels, the lowest System voltage level of the element(s) removed for the analyzed Contingency determines the stated performance criteria regarding allowances for Firm Demand interruptions under footnote ‘b’, or
   b. For a non-generator step up transformer outage Contingency, the 300 kV limit applies to the low-side winding (excluding tertiary windings). For a generator or generator step up transformer outage Contingency, the 300 kV limit applies to the BES connected voltage (high-side of the Generator Step Up transformer)
2. The planned Firm Demand interruption under footnote ‘b’ is greater than or equal to 25 MW

Once assurance has been received that the applicable regulatory authorities or governing bodies responsible for retail electric service issues do not object to the use of Firm Demand interruption under footnote ‘b’, the Planning Coordinator or Transmission Planner must submit the information outlined in items II.1 through II.8 above to the ERO for a determination of whether there are any Adverse Reliability Impacts caused by the request to utilize footnote ‘b’ for Firm Demand interruption.

Appendix 1

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)
[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.
[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[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*."
[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

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] of either "stuck breaker" or "protection system failure" contingency[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,

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[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.
[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.
[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.
[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,"

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.

Exhibit G

Consideration of Comments for Proposed Interpretation

Interpretation 2012-INT-02
TPL-003-0a and TPL-004-0 for SPCS

Related Files

Status: The interpretation will be presented to the NERC Board of Trustees for adoption at its February 2013 meeting and if adopted, filed with regulators for approval.

Background:
This interpretation request was submitted to NERC as a process to address the Federal Energy Regulatory Commission's concern about the study of single point of failure in protection systems documented in Order No. 754.

Interpretation Process (excerpt):
In accordance with the Reliability Standards Development Procedure, the first formal comment period shall be 30-days long. If the drafting team makes substantive revisions to the interpretation following the initial formal comment period, then the interpretation shall undergo another quality review before it is posted for its second formal comment period. The second formal comment period shall have a 45-day duration and shall start after the drafting team has posted its consideration of stakeholder comments and any conforming changes to the associated standard.

Formation of a ballot pool shall take place during the first 30 days of the 45-day formal comment period, and the initial ballot of the interpretation shall take place during the last 10 days of that formal comment period. The interpretation drafting team shall consider and respond to all comments submitted during the formal comment period at the same time and in the same manner as specified for addressing comments submitted with ballots.

If the interpretation is approved by its ballot pool, then the interpretation will be appended to the standard and will become effective when adopted by the NERC Board of Trustees and approved by the applicable regulatory authorities. The interpretation will remain appended to the standard until the standard is revised through the normal standards development process. When the standard is revised, the clarifications provided by the interpretation will be incorporated into the revised standard.

Draft	Action	Dates	Results	Consideration of Comments
Draft 3 SPCS Interpretation of TPL-003-0a and TPL-004-0 Interpretation Clean | Redline to Last Posted Request for Interpretation **Supporting Documents:** TPL-003-0a TPL-004-0	Recirculation Ballot Info>> Vote>>	01/22/13 - 01/31/13 (closed)	Summary>> Full Record>>	
Draft 2 SPCS Interpretation of TPL-003-0a and TPL-004-0 Interpretation Clean | Redline to Last Posted Request for Interpretation **Supporting Documents:** Unofficial Comment Form (Word) TPL-003-0a TPL-004-0	Initial Ballot Updated Info>> Info>> Vote>>	11/26/12 - 12/05/12 (closed)	Summary>> Full Record>>	
	Formal Comment Period Info>> Submit Comments>>	10/22/12 - 12/05/12 (closed)	Comments Received>>	Consideration of Comments>> (2)
	Join Ballot Pool	10/22/12 - 11/20/12 (closed)		

Draft 1 SPCS Interpretation of TPL-003-0a and TPL-004-0 Interpretation Request for Interpretation **Supporting Documents:** Unofficial Comment Form (Word) TPL-003-0a TPL-004-0	Comment Period Info>> Submit Comments>>	06/20/12 - 07/19/12 (closed)	Comments Received>>	Consideration of Comments>> (1)

Consideration of Comments

Interpretation of TPL-003-0a and TPL-004-0 for SPCS
Project 2012-INT-02

The Project 2012-INT-02 Interpretation Drafting Team (IDT) thanks all commenters who submitted comments on the Interpretation of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee (SPCS). This interpretation was posted for a 30-day public comment period from June 20, 2012 through July 19, 2012. Stakeholders were asked to provide feedback on the standards and associated documents through a special electronic comment form. There were 31 sets of comments, including comments from approximately 102 different people from approximately 69 companies representing 9 of the 10 industry segments as shown in the table on the following pages.

Summary Consideration

The IDT received overwhelmingly supportive comments regarding the interpretation for both questions posed by the SPCS. Revisions made to the interpretation are summarized in the following sections by question.

Question 1

The IDT made clarifying edits to the interpretation response. The quotes and parentheses around the parenthetical for "stuck breaker and protection system failure" were swapped to more accurately reflect the information referenced by the IDT. The phrase "in either standard" was added to clarify that the Table I reference pertains to both standards identified in the interpretation. The last sentence was improved for readability and clarity. The word "either" was removed as it was not necessary for clarity. The actual answer to the question was moved to the first part of the IDT's response for clarity. The IDT added the Planning Authority to the interpretation to remove confusion that both registered entities applicable to the standard are both identified in the interpretation. The parenthetical "(i.e., TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1)" was added to provide greater clarity to the specific requirement being identified by the IDT. Last, the IDT added "of" between "regardless of whether" to improve readability.

Question 2

The IDT received the most comments on the interpretation concerning question 2. The revision provides additional clarity about the failure of a protection system component that impacts one or more protection systems where the total fault clearing time increases. This clarification was made to address the confusion about the phrase "Delayed Clearing" used in footnote (e) of both standards. In response to commenters, the IDT made several revisions and added substantively more language to provide further clarity to industry stakeholders about what protection system components are to be evaluated within the standards.

The additional text discusses the IDT's conclusion about the use of the lowercase phrase "protection system" rather than the defined NERC glossary phrase. Furthermore, the IDT notes that the applicable entities are permitted the use of engineering judgment in their evaluation of Category C and D assessments in regard to those components that would produce the more sever system results or impacts. Last, the actual answer to the question was moved to the first part of the IDT's response for clarity.

Additional Information

All comments submitted may be reviewed in their original format on the standard's project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President of Standards, Mark Lauby, at 404-446-9723 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners

2 — RTOs, ISOs

3 — Load-serving Entities

4 — Transmission-dependent Utilities

5 — Electric Generators

6 — Electricity Brokers, Aggregators, and Marketers

7 — Large Electricity End Users

8 — Small Electricity End Users

9 — Federal, State, Provincial Regulatory or other Government Entities

10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Guy Zito	Northeast Power Coordinating Council										X

	Additional Member	Additional Organization	Region	Segment Selection
1.	Alan Adamson	New York State Reliability Council, LLC	NPCC	10
2.	Carmen Agavriloai	Independent Electricity System Operator	NPCC	2
3.	Greg Campoli	New York Independent System Operator	NPCC	2
4.	Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
5.	Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1
6.	Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
7.	Mike Garton	Dominion Resources Services		5
8.	Kathleen Goodman	ISO - New England	NPCC	2
9.	Michael Jones	National Grid	NPCC	1
10.	David Kiguel	Hydro One Networks Inc.	NPCC	1

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

11.	Michael R. Lombardi	Northeast Utilities	NPCC	1
12.	Randy MacDonald	New Brunswick Power Transmission	NPCC	9
13.	Bruce Metruck	New York Power Authority	NPCC	6
14.	Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
15.	Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
16.	Robert Pellegrini	The United Illuminating Company	NPCC	1
17.	Si-Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
18.	David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
19.	Brian Robinson	Utility Services	NPCC	8
20.	Michael Schiavone	National Grid	NPCC	1
21.	Wayne Sipperly	National Grid	NPCC	5
22.	Donald Weaver	New Brunswick System Operatorator		2
23.	Ben Wu	Orange and Rockland Utilities	NPCC	1
24.	Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
2.	Group	Jonathan Hayes	Southwest Power Pool NERC Reliability Standards Development Team	X		X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Jonathan Hayes	Southwest Power Pool	SPP	NA
2.	Robert Rhodes	Southwest Power Pool	SPP	NA
3.	Don Taylor	WESTAR	SPP	1, 3, 5, 6
4.	Tiffany Lake	WESTAR	SPP	1, 3, 5, 6
5.	Mo Awad	WESTAR	SPP	1, 3, 5, 6
6.	John Allen	City Utilities of Springfield	SPP	1, 4
7.	Mohsen Ghavami	Xcel Energy	SPP	1, 3, 5, 6
8.	Helal Islam	Xcel Energy	SPP	1, 3, 5, 6
9.	Buyanni	Xcel Energy	SPP	1, 3, 5, 6
10.	Mark Hamilton	Oklahoma Gas and Electric	SPP	1, 3, 5
11.	Stephen McGie	City of Coffeyville	SPP	NA
12.	Valerie Pinamonti	American Electric Power	SPP	1, 3, 5
13.	Terri Pyle	Oklahoma Gas and Electric	SPP	1, 3, 5
14.	Lynn Schroeder	WESTAR	SPP	1, 3, 5, 6

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
3.	Group	Sasa Maljukan	Hydro One	X									

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10

	Additional Member	Additional Organization	Region	Segment Selection
1.	David Kiguel	Hydro One NEtworks Inc.	NPCC	1
2.	Hamid HAMADANIZADEH	Hydro One NEtworks Inc.	NPCC	1

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
4.	Group	David Thorne	Pepco Holdings Inc. & Affiliates	X		X							

	Additional Member	Additional Organization	Region	Segment Selection
1.	Carl Kinsley	Delmarva Power & Light	RFC	1

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
5.	Group	Bill Miller	NERC System Protection and Control Subcommittee (SPCS)	X			X	X				X	X

No additional members listed.

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
6.	Group	Steve Rueckert	Western Electricity Coordinating Council										X

No additional members listed.

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
7.	Group	WILL SMITH	MRO NSRF	X	X	X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	MAHMOOD SAFI	OPPD	MRO	1, 3, 5, 6
2.	CHUCK LAWRENCE	ATC	MRO	1
3.	TOM WEBB	WPS	MRO	3, 4, 5, 6
4.	JODI JENSON	WAPA	MRO	1, 6
5.	KEN GOLDSMITH	ALTW	MRO	4
6.	ALICE IRELAND	XCEL	MRO	1, 3, 5, 6
7.	DAVE RUDOLPH	BEPC	MRO	1, 3, 5, 6
8.	ERIC RUSKAMP	LES	MRO	1, 3, 5, 6
9.	JOE DEPOORTER	MGE	MRO	3, 4, 5, 6
10.	SCOTT NICKELS	RPU	MRO	4
11.	TERRY HARBOUR	MEC	MRO	5, 6, 1, 3
12.	MARIE KNOX	MISO	MRO	2
13.	LEE KITTELSON	OTP	MRO	1, 3, 5, 6
14.	SCOTT BOS	MPW	MRO	1, 3, 5, 6
15.	TONY EDDLEMAN	NPPD	MRO	1, 3, 5
16.	MIKE BRYTOWSKI	GRE	MRO	1, 3, 5, 6
17.	DAN INMAN	MPC	MRO	1, 3, 5, 6

	Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
8.	Group	Al DiCaprio	ISO/RTO Council Standards Review Committee		X								

	Additional Member	Additional Organization	Region	Segment Selection
1.	Terry Bilke	MISO	MRO	2
2.	Greg Campoli	NYISO	NPCC	2
3.	Gary DeShazo	CAISO	WECC	2
4.	Kathleen Goodman	ISO-NE	NPCC	2
5.	Ben Li	IESO	NPCC	2
6.	Ken Gardner	AESO	WECC	2
7.	Charles Yeung	SPP	SPP	2
8.	Don Weaver	NBSO	NPCC	2

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
9.	Group	Emily Pennel	Southwest Power Pool Regional Entity										X

No additional members listed.

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
10.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Berhanu	Tesema	WECC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
11.	Group	Jason Marshall	ACES Power Marketing Standards Collaborators						X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	John Shaver	Southwest Transmission Cooperative	WECC	1
2.	Chris Bradley	Big Rivers Electric Corporation	SERC	1
3.	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
4.	Patrick Woods	East Kentucky Power Cooperative	SERC	1, 3, 5

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
12.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X				
13.	Individual	Janet Smith	Arizona Public Service Company	X		X		X	X				
14.	Individual	Aaron Staley	Orlando Utilities Commission	X									
15.	Individual	Chris Mattson	Tacoma Power	X		X	X	X	X				
16.	Individual	Thad Ness	American Electric Power	X		X		X	X				
17.	Individual	Michael Falvo	Independent Electricity System Operator		X								

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
18.	Individual	Kasia Mihalchuk	Manitoba Hydro	X		X		X	X				
19.	Individual	Jay	Campbell	X		X	X	X					
20.	Individual	John Pearson	ISO New England		X								
21.	Individual	Brett Holland	KCP&L/ KCP&L-GMO	X		X		X	X				
22.	Individual	Anthony Jablonski	ReliabilityFirst										X
23.	Individual	Kirit Shah	Ameren	X		X		X	X				
24.	Individual	Milorad Papic	Idaho Power Company	X		X							
25.	Individual	J. S. Stonecipher, PE	City of Jacksonville Beach dba/Beaches Energy Services	X								X	
26.	Individual	RoLynda Shumpert	South Carolina Electric and Gas	X		X		X	X				
27.	Individual	Andrew Z. Pusztai	American Transmission Company	X									
28.	Individual	Oliver Burke	Entergy Services, Inc.	X		X		X	X				
29.	Individual	Greg Rowland	Duke Energy	X		X		X	X				
30.	Individual	Patrick Brown	Essential Power, LLC					X					
31.	Individual	Keira Kazmerski	Xcel Energy	X		X		X	X				

1. **Do you agree with Response 1 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration:

Industry comments vastly support the Interpretation Drafting Team's (IDT) interpretation to Question 1. The IDT made minor clarifications to support the interpretation including a reference to TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1.

A stakeholder questioned the need for the interpretation based on parallel initiatives such as the development of TPL-001-2 and the Order No. 754 Request for Data or Information ("data request"). The Federal Energy Regulatory Commission (FERC) Order No. 754[2] (i.e., approval of the interpretation of TPL-002-0) addresses the concern about the non-operation of non-redundant protection systems. The Request for Interpretation along with the data request both support approaches that were formed at the October 24-25, 2011 FERC Technical Conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach.

A stakeholder raised a concern that an implementation plan may be needed if the Planning Authority and Transmission Planner might have only been studying one or the other (i.e., stuck breaker or protection system failure) for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing,[e] Elements C6, C7, C8, and C9. The IDT believes that when the Planning Authority and Transmission Planner's consideration of the situation(s) that produce the more severe system results or impacts of stuck breaker or protection system failure indicates an inability of the system to meet the performance requirements of the standard (i.e., TPL-003-0a), that the implementation plan associated with achieving the desired performance is addressed by TPL-003-0, Requirement R2 and its sub-requirements.

Organization	Yes or No	Question 1 Comment
Pepco Holdings Inc. & Affiliates	No	1) TPL-001-2 was designed to be a single, comprehensive, and coordinated standard that merges the requirements of four existing standards: TPL-001-1; TPL-002-1b; TPL-003-1a; TPL-004-1 and also results in the retirement of TPL-005 and TPL-006. TPL-001-2 went through the industry vetting process

2 Order No. 754, *Interpretation of Transmission Planning Reliability Standard, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)*

Organization	Yes or No	Question 1 Comment
		and was approved by the NERC Board of Trustees on August 4, 2011. The language in TPL-001-2 was debated extensively within the industry, including the reference to "protection system failures". It was a balloted consensus to replace that phrase with the term "failure of a non-redundant relay", which was clarified in footnote 13 of Table 1. As such, it would appear that the language in TPL-001-2, if approved, would preclude the need for this interpretation of TPL-003-0a and TPL-004-0. Although TPL-001-2 has not yet been FERC approved, the perceived objection centered around footnote 12 (consequential load loss) and not footnote 13 and the elimination of the term "protection system failure". **Response:** The IDT thanks you for your comment and believes that the NERC Board of Trustees-adopted and not yet FERC-approved TPL-001-2 standard aims to resolve and improve certain aspects of the TPL standards, including protection system failures. The NERC Board of Trustees-adopted TPL-001-2 (8/2011) preceded subsequent milestone events such as the Order No. 754 (9/2011) and FERC Technical Conference (10/2011), which provided further direction on the Commission's concern regarding "…the study of the non-operation of non-redundant primary protection systems; e.g., the study of a single point of failure on protection systems."[3] NERC's Order No. 754 Informational Filing[4] describes how this interpretation along with the Order No. 754 Data Request is part an overall approach formed at the October 24-25, 2011 FERC Technical Conference to address FERC's concern. The comment provided has not addressed the IDT's question. No change made. 2) In addition, there is presently a data request on Order 754 to ascertain the significance of protection system single points of failure. In that data request it provides a method for identifying single points of failure.

[3] Interpretation of Transmission Planning Reliability Standard, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)

[4] http://www.nerc.com/files/Final_Order_754_Informational_Filing_3-15-12_complete.pdf

Organization	Yes or No	Question 1 Comment
		However, dynamic simulations involving faults coupled with the failure of a single battery system are not required, even though it could render all protection systems at a station inoperable, requiring remote clearing. Neither the existing sets of TPL standards that use the term "protection system failure", nor this interpretation, makes any attempt to define what single points of failure need to be evaluated, or whether a failure of a single battery system needs to studied. **Response:** The IDT thanks you for your comment; however, the comment provided has not addressed the IDT's question. The interpretation is responsive to the System Protection and Control Subcommittee's question raised and clarifies that the parenthetical (i.e., "stuck breaker or protection system failure") portion of the Table I, Category C6-C9, contingencies applicable to TPL-003-0a does not establish other or optional approaches for addressing a delayed clearing mode for a SLG Fault. No change made. The IDT clarifies the interpretation in response to the System Protection and Control Subcommittee's Question #2 comment that the use of "protection system" in the existing TPL standards does not explicitly use the defined NERC glossary term "Protection System." The IDT believes that an entity is not precluded from evaluating a DC supply component failure and revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1). 3) Considering the uncertainty of how to address certain single points of failure, coupled with the numerous industry comments supporting the language change in TPL-001-2, it would seem prudent at this time to delay a response to this interpretation in order to allow the standards development process to play out, and FERC review of TPL-001-2 to proceed. The Order 754 data request should proceed as planned and FERC approval of TPL-001-2

Organization	Yes or No	Question 1 Comment
		should be pursued. The outcome of both could significantly impact this proposed interpretation response, or render it unnecessary. **Response:** The IDT thanks you for your comment. This interpretation is one approach, in addition to the Order No. 754 Request for Data or Information, to address FERC's concern raised in paragraphs 19 and 20 of the Order No. 754.[5] The interpretation clarifies that the existing TPL standards (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) require both stuck breaker and protection system failure must be considered within a Planning Authority and Transmission Planner system assessment. The comment provided has not addressed the IDT's question. No change made.
Response: Please see the responses above.		
ACES Power Marketing Standards Collaborators	No	Conceptually, we think the first response largely captures the intent and language of the standard. However, we think additional clarity is needed. What does the drafting team mean by evaluate? **Response:** The IDT thanks you for your comment and clarifies the interpretation by adding the parenthetical for "(i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1)" to note the reference to "evaluate[d]," see R1.3.1 below. Clarification made. *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.* If the intention is simply that the TP or PC must consider these stuck breaker

[5] *Interpretation of Transmission Planning Reliability Standard*, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)

Organization	Yes or No	Question 1 Comment
		or failed protection system contingencies, we agree. If the intention is that the TP or PC must simulate each of these stuck breaker or failed protection system contingencies, then we disagree. R1.3.1 compels the PC and TP to perform or evaluate Category C contingencies “that would produce the more severe system results or impacts” while R1.5 requires the TP and PC to consider all Category C contingencies in their studies. Thus, if the stuck breaker or failed protection systems are not expected to be among the “more severe system results or impacts”, the PC and TP do not have to perform simulations for them. The standard does not specify how the TP or PC makes this determination but there are a myriad of ways (i.e. experience, previous studies) that they could arrive at the conclusion that a contingency will not produce “more severe system results or impacts”. **Response:** The IDT thanks you for your comment. The interpretation does not imply that the Planning Authority and Transmission Planner must simulate each stuck breaker or protection system failure contingency. The interpretation states that the Planning Authority and Transmission Planner must consider 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. No change made.
Response: See responses above.		
Western Electricity Coordinating Council	Yes	That would be my understanding
Response: The IDT thanks you for your support. No change made.		

Organization	Yes or No	Question 1 Comment
MRO NSRF	Yes	This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate "protection system components". However, if Interpretation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.
Response: The IDT thanks you for your support. No change made.		
ISO/RTO Council Standards Review Committee	Yes	The SRC Standards Review Committee agrees that Response 1 duly addresses Question 1 within the scope of the requirement, the contingency type and its footnote.
Response: The IDT thanks you for your support. No change made.		
ReliabilityFirst	Yes	ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 1, but offers the following additional language for added clarity: Response 1 – TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused

Organization	Yes or No	Question 1 Comment
		by a failure of a protection system or circuit breaker is evaluated to examine its impact on BES performance. Therefore, the transmission planner considers the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Note: The IDT has applied formatting (proposing/~~deleting~~) to bring attention to ReliabilityFirst's proposed suggestion above: ***ReliabilityFirst (from above):*** *"Response 1 – TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker is ~~must be~~ evaluated to examine its impact on BES performance. Therefore, the transmission planner considers ~~must consider~~ the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure."* **Response:** This IDT thanks you for your comment and decided not to incorporate the two modifications in the interpretation as proposed because it is important to be clear that the Planning Authority and Transmission Planner must consider the situation that produces the more severe system results or impacts. No change made.		
Ameren	Yes	We agree with the SDT that the more severe system results or impacts due to a delayed clearing condition should be evaluated.

Organization	Yes or No	Question 1 Comment
Response: The IDT thanks you for your support. No change made.		
Idaho Power Company	Yes	We support the following response from SPCS to a Question No. 1 TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance. Therefore, the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.
Response: The IDT thanks you for your support. No change made.		
American Transmission Company	Yes	This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate “protection system components.” However, if Interpretation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.

Organization	Yes or No	Question 1 Comment
Response: The IDT thanks you for your support, please see response for American Transmission Company in Question 2 below. No change made.		
Duke Energy	Yes	The interpretation appears to expand upon historical industry practices implying that more detailed evaluation and complex analysis will be required. The change in practices would require definition of an implementation plan to achieve compliance with the interpretation's requirements.
Response: The IDT recognizes there may be cases where a Planning Authority and Transmission Planner may have only been studying one or the other (i.e., stuck breaker or protection system failure) for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing,[e] Elements 6, 7, 8, and 9. The IDT believes that when the Planning Authority and Transmission Planner's consideration of the situation(s) that produce the more severe system results or impacts of stuck breaker or protection system failure indicate an inability of the system to meet the performance requirements of the standard (i.e., TPL-003-0a), that the implementation plan associated with achieving the desired performance is addressed by TPL-003-0a, Requirement R2 and its sub-requirements. No change made. **TPL-003-0a, R2:** *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.* The Reliability Standard, TPL-004-0, only requires the documented results of three-phase faults for stuck breaker or protection		

Organization	Yes or No	Question 1 Comment
system failure and does not require corrective action implementation plans.		
Manitoba Hydro	Yes	MH agrees with the response. In order to determine the more severe result due to delayed clearing of a fault (as defined in footnote (e)), the planner will have to consider the stuck breaker fault and the protection system failure.
Response: The IDT thanks you for your support. No change made.		
Northeast Power Coordinating Council	Yes	
Southwest Power Pool NERC Reliability Standards Development Team	Yes	
Hydro One	Yes	
NERC System Protection and Control Subcommittee (SPCS)	Yes	
Southwest Power Pool Regional Entity	Yes	
Bonneville Power Administration	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Orlando Utilities Commission	Yes	

Organization	Yes or No	Question 1 Comment
Tacoma Power	Yes	
American Electric Power	Yes	
Independent Electricity System Operator	Yes	
Campbell	Yes	
ISO New England	Yes	
KCP&L/ KCP&L-GMO	Yes	
City of Jacksonville Beach dba/Beaches Energy Services	Yes	
South Carolina Electric and Gas	Yes	
Entergy Services, Inc.	Yes	
Essential Power, LLC	Yes	

2. **Do you agree with Response 2 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration: Several industry stakeholders provided comments that the IDT's interpretation did not adequately address the underlying key issue implied by the request for interpretation, Question 2, namely whether "any protection system component" in the TPL-003-0a and TPL-004-0 must include "single point of failure components". Other commenters felt the reference to "full impact" was vague and subjective. The IDT clarified the interpretation based on these industry stakeholder comments.

The System Protection and Control Subcommittee raised a valid comment and the IDT has modified the interpretation. The IDT's revised interpretation clarifies that the term, "Delay Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Additionally, the IDT now indicates that simulating the "full impact" covers both the clearing time and the facilities removed.

Several commenters raised concerns the interpretation did not provide adequate clarity regarding the components the Planning Authority and Transmission Planner must consider. The IDT concurs with these comments and has revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component.

A commenter raised a concern about the evaluation of batteries. The IDT believes that an entity is not precluded from evaluating a DC supply component failure. The potential risk of batteries with regard to single component failure is currently being assessed through the Order No. 754 data request which became effective September 1, 2012. The IDT's revised the interpretation to clarify the performance expectations with regard to components for the current version of these two standards.

Organization	Yes or No	Question 2 Comment
Pepco Holdings Inc. & Affiliates	No	See #1
Response: The IDT refers the commenter to the response in Question 1. No change made.		
NERC System Protection and Control Subcommittee (SPCS)	No	The SPCS generally agrees with the proposed interpretation. However, we believe the reference to a failure that "increases clearing time" is too narrow and implies it is

Organization	Yes or No	Question 2 Comment
*This IDT has highlighted the SPCS proposed text to the right to make their suggestion more identifiable.		not necessary to consider failures that disable a protection system, therefore affecting both the clearing time and the number of elements that may be tripped by remote protection systems. The SPCS proposes revising the interpretation to address "failure of a protection system component that affects the operation (disables or increases clearing times) of one or more protection systems," and recommends adding an example for clarification. The full text would then be as proposed below. Note: Added text is identified by square brackets. The term "Delayed Clearing" that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. Any failure of a protection system component that [affects the operation (disables or] increases clearing times[)] of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance. [For example, if a single current transformer provides AC current input to both a local primary and secondary protection system, then simulating failure of the current transformer must include the effect of disabling both local protection systems. This may require modeling clearing from remote terminals to expose the full impact on BES performance.]
Response: The IDT thanks you for using the brackets for emphasis and clarity to note the suggested changes. The System Protection and Control Subcommittee have a valid comment and the IDT has modified the interpretation. The IDT revised the interpretation to clarify that the term, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Additionally, the IDT now indicates that simulating the "full impact" covers both the clearing time and the facilities removed. Clarification made.		
MRO NSRF	No	The interpretation does not address the key issue that is implied by Question 2, namely whether "any protection system component" in the TPL-003 and TPL-004 must be interpreted to include "single point of failure components". Several thoughts to consider with regard to this issue are:

Organization	Yes or No	Question 2 Comment
		1. The term, "protection system component" in footnote 'e' of TPL-003 and TPL-004 is not a defined term (i.e. is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. **Response:** The IDT concurs with the comment and has revised the interpretation to clarify the scope of "any component" found in footnote (e). Clarification made. 2. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact all efforts by regulatory entities and industry groups so far have failed to reach agreement on what types and what granularity of system protection components should be subject to "single point of failure" assessment and establish written list of all components that must be taken into account. **Response:** The comment provided has not addressed the IDT's question. No change made. 3. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly stipulate the component that must be considered to be fully compliance, if the TPL standards were revised to "any Protection System component", then the components to be considered would at least include "protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits". We suggest that Response 2 be revised to acknowledge say that the wording, "any protection system component", in Footnote "e" is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers and are at liberty to judge what additional components are appropriate to be assessed. Transmission Planners and Planning Coordinators may also include associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components, but they are not obliged to assess these components based on the

Organization	Yes or No	Question 2 Comment
		present wording of footnote 'e'. **Response:** The IDT concurs with the comments and has revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.
Response: Please see the responses above.		
ACES Power Marketing Standards Collaborators	No	Response 2 is inconsistent with the plain meaning of the standards and actually modifies both standards. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for "any failure of a protection system component that increases clearing times of one or more protection systems ". Both standards say that a study or simulation is required only for the contingencies "that would produce the more severe system results or impacts" R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider all Category C and D contingencies respectively. Thus, if a protection system failure that would increase clearing times and would produce "more severe system results and impacts", it would be required to be studied and simulated. However, if it did not produce the "more severe system results and impacts", it would not be required to be studied and simulated. The manner in which the PC or TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. However, we offer that there are many ways that a PC or TP could reasonably determine the need to fully simulate a contingency and, thus, ensure that single points of failure are addressed. For instance, the TP or PC could rely on actual system experience or past studies. They could also rely on steady state screening studies. If there are not problems in the steady state and the contingency is electrically far from any generators, it is not likely there will be any transient or dynamic stability

Organization	Yes or No	Question 2 Comment
		problems either.
Response: The IDT thanks you for your comments. In consideration of ACES' suggestions, along with other industry stakeholders, the IDT made adjustments to the interpretation. The revised interpretation clarifies that the two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Ameren	No	We do not believe that it is necessary to evaluate every possible delayed clearing time due to system component failures. As we have stated in question 1 above, the goal should be to evaluate the more severe system results or impacts which usually correlates with the longest clearing time.
Response: The IDT thanks you for your comment and concurs in general with Ameren's view; however, the IDT does not believe that the two standards as written mandate the determination of the "longest clearing time." The IDT is not interpreting the two standards to require review (or evaluation) of all clearing time impacts for a given component failure. The interpretation now clarifies that, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Clarification made.		
American Transmission Company	No	The interpretation does not address the key issue that is implied by Question 2, namely whether "any protection system component" in the TPL-003 and TPL-004 must be interpreted to include "single point of failure components." ATC recommends the following comments be considered by the SDT regarding this issue: a. The term, "protection system component" in footnote 'e' of TPL-003 and TPL-004 is not a defined term (i.e., is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. b. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact, all efforts by regulatory entities and industry groups so far have

Organization	Yes or No	Question 2 Comment
		failed to reach agreement on what types and what granularity of system protection components should be subject to "single point of failure" assessment and establish a written list of all components that must be taken into account. c. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly specify the component that must be considered to be fully compliant if the TPL standards are revised to apply to "any Protection System component." Incorporating this list would ensure the components to be considered would include, at a minimum, "protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits." d. ATC recommends that Response 2 be revised to acknowledge that the wording, "any protection system component," if Footnote "e" is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers in their assessment. However, Transmission Planners and Planning Coordinators may decide, in their discretion, whether additional components not covered by the current wording of footnote 'e' are appropriate to be assessed, such as associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components.
Response: The IDT thanks you for your comments and has revised the interpretation in consideration of this comment and other stakeholder comments. The revised interpretation clarifies that these two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Xcel Energy	No	We agree with the underlying intent in the proposed interpretation; however, the response verbiage needs some improvements. The phrase "normally expected clearing time" in the first sentence is ambiguous since it is not standard terminology

Organization	Yes or No	Question 2 Comment
		used by system protection or planning engineers. The more widely accepted and better understood term in protection engineering jargon is "maximum expected clearing time" of a protection scheme - but this term is equally applicable to both normal and delayed clearing by a protection scheme. Since both Normal Clearing and Delayed Clearing are terms extensively employed in Table I (and are defined in footnote e), we suggest using these existing terms rather than introducing any new term in the interpretation. One way to achieve this is to omit the first sentence in the interpretation - it appears unnecessary to explain the term Delayed Clearing in the interpretation when it is already described in footnote e. Recommend deleting the first sentence and modifying the second sentence as follows: "The Transmission Planner and Planning Authority is required to simulate the Delayed Clearing resulting from the failure of any protection system component (as described in footnote e) that impacts the maximum expected clearing time of one or more protection systems based on as-built design."
Response: The IDT thanks you for your comments. The two standards do not specify that that the "maximum" clearing time be assessed or the "most" severe system result determined throughout its system. The IDT believes the interpretation describes what defines this condition and now emphasizes that the term, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." The revised interpretation clarifies that these two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
ReliabilityFirst	Yes	ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 2, but offers the following additional language for added clarity: Response 2 - The term "Delayed Clearing" that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's

Organization	Yes or No	Question 2 Comment
		normally expected clearing time. The Transmission Planner and Planning Authority is required to simulate the full impact on the Bulk Electric System performance of a failure of a protection system that increases clearing times of one or more protection systems. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Response: The IDT thanks you for your comments and has revised the interpretation in consideration of this comment and other stakeholder comments. Although RFC's suggestions were not specifically incorporated, the IDT believes the revised interpretation addresses the points raised by RFC. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Idaho Power Company	Yes	We support the following response from SPCS to Question No. 2. The term "Delayed Clearing" that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. Any failure of a protection system component that increases clearing times of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance.
Response: The IDT thanks you for your support. Although this comment supports the IDT's initial interpretation, the System Protection and Control Subcommittee raised a valid comment that led to the IDT modifying the interpretation. The IDT's revised interpretation clarifies that the term, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems". Additionally, the IDT has further clarified the phrase "full impact" with the parenthetical text "(clearing time and facilities removed).". Clarification made.		

Organization	Yes or No	Question 2 Comment
City of Jacksonville Beach dba/Beaches Energy Services	Yes	Consider deleting the word “full” in the phrase “full impact”. The word seems to add ambiguity to the phrase, e.g., what is the difference between “impact” and “full impact”?
Response: The IDT thanks you for your comments. The IDT has further clarified the phrase “full impact” with the parenthetical text “(clearing time and facilities removed).” Clarification made.		
Western Electricity Coordinating Council	Yes	That would be my understanding
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
ISO/RTO Council Standards Review Committee	Yes	The SRC Standards Review Committee agrees that Response 2 duly addresses Question 2 within the scope of the requirement, the contingency type and its footnote.
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
Bonneville Power Administration	Yes	BPA thanks you for the opportunity to comment on Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee. BPA stands in support of the Interpretation of TPL-003-0a and TPL-004-0 and has no further comments or concerns at this time.
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
Orlando Utilities Commission	Yes	I recommend adding an example. If by “protection system components” you mean more then just the protective relay itself, an example that lists other components essential to the operation of the protective relay itself. For example “Protection system components including DC systems, fuses, auxiliary relays, PTs, CT,s and other equipment that could fail and is crucial to the proper operation of one or more protective system.”

Organization	Yes or No	Question 2 Comment
Response: The IDT thanks you for your support. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
ISO New England	Yes	While we generally agree with the response, we would like to request further clarification from NERC relating to the distinction (if any) between what is termed a “protection system failure” and a “DC supply or battery system failure”. Part of the PG&E clarification request (page 2) mentions that *“...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.”* The NERC Response 1 (page 5-6) indicates *“...the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.”* So it seems clear from this response that the most limiting failure condition must be tested, however, does NERC make a distinction between a “protection system failure” and a “DC supply or battery system failure” or is a battery system inherently considered a component of protection system? At many single battery stations the answer to this question could significantly affect stability studies. For example, some stations may have full protection redundancy except for the battery system which means that a failed battery condition would be the most limiting single point failure in that it would disable all local fault clearing protection. The result would be significantly longer fault clearing times than would occur for any other individual protection component failure at that same station including a stuck

Organization	Yes or No	Question 2 Comment
		breaker condition. Please clarify if the intent is to include the effects of a failed DC Supply system.
Response: The IDT thanks you for your comments. Concerning the request for clarification in the above comments, the interpretation now indicates that engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. An entity is not precluded from evaluating a DC supply component failure. The potential risk of batteries with regard to single component failure is currently being assessed through the Order No. 754 data request which became effective September 1, 2012. The IDT's revised interpretation clarifies the performance expectations with regard to components for the current version of these two standards. Clarification made.		
Northeast Power Coordinating Council	Yes	
Southwest Power Pool NERC Reliability Standards Development Team	Yes	
Hydro One	Yes	
Southwest Power Pool Regional Entity	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Tacoma Power	Yes	
American Electric Power	Yes	

Organization	Yes or No	Question 2 Comment
Independent Electricity System Operator	Yes	
Campbell	Yes	
KCP&L/ KCP&L-GMO	Yes	
South Carolina Electric and Gas	Yes	
Entergy Services, Inc.	Yes	
Duke Energy	Yes	
Essential Power, LLC	Yes	

END OF REPORT

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project 2012-INT-02 Interpretation of Interpretation of TPL-003-0a and TPL-004-0 for SPCS

The Project 2012-INT-02 Drafting Team thanks all commenters who submitted comments on the proposed interpretations of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee. The interpretations were posted for a 45-day public comment period from October 22, 2012 through December 5, 2012. Stakeholders were asked to provide feedback on the interpretations and associated documents through a special electronic comment form. There were 39 sets of comments, including comments from approximately 103 different people from approximately 69 companies representing 8 of the 10 Industry Segments as shown in the table on the following pages.

Summary Consideration

In the previous initial posting and first formal comment period, the interpretation received supportive comments overall. The interpretation drafting team (“IDT”) made minor non-substantive clarifications to the interpretation based on these comments. The IDT believes it has addressed stakeholder comments in such a way that the interpretation clarity is improved and meets the expectations expressed in comments for reliability and industry approval.

Clarifications Made to Response 1

The IDT replaced the word “consider” with “evaluate” to better align with its use in the standards. There were concerns that entities should be allowed to exercise their professional “engineering judgment” to choose between the scenarios when assessing system performance for Category C and D contingencies and that all scenarios should not require simulation. The IDT clarified that “engineering judgment” is permitted and clarified that in draft 3. Minority comments suggested a need for an implementation plan to the extent the Planning Authority and Transmission Planner might have only been studying either stuck breaker or protection system failure. Based on IDT experience, planning practices do reflect consideration (i.e., “engineering judgment”) of both (i.e., “stuck breaker or protection system failure”) when considering its selection of what produces the “more severe system results or impacts;” therefore, the IDT notes an implementation plan is not needed.

Clarifications Made to Response 2

The IDT also made only minor clarifications to response two. The IDT rephrased the second sentence and added a reference to the requirement being addressed in the two standards for clarity. The clarifying revisions were based on a suggestion regarding minor wording changes to the 2nd sentence of the response which some in industry stakeholders found confusing and awkwardly worded. The sentence was a “run-on” sentence and is now two separate sentences in the draft 3 interpretation.

Additional Information

All comments submitted may be reviewed in their original format on the interpretations' project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Mark Lauby, at 404-446-2560 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

Index to Questions, Comments, and Responses

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

The Industry Segments are:

1 — Transmission Owners

2 — RTOs, ISOs

3 — Load-serving Entities

4 — Transmission-dependent Utilities

5 — Electric Generators

6 — Electricity Brokers, Aggregators, and Marketers

7 — Large Electricity End Users

8 — Small Electricity End Users

9 — Federal, State, Provincial Regulatory or other Government Entities

10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Jim Kelley	SERC EC Planning Standards Subcommittee	X				X					

	Additional Member	Additional Organization	Region	Segment Selection
1.	John	Sullivan	SERC	1
2.	Charles	Long	SERC	1
3.	Edin	Habibovich	SERC	1
4.	James	Manning	SERC	1
5.	Philip	Kleckley	SERC	1
6.	Bob	Jones	SERC	1
7.	Darrin	Church	SERC	1
8.	Pat	Huntley	SERC	10

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
2.	Group	Guy Zito	Northeast Power Coordinating Council										X

	Additional Member	Additional Organization	Region	Segment Selection

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

1. Alan Adamson	New York State Reliability Council, LLC	NPCC	10
2. Carmen Agavriloai	Independent Electricity System Operator	NPCC	2
3. Greg Campoli	New York Independent System Operator	NPCC	2
4. Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1
5. Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
6. Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
7. Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3
8. Kathleen Goodman	ISO - New England	NPCC	2
9. Michael Jones	National Grid	NPCC	1
10. David Kiguel	Hydro One Networks Inc.	NPCC	1
11. Christina Koncz	PSEG Power LLC	NPCC	5
12. Randy MacDonald	New Brunswick Power Transmission	NPCC	9
13. Bruce Metruck	New York Power Authority	NPCC	6
14. Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
15. Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
16. Robert Pellegrini	The United Illuminating Company	NPCC	1
17. Si-Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
18. David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
19. Brian Robinson	Utility Services	NPCC	8
20. Brian Shanahan	National Grid	NPCC	1
21. Wayne Sipperly	New York Power Authority	NPCC	5
22. Donald Weaver	New Brunswick System Operator	NPCC	2
23. Ben Wu	Orange and Rockland Utilities	NPCC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
3.	Group	Greg Rowland	Duke Energy	X		X		X	X				

Additional Member	Additional Organization	Region	Segment Selection
1. Doug Hils	Duke Energy	RFC	1
2. Lee Schuster	Duke Energy	FRCC	3
3. Dale Goodwine	Duke Energy	SERC	5
4. Greg Cecil	Duke Energy	RFC	6

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
4.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				

Additional Member	Additional Organization	Region	Segment Selection

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

1. Berhanu Tesema	Transmission Planning	WECC	1
2. Deanna Phillips	FERC Compliance	WECC	1, 3, 5, 6

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
5. Group	Frank Gaffney	Florida Municipal Power Agency	X		X	X	X	X				

Additional Member	Additional Organization	Region	Segment Selection
1. Timothy Beyrle	City of New Smyrna Beach	FRCC	4
2. Jim Howard	Lakeland Electric	FRCC	3
3. Greg Woessner	Kissimmee Utility Authority	FRCC	3
4. Lynne Mila	City of Clewiston	FRCC	3
5. Cairo Vanegas	Fort Pierce Utility Authority	FRCC	4
6. Randy Hahn	Ocala Utility Service	FRCC	3

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
6. Group	Sasa Maljukan	Hydro One Networks Inc.	X									

Additional Member	Additional Organization	Region	Segment Selection
1. David Kiguel	Hydro One Networks Inc.	NPCC	1
2. Hamid HAMADANIZADEH	Hydro One Networks Inc.	NPCC	1
3. Ibrahim El-Nahas	Hydro One Networks Inc.	NPCC	1

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
7. Group	Chris Scanlon	Exelon	X		X							

Additional Member	Additional Organization	Region	Segment Selection
1. Baltimore Gas and Electric		RFC	1
2. ComEd		RFC	1
3. PECO		RFC	1

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
8. Group	Sunitha Kothapalli	Puget Sound Energy	X		X							

Additional Member	Additional Organization	Region	Segment Selection
1. Zachary Sanford	Puget Sound Energy	WECC	1, 3
2. Kebede Jimma	Puget Sound Energy	WECC	1, 3
3. Joe Seabrook	Puget Sound Energy	WECC	1, 3
4. Ron Forster	Puget Sound Energy	WECC	1, 3
5. Eleanor Ewry	Puget Sound Energy	WECC	1, 3

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
9. Group	Ben Engelby	ACES Standards Collaborators						X				

Additional Member	Additional Organization	Region	Segment Selection
1. Michael Brytowski	Great River Energy	MRO	1, 3, 5, 6

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
2.	John Shaver	Arizona Electric Power Cooperative/Southwest Transmission Cooperative, Inc.	WECC	1, 4, 5									
3.	Amber Anderson	East Kentucky Power Cooperative	SERC	3, 5, 6, 1									
4.	Shari Heino	Brazos Electric Power Cooperative, Inc.	ERCOT	1, 5									
5.	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1									
6.	Megan Wagner	Sunflower Electric Power Corporation	SPP	1									
10.	Group	paul haase	seattle City Light	X		X	X	X	X				
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
1.	pawel krupa	seattle city light	WECC	1									
2.	dana wheelock	seattle city light	WECC	3									
3.	hao li	seattle city light	WECC	4									
4.	mike haynes	seattle city light	WECC	5									
5.	dennis sismaet	seattle city light	WECC	6									
11.	Group	John Allen	Iberdrola USA	X									
	Additional Member	**Additional Organization**	**Region**	**Segment Selection**									
1.	Joseph Turano	Central Maine Power	NPCC	1									
2.	Raymond Kinney	New York State Electric & Gas	NPCC	1									
12.	Individual	Tim Ponseti, VP	TVA Transmission Reliability Engineering and Controls	X								X	
13.	Individual	Bill Miller	NERC System Protection and Control Subcommittee (SPCS)	X			X	X				X	X
14.	Individual	Bob Steiger	Salt River Project	X		X		X	X				
15.	Individual	Jonathan Hayes	Southwest Power Pool Realibility Standards development Team		X								
16.	Individual	Steve Rueckert	Western Electricity Coordinating Council										X
17.	Individual	ryan millard	pacificorp	X		X		X	X				
18.	Individual	Oliver Burke	Entergy Services, Inc. (Transmission)	X									
19.	Individual	Thad Ness	American Electric Power	X		X		X	X				
20.	Individual	Nazra Gladu	Manitoba Hydro	X		X		X	X				
21.	Individual	Andrew Z. Pusztai	American Transmission Company, LLC	X									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
22.	Individual	Carter B. Edge	SERC Reliability Corporation										X
23.	Individual	Michael Falvo	Independent Electricity System Operator		X								
24.	Individual	Alice Ireland	Xcel Energy	X		X		X	X				
25.	Individual	Kathleen Goodman	ISO New England, Inc		X								
26.	Individual	Milorad Papic	Idaho Power Company	X		X							
27.	Individual	Mark Westendorf	Midwest Independent Transmission System Operator, Inc.		X								
28.	Individual	Kenn Backholm	Public Utility District No. 1 of Snohomish County	X		X	X	X	X			X	
29.	Individual	Donald Weaver	New Brunswick System Operator		X								
30.	Individual	Jason Marshall	New England States Committee on Electricity (NESCOE)										
31.	Individual	David Jendras	Ameren	X		X		X	X				
32.	Individual	Steven Mavis	Southern California Edison Company	X									
33.	Individual	Chifong Thomas	BrightSource Energy					X					
34.	Individual	Darryl Curtis	Oncor Electric Delivery Conpany LLC	X									
35.	Individual	Cheryl Moseley	Electric Reliability Council of Texas, Inc.		X								
36.	Individual	Teresa Czyz	GTC	X									
37.	Individual	Michael Moltane	ITC	X									
38.	Individual	Daniela Hammons	CenterPoint Energy Houston Electric, LLC	X									
39.	Individual	Richard Vine	California Independent System Operator		X								

If you support the comments submitted by another entity and would like to indicate you agree with their comments, please select "agree" below and enter the entity's name in the comment section (please provide the name of the organization, trade association, group, or committee, rather than the name of the individual submitter).

Organization	Supporting Comments of “Entity Name”
Xcel Energy	Duke Energy
New Brunswick System Operator	NPCC Reliability Standards Committee
Public Utility District No. 1 of Snohomish County	Public Utility District No. 1 of Snohomish County supports the comments of Salt River Project.
seattle City Light	Salt River Project (SRP)
Ameren	SERC PSS

1. **Do you agree with the revised Response 1 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration:

The majority of industry stakeholder comments support the interpretation drafting team's ("IDT") draft 2 version of the interpretation to question 1.

Based on the comments received, the IDT made clarifications to the interpretation in regard to the use of the word "evaluate" to better align with its use in the standards. Some commenters raised a concern that the response implied that all possible breaker failures and protection system failures require "evaluation" or simulation. This is not the IDT's intent and this has been clarified in the response to better reflect the original intent that each contingency condition (i.e., stuck breaker or protection system failure) must be "considered," however, the selected contingencies evaluated are those deemed to produce the more severe results or impacts (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1).

Some industry comments expressed that the Planning Authority and Transmission Planner should be allowed to exercise professional engineering judgment to choose between the scenarios when assessing system performance for Category C and D contingencies, and that all scenarios should not require simulation. The IDT clarifies that "engineering judgment" is permitted and that clarifications made in the draft 3 version clarify the IDT's original intent.

A minority opinion was raised by some commenters suggesting a need for an implementation plan to the extent the Planning Authority and Transmission Planner might have only been studying either stuck breaker or protection system failure for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing, Elements C6, C7, C8, and C9 and TPL-004-0, Category D, 3ø Fault, with Delayed Clearing, Elements D1, D2, D3, and D4. Based on the IDT's experience, entities' historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering the selection of what produces the "more severe system results or impacts;" therefore, the IDT notes an implementation plan is not needed.

Organization	Yes or No	Question 1 Comment
ACES Standards Collaborators	No	(1) We appreciate the drafting team's response to our previous comment and thank them for addressing the term "evaluated" by adding the parenthetical. However,

		we do not think inclusion of the parenthetical clarifies what is meant by evaluation. We are concerned that auditors will read "evaluate" to mean that a simulation must be performed for all single line-to-ground (SLG) faults. For example, the interpretation states that evaluation of a SLG and three-phase fault "with delayed clearing is required and further defined by footnote (e)" and the statement is not qualified by indicating only those faults with delayed clearing that produce the more severe results. Because footnote (e) simply explains what is meant by delayed clearing and does not qualify it is only those delayed clearing faults that produce the more severe system results or impacts, this interpretation may cause an auditor to expect that simulations are required for all delayed clearing faults. Furthermore, a current simulation is not even required for those delayed clearing faults with more severe system results or impacts but rather "a current or past study and/or system simulation." **Response: The IDT agrees with the concerns raised by the commenter regarding specific contingencies that must be evaluated (simulated) by the Planning Authority and Transmission Planner. The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.** (2) We continue to ask the team to state explicitly that the PC or TP would only have to perform simulations if the contingencies are expected to produce "more severe system results or impacts," otherwise, simulations are not required. We still believe this clarification is needed to allow PC/TP to consider actual system experience, previous studies, or steady state screening studies for the determination to include stuck breakers or protection system failures. **Response: The IDT believes that Requirements R1.3 and R1.3.1 (both standards) are clear on this matter. The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.** (3) We think the response to Q1 is overly broad, redundant, and is still not consistent with the requirements of TPL-003 and TPL-004. We suggest revising the interpretation to make it more succinct and to answer the question directly. We suggest the following as the response to Q1 which addresses our issues in points (1)

		and (2). "The applicable entity must consider all Category C contingenices per R1.5 in its assessment. However, it is not required to evaluate or perform simulations for all Category C contingencies. Rather, it is only required to perform and evaluate 'only those Category C contingencies that would produce the more severe system results or impacts.' This is further supported by R1.3.1 that states the 'rationale for the contingencies selected for evaluation shall be available for supporting information' and an explanation of why the remaining simulations would produced less severe system results shall be available as supporting information." **Response: The IDT believes the interpretation response addresses the chief question asked in the interpretation – "does an entity have the option of evaluating the effects of either a stuck breaker or protection system failure contingency." No change made.** (4) The interpretation causes a lot of confusion because of the inconsistent use of "evaluation" in the interpretation as compared to in the standard. The standard appears to consider an evaluation to have a more detailed and specific meaning in R1.3.1 that would include simulation. Whereas the interpretation appears to use "evaluate" more consistently with "consider" in R1.5. Use of "evaluation" in the interpretation appears to be a high level review through engineering judgment. The inconsistent use of the language continues cause us confusion over exactly what is required. We suggest consistent use of these terms so they are aligned with the interpretation and the applicable requirements. **Response: The IDT has clarified the interpretation to address the commenter's concerns. The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Salt River Project	No	As written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, "..... The ordered reading of the text in

		Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP must "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. We suggest that 1) the last sentence be changed to read, "The ordered reading of the text in Table 1 in either standard explains that THE MORE SEVERE CONTINGENCIES DUE TO delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance" and 2) the sentence "the Planning Authority and Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation and make available the explanation of why the remaining

		simulations would produce less severe system results as supporting information" be added to end of Response 1.
Response: The IDT thanks you for your comment and suggestion, although not used, the IDT concurs with yours and other stakeholder concerns on what must be "evaluated." The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.		
CenterPoint Energy Houston Electric, LLC	No	CenterPoint Energy agrees that the situation that produces the more severe system impacts due to delayed clearing conditions should be considered, regardless of whether the condition resulted from a stuck breaker or protection system failure; however, CenterPoint Energy believes that the interpretation appears to expand upon historical industry practices. Some entities may need to expand their annual assessments to include more detailed evaluations and analyses, which will take a finite period of time. CenterPoint Energy would vote "affirmative" if an implementation period were developed to accompany this interpretation.
Response: The IDT thanks you for your comment. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. The concern about the consideration of whether both are considered was raised at the October 24-25, 2011 technical conference at FERC that led to this interpretation request. Requirement R1.3.1, the same in both standards, describes what an entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Western Electricity Coordinating Council	No	It appears that the revised interpretation removes the discretion for the Planning Authority and Transmission Planner to use engineering judgement and system knowledge as rational for the contingencies selected in determining the "more severe system results" and now instead reqires studies of both stuck breakers and protection system failure to determine the more severe system results or impacts. Was that the intent of the changes?
Response: The IDT thanks you for your comment and in regard to the concern that the interpretation "removes discretion" for selecting the contingencies evaluated by the entity, the IDT has clarified that "engineering judgment" is permitted in selecting the		

contingencies for evaluation. Change made.		
Oncor Electric Delivery Company LLC	No	Oncor takes the position that the interpretation request by the System Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0 in light of other NERC initiatives. Many of the concerns expressed (i.e. single point of failure) are already being addressed under the NERC Order 754 data request. Likewise the development of TPL-001-2 under Project 2006-02 Assess Transmission Future Needs and Develop Transmission Plans intends to combine six (6) Transmission Planning standards under a single standard, resulting in the retirement of TPL-003-0a and TPL-004-0.
Response: The IDT thanks you for your comment. As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation. **The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC).**		
Southern California Edison Company	No	The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgement to choose between the scenarios when assessing system performance for Category C and D contingencies.
Response: The IDT thanks you for your comment and notes that both contingencies (stuck breaker or protection system failure) must be considered (i.e., “engineering judgment) when determining the situation that produces the “more severe system results or impacts.” The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. No change made.		

California Independent System Operator	No	The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgment to choose between the scenarios when assessing system performance for Category C and D contingencies.
Response: The IDT thanks you for your comment and notes that both contingencies (stuck breaker or protection system failure) must be considered (i.e., "engineering judgment) when determining the situation that produces the "more severe system results or impacts." The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. No change made.		
Puget Sound Energy	No	The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
Response: The IDT thanks you for your comment and believes that the interpretation response addresses the chief question asked in the interpretation with regard to the evaluation of "stuck breaker or protection system failure." For further information on the genesis of the interpretation, single-point of failure, and the Order No. 754 Data Request, refer to the detailed meeting notes from the October 24-25, 2011 technical conference held at FERC in response to Order No. 754. The project "Order 754" may be found on the NERC website under "Standards/Standards Under Development." No change made. **The concerns about the non-operation of non-redundant (i.e., "single-point of failure") protection systems is being addressed in the data request that became effective September 1, 2012. The data request aims to determine if "single-point of failure" on protection system is a problem and, if so, to what extent. The results of the data request will lead to further discussion and evaluation of single-point of failure on protection systems.** **The commenter's concern regarding non-redundant DC supply loss is more appropriately addressed by the IDT's response to Question 2. The IDT's Question 2 response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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" and therefore the IDT's response does not mandate review of DC supply loss. No change made.		
BrightSource Energy	No	While BSE does not disagree with the proposed Response 1 to Question 1, however, as written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, "..... The ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that only the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with rationale and explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation, and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. BSE suggests that 1) the last sentence be changed to read, "The ordered reading of the text in

		Table 1 in either standard explains that the more severe contingencies due to delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine their impact on BES performance" and 2) the sentence, "the Planning Authority or Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation, and make available the explanation of why the remaining simulations would produce less severe system results as supporting information", be added to end of Response 1.
Response: The IDT thanks you for your comment and suggestion, although not used, the IDT concurs with yours and other stakeholder concerns on what must be "evaluated." The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.		
Entergy Services, Inc. (Transmission)	No	While we agree that protection system failures should be studied in TPL assessments, we have numerous concerns about the implementation difficulties of such studies. In many instances, breaker failure events were studied as a proxy for protection system failures because breaker failure events were not overly burdensome to simulate in TPL assessments such that assessments could be completed in a timely manner. A breaker failure event was independent of fault location, what types of redundancies were present, and the complexities associated with protection systems. The currently proposed interpretation is not a trivial expansion of scope. The technical and process challenges in completing such studies annually is overly burdensome and may result in overall study quality degradation as entities struggle to complete the analyses every year, especially in regions where rapid transmission expansion is occurring changing system characteristics substantially each year. Simply adding engineering resources is not a viable option due to extremely limited resource pools with the qualifications to perform such work and no end in sight to the shortage. The current definition of a protection system is too broad for application to TPL standards. DC control circuitry is not adequately defined. Is the ground grid part of DC circuitry? What about cable troughs? Failure modes of different protection

		system components are likewise inadequately defined. For example, what failure mode in a voltage sensing device is required to be studied? Loss of potential is usually a single phase loss of potential. Should planners simulate the loss of all three phases or just one, or all possible scenarios? Loss of potential is one mode but others could include introduction of harmonic content or noise into protective relays - how would relay response be predicted? In some cases, failures can result in inappropriate operation; others can result in failure to operate. Would all such permutations need to be assessed to have a valid assessment? How are the protection system engineers and planning engineers to develop valid assumptions such that TPL assessments are valid? This issue was explored in the TPL-001-2 ATFNSTD process and the standard proposes limiting failure analyses to specific protective relay types to reduce complexity and uncertainty in assumptions and analyses. The specific types of relays listed, in the opinion of the ATFNSDT, cover all historical failures which have led to BES events as well as every relay type that performs significant BES protection functions. While some obscure failure in an actual DC circuit wire, terminal block, CT, PT, etc. could occur, would those events not be replicated adequately by simulating a limited set of relay failures such as that proposed by the ATFNSDT? Mitigation plans could certainly focus on developing complete redundancy (not just the relay) for each instance where the relay failure (and potentially related protection system components) could result in BES reliability issues. The other simple but costly potential approach for the industry is to simply make all protection systems redundant. This poses similar challenges due to the inadequate protection system definitions. How would a redundant ground grid be installed? Is a terminal block part of the DC control circuitry? What about the primary winding of a PT or CT - would they need redundancy? What about a multiplexer in a communications circuit? Additionally, the attempt to add redundancy poses additional BES risk. Since protection systems cannot be modified with the facilities they protect in service in many cases, BES outages will have to occur. The proposed TPL has a 7 year implementation plan. Is that long enough to do the massive overhaul this interpretation may result in? What will be the operational risk we have to take to make upgrades? The industry could be forced to choose between

		violating operating standards and violating planning standards. We appreciate the efforts of the team on these extremely complex industry issues and we realize that perfection is not going to occur. However, we are convinced that limiting the complexity associated with these studies will provide for better overall study quality. The approach contemplated in the proposed TPL substantially raises the bar where protection systems are concerned and will result in more thorough assessments without introducing unmanageable complexity. We support that approach but cannot support the approach contemplated by this interpretation.

Response: The IDT thanks you for your comments.

The commenter raises a question regarding the need for an implementation plan and states that "the currently proposed interpretation is not a trivial expansion of scope." The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.

The comment provided indicates that the "current definition of a protection system is too broad for application to TPL standards." This concern is better addressed by the IDT's response to Question 2 and the IDT concluded that the NERC Glossary of Term for "Protection System" is not intended for use in the TPL standards subject to this interpretation request. The IDT clarifies in Question 1 that both contingencies (stuck breaker or protection system failure) must be considered (i.e., "engineering judgment) when determining the situation that produces the "more severe system results or impacts." The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. The IDT did revise its Question 1 response to better align with TPL requirement language in regard to what must be "evaluated" and this may alleviate some of the concerns raised.

The feedback provided by Entergy Services, Inc. (Transmission) in some instances goes outside the scope of the questions raised by the SPCS's questions. For example, one item discussed at length is a question of required redundancy of protection system components and the IDT notes that this topic is being addressed by the on-going Order 754 Data Request and is not relevant to the interpretation request.

Exelon	Yes	Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Response: The IDT thanks you for your comments. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Idaho Power Company	Yes	However, we do support a corrected response 1 made by Duke Energy.
Response: The IDT thanks you for your comment.		
Manitoba Hydro	Yes	No comment.
Duke Energy	Yes	While Duke Energy is voting affirmative on this ballot, we note that the interpretation appears to expand upon historical industry practices. Some entities will need to expand their annual assessment to include more detailed evaluation and complex analysis. As a result, mitigation plans may need to be developed. Therefore, an implementation plan should be developed to accompany this interpretation. We suggest an effective date of the first day of the first calendar quarter eighteen months after applicable regulatory approval.
Response: The IDT thanks you for your comments. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		

SERC Reliability Corporation	Yes	While I agree with the response I am concerned with the technical feasibility of evaluating all possible protection system failures. I prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
SERC EC Planning Standards Subcommittee	Yes	While we agree with the response we are concerned with the technical feasibility of evaluating all possible protection system failures. We prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
TVA Transmission Reliability Engineering and Controls	Yes	While we agree with the response, we prefer the approach taken in the proposed standard TPL-001-2 which specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
Northeast Power Coordinating Council	Yes	
Bonneville Power Administration	Yes	
Hydro One Networks Inc.	Yes	
Iberdrola USA	Yes	
NERC System Protection and Control Subcommittee (SPCS)	Yes	
Southwest Power Pool Realibility Standards development Team	Yes	

pacificorp	Yes	
American Electric Power	Yes	
American Transmission Company, LLC	Yes	
Independent Electricity System Operator	Yes	
ISO New England, Inc	Yes	
Midwest Independent Transmission System Operator, Inc.	Yes	
Electric Reliability Council of Texas, Inc.	Yes	
GTC	Yes	
ITC	Yes	
Florida Municipal Power Agency	Yes	

2. Do you agree with Response 2 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

Summary Consideration:

The majority of industry stakeholder comments support the interpretation drafting team's ("IDT") draft 2 version of the interpretation to question 2.

In response to industry feedback, the IDT made only minor clarifications to the interpretation for response two. The IDT accepted minor wording changes to the 2nd sentence which some in industry stakeholders found confusing and awkwardly worded. The sentence was a "run-on" sentence and is now two separate sentences in the draft 3 interpretation.

A minority opinion is noted in that some commenters believe that the interpretation response was requiring the evaluation of a non-redundant DC supply or review of the "most severe" protection system component failure. The IDT states in its response to those concerns that the interpretation does not mandate the evaluation of a non-redundant DC supply loss. Additionally, the IDT notes that Requirement R1.3.1 (TPL-003-0a and TPL-004-0) requires the evaluation of contingencies that would produce the "more severe system results or impacts," not "most severe event." As clarified in the interpretation, the Planning Authority and Transmission Planner is permitted "engineering judgment" in the selection of those components of a protection system that may lead to "more severe results or impacts."

Additionally, the interpretation concludes that the NERC defined term for Protection System is not implicitly used in the subject TPL standards. This is emphasized in the last sentence of response two which states, "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."

Organization	Yes or No	Question 2 Comment
ACES Standards Collaborators	No	(1) Response 2 departs from the plain language of the requirements and actually expands the application of both standards which is not consistent with the standards process. According to the Standards Process Manual, "a valid interpretation response provides additional clarity about one or more requirements, but does not expand on any requirement." The interpretation clearly states in response 2 that 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." This language is contradictory with the earlier statement that the PA and TP are permitted to use engineering judgment in selecting Category C and D contingencies. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for faults with delayed clearing. This is only required if they would produce the "more severe system results or impacts." The interpretation that the drafting team is proposing expands on the requirements and should not instruct the PC/TP to perform simulations beyond the existing language in the requirements. The manner in which the PC/TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. **Response: The standard allows for engineering judgment in the selection of contingencies to be studied; once the contingency is selected for study, then a simulation has to assess the full impact (delayed clearing and facilities removed).** (2) The interpretation states that the Planning Authority and Transmission Planner must "consider 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. We have concerns regarding how the PC/TP must document these "considerations" and whether the PC/TP must maintain paperwork when they decide that the delayed clearing condition would not produce a more severe system impact. We believe that the interpretation is requiring additional actions outside the requirements of the standard. **Response: The concern raised by the commenter is out of the scope of the request for interpretation and addresses a compliance evidence concern related to "paperwork needed" for selecting (and excluding) contingencies deemed to produce the "more severe system results or impacts." No change made.** (3) The interpretation should clearly state that there is no clear bright line about what constitutes "more severe" results. Thus, applicable entities may use engineering judgment in determining what more severe system results are. There is no clear bright line threshold for when a PC/TP must study and simulate stuck

		breakers or protection system failures. There are adverse impacts on the industry without clear direction, and the Interpretation Drafting Team may not be able to provide that clarity within the bounds of the Standards Process Manual. For example, if a protection system failure would increase clearing times and would produce "more severe system results and impacts," it would be required to be studied and simulated. However, if it did not produce the "more severe system results and impacts," it would not be required to be studied and simulated. There is no clarity on what makes an impact more severe and therefore, the interpretation is requiring the PC/TP to study and simulate all contingencies because not doing so may result in a finding of noncompliance, even though some of those studies would not meet the threshold of "more severe." **Response: The IDT concludes that the concern raised by the stakeholder is out of scope for the SCPC interpretation request. No change made.** (4) The interpretation team should consider adding flexibility to considerations that a PC or TP could use to determine the need to simulate single points of failure. As example, actual system experience, past studies, or steady state screening studies could be relied upon. For instance, if there are not problems in the steady state and the contingency is electrically far from any generators, system experience or past studies could prove that transient or dynamic stability problems are not likely to occur. **Response: The IDT concludes that the concern raised by the stakeholder is out of the scope of the request for interpretation. The standards are clear in R1.3.1 (TPL-003-0a and TPL-004-0) that the Planning Authority and Transmission Planner must provide "The rationale for the contingencies selected for evaluation shall be available as supporting information." The request for interpretation does not question the clarity of this language. No change made.** (5) We think both parts of the interpretation would benefit from clarifying what is meant by consideration of contingencies in TPL-003-0a R1.5 and TPL-004-0 R1.4 and evaluation in R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider Category C and D contingencies respectively. However, both standards say that a study or simulation is required only for the contingencies "that

		would produce the more severe system results or impacts" R1.3.1. We would like the drafting team to further clarify this issue. **Response: No change made. See responses to items 3 and 4 above.** (6) We found a few typos, confusing clauses, and sentences that needed grammatical changes in Q2. In particular, the second sentence in Response 2 in confusing. We believe the sentence would be clearer if stated, "The PC and TP is permitted engineering judgment in its [selection of] Category C and D contingencies for protection system component failures..." **Response: The IDT has inserted the clarifying words, "selection of," as suggested. Change made.** (7) Second, the clause in the last sentence after (R1.3.1) "and this would include addressing all protection systems affected by the selected component" should be struck. It's a run-on sentence and adds more confusion than clarity. **Response: The IDT did not strike the interpretation text as suggested and instead broke the 2nd sentence up into two sentences for readability. Change made.** (8) Finally, we suggest striking everything in response 2 after the first paragraph because it only adds confusion. The first paragraph is clear that the TP and PC can apply engineering judgment in selecting Category C and D contingencies. What else needs to be said? **Response: The IDT believes the entire response is important. For example, the third paragraph contains important insights regarding how the IDT reached its conclusion. No change made.** (9) Thank you for the opportunity to comment. **Response: The IDT appreciates your thorough review and participation in the NERC standard development process.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Oncor Electric Delivery Conpany	No	Again, Oncor takes the position that the interpretation request by the System

LLC		Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0. Oncor does agrees with the statement in Response 2, “The Planning Authority and Transmission Planner is permitted engineering judgment in its Category C or D contingencies to select the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.” However, Oncor takes the position, that current NERC initiatives including NERC Order 754 Data request and current efforts under Project 2006-02 will ultimately address all concerns related to contingency selection validation.
Response: The IDT thanks you for your comment. As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation. **The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC).** **The IDT appreciates Oncor’s support of the views stated in our Q2 response.**		
Florida Municipal Power Agency	No	FMPA does not agree with the conclusion of the last paragraph that: “the two standards do not prescribe the specific protection system components that must be addressed”. The operative word of footnote e is “any” as in: “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” (emphasis added). In addition, the use of the phrase “such as” by definition is an introduction to a list that is not exhaustive. Hence, it is beyond argument footnote e includes consideration of delayed clearing due to failure of relays, circuit breakers, current transformers, and at least one additional protection system component. Common use of the term “protection system” includes the NERC glossary definition

		plus breakers (e.g., Wikipedia at: http://en.wikipedia.org/wiki/Power_system_protection). Consequently, FMPA believes that the term "protection system" as used in footnote e is more inclusive than the definition of Protection System in the NERC glossary (i.e., to include breakers). As such, footnote e is prescriptive of the minimum set of protection system components that must be considered: the components that comprise the glossary definition of Protection System, plus circuit breakers.
Response: The IDT thanks you for your comments. The IDT reached the interpretation to Q2 upon further review of the standard and consideration of earlier industry comments from the draft 1 posting. The IDT fully vetted and considered this specific issue. Our reasons for the conclusions reached are clearly stated in the last paragraph of the Q2 response. This comment is a minority opinion based on the collective industry responses to the interpretation. No change made.		
ISO New England, Inc	No	ISO New England disagrees with the wording for response 2. The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. **The IDT is not mandating an evaluation of non-redundant DC supply loss. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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." No change made.** Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and

		second paragraph's together, it appears that failure of the battery system is a required aspect of testing. **Response: See above response. No change made.** Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The cost of retrofitting redundant battery protection systems would clearly outweigh any reliability benefit possibly gained. **Response: The IDT notes that explicitly stating in the interpretation that DC supply or battery failure is excluded would be an expansion of the standard and is beyond the scope of the request for interpretation. No change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Southern California Edison Company	No	same as for question 1
Response: The IDT thanks you for your comments and refers to the response in question 1 for Southern California Edison Company.		
Iberdrola USA	No	Since TPL-003 and TPL-004 refer to "protection system" in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 have been superceded by TPL-001-2, approved by the NERC Board of Trustees in August 2011. In the development of TPL-001-2, the reference to "protection system" was clarified to be "relay" with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that "protection system" (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13.
Response: The IDT thanks you for your comments. The IDT must interpret the existing and mandatory enforceable standards brought to question in this request for interpretation. The development and approval of TPL-001-2 remains a pending matter		

before Federal Energy Regulatory Commission (FERC). As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation.		
Northeast Power Coordinating Council	No	The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. **Response: The IDT's interpretation does not mandate that non-redundant DC supply loss must be evaluated. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a and Category D (TPL-004-0) contingencies that would produce the more severe system results or impacts. Additionally, the last paragraph indicates "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." No change made.** Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and second paragraphs together, it appears that failure of the battery system is a required aspect of testing. **Response: The IDT notes that response 2 does not require the applicable entity to consider protection elements beyond those listed in footnote 'e'; however, for a selected protection system component 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. No change made. Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The Drafting Team should explicitly state that "protection system" (lower case) referred to in Footnote (e) does not include station batteries (unlike "Protection System" in NERC Glossary of Terms). **Response: See above response. No change made.** Additionally, because TPL-003 and TPL-004 refer to "protection system" in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 are likely to be superseded by TPL-001-2 after regulatory approvals. In the development of TPL-001-2, the reference to "protection system" was clarified to be "relay" with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that "protection system" (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13. **Response: The IDT thanks you for your comments. The IDT must interpret the existing and mandatory enforceable standards brought to question in this request for interpretation. The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC). As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation.**

Response: The IDT thanks you for your comments. Please see the responses above.		
New England States Committee on Electricity (NESCOE)	No	The New England States Committee on Electricity (NESCOE) appreciates this opportunity to comment on a narrow issue raised by ISO New England (ISO-NE) regarding the intended meaning of "protection system component failure" in Response 2. In comments on Draft One of the proposed interpretation, ISO-NE requested clarification on whether a battery system is considered a component of a protection system for purposes of the standard. ISO-NE stated that the answer to this question could have significant implications for the outcome of stability studies, citing as an example that substations may have full redundancy protection in all aspects except for the battery system. NESCOE understands that ISO-NE will provide comments on this Draft 2 version noting that modeling non-redundant DC supply or battery failure was not intended in the drafting of the interpretation and that the cost of requiring redundant battery protection systems in all cases will be clearly outweighed by any reliability benefit gained. **Response: The concern is a perception that the requirement is to address failure of a non-redundant DC supply relied upon for protection systems. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a and Category D (TPL-004-0) contingencies that would produce the more severe system results or impacts.** NESCOE shares ISO-NE's concern that the latest version of Response 2 does not resolve the ambiguity related to modeling protection system failures and whether battery systems are distinguished from other components. Specifically, the language in paragraph one provides that the planning authority and transmission planner may exercise "engineering judgment" in selecting protection system component failures for study. However, the subsequent paragraph appears to require study of the most severe event, which absent clarification could be read to mandate the modeling of battery failure. New England consumers should not be exposed to cost increases due to a lack of clarity. Nor, as in all cases, should consumers bear costs that are not justified by measurable reliability benefits.

		NESCOE requests that the IDT squarely address and resolve this ambiguity in a subsequent version of the proposed interpretation. Thank you for your consideration of these comments. **Response: The IDT notes that the standard in R1.3.1 requires evaluation of contingencies that would produce the "more severe system results or impacts," not "most severe event." As clarified in the interpretation, the Planning Authority and Transmission Planner are permitted engineering judgment in the selection of those components of a protection system that may lead to "more severe results or impacts" than others. For example, if the entity believes that a non-redundant CT failure would likely lead to more severe system results or impacts than a stuck breaker, then the entity may select that condition for evaluation. The interpretation concludes that "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." No change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Puget Sound Energy	No	The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
Response: The IDT thanks you for your comment and believes that the interpretation response addresses the chief question asked in the interpretation with regard to the evaluation of "stuck breaker or protection system failure." For further information on the genesis of the interpretation, single-point of failure, and the Order No. 754 Data Request, refer to the detailed meeting notes from the October 24-25, 2011 technical conference held at FERC in response to Order No. 754. The project "Order 754" may be found on the NERC website under "Standards/Standards Under Development." No change made. **The concerns about the non-operation of non-redundant (i.e., "single-point of failure") protection systems is being addressed in the Order No. 754 data request that became effective September 1, 2012. The data request aims to determine if "single-point of failure" on protection system is a problem and, if so, to what extent. The results of the data request will lead to further discussion**		

and evaluation of single-point of failure on protection systems. **The IDT's interpretation response does not mandate that non-redundant DC supply loss must be evaluated. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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." No change made.**		
ITC	No	We have concerns regarding the use of terms like "engineering judgement" in requirments or interpretations. Such terms are vague and will lead to coninued uncertainty as to whether an auditor will find an entity in compliance (i.e,, will the "engineering judgement" applied by an entity be acceptable to an auditor?
Response: The IDT thanks you for your comment and believes that R1.3.1 is clear that the applicable entity is permitted engineering judgment based on the wording "for the contingencies selected for evaluation." The entity must be able to provide "The rationale for the contingencies selected for evaluation shall be available as supporting information." The standard is also clear that an "explanation of why the remaining simulations would produce less severe system results shall be available as supporting information." No change made.		
California Independent System Operator	No	
Duke Energy	Yes	Also, while Duke Energy agrees with Response 2, we believe wording changes are needed for clarity in the first paragraph to align it with the third paragraph. Suggest rewording : 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.

Response: The IDT thanks you for your comment and support. The IDT revised the 2nd sentence of its Draft 2 response for clarity and readability based on yours and other industry feedback provided. The sentence now uses the wording "selection of" as suggested and is broken into two sentences in the Draft 3 version.		
Exelon	Yes	Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Response: The IDT thanks you for your comment. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1, the same in both standards, describes what an entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Idaho Power Company	Yes	However, we do support a corrected response 2 made by Duke Energy.
Response: The IDT thanks you for your comment and support.		
NERC System Protection and Control Subcommittee (SPCS)	Yes	The SPCS appreciates the consideration of its previous comment. The IDT revision to the interpretation addresses the SPCS concern noted during the first posting.
Response: The IDT thanks you for your comment and support.		
Manitoba Hydro	Yes	We generally agree with the respose. However, we suggest that the wording provided by Duke Energy should be adopted to add clarity: 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.
Response: The IDT thanks you for your comment and support. Please refer to the response provided to Duke Energy.		
Southwest Power Pool Realibility Standards development Team	Yes	We would suggest that the drafting team take a look at the effort surrounding FERC Order No. 754 which is clearly laid out for what to look at and how to look at single point of failure.
Response: The IDT thanks you for your comment and support. The NERC Standards Developer and Technical Advisor assigned to this project are also participants and involved with the Order No. 754 project. No change made.		
SERC EC Planning Standards Subcommittee	Yes	
Bonneville Power Administration	Yes	
Hydro One Networks Inc.	Yes	
TVA Transmission Reliability Engineering and Controls	Yes	
Salt River Project	Yes	
Western Electricity Coordinating Council	Yes	
pacificorp	Yes	
Entergy Services, Inc. (Transmission)	Yes	

American Electric Power	Yes	
American Transmission Company, LLC	Yes	
Independent Electricity System Operator	Yes	
Midwest Independent Transmission System Operator, Inc.	Yes	
BrightSource Energy	Yes	
Electric Reliability Council of Texas, Inc.	Yes	
GTC	Yes	
CenterPoint Energy Houston Electric, LLC	Yes	
Response:		

END OF REPORT

Exhibit H

Record of Development of Proposed Interpretation

Interpretation 2012-INT-02
TPL-003-0a and TPL-004-0 for SPCS

Related Files

Status: The interpretation will be presented to the NERC Board of Trustees for adoption at its February 2013 meeting and if adopted, filed with regulators for approval.

Background:
This interpretation request was submitted to NERC as a process to address the Federal Energy Regulatory Commission's concern about the study of single point of failure in protection systems documented in Order No. 754.

Interpretation Process (excerpt):
In accordance with the Reliability Standards Development Procedure, the first formal comment period shall be 30-days long. If the drafting team makes substantive revisions to the interpretation following the initial formal comment period, then the interpretation shall undergo another quality review before it is posted for its second formal comment period. The second formal comment period shall have a 45-day duration and shall start after the drafting team has posted its consideration of stakeholder comments and any conforming changes to the associated standard.

Formation of a ballot pool shall take place during the first 30 days of the 45-day formal comment period, and the initial ballot of the interpretation shall take place during the last 10 days of that formal comment period. The interpretation drafting team shall consider and respond to all comments submitted during the formal comment period at the same time and in the same manner as specified for addressing comments submitted with ballots.

If the interpretation is approved by its ballot pool, then the interpretation will be appended to the standard and will become effective when adopted by the NERC Board of Trustees and approved by the applicable regulatory authorities. The interpretation will remain appended to the standard until the standard is revised through the normal standards development process. When the standard is revised, the clarifications provided by the interpretation will be incorporated into the revised standard.

<table>
<tr><th>Draft</th><th>Action</th><th>Dates</th><th>Results</th><th>Consideration of Comments</th></tr>
<tr><td>Draft 3
SPCS Interpretation of TPL-003-0a and TPL-004-0

Interpretation
Clean (22) | Redline to Last Posted (23)

Request for Interpretation (24)

Supporting Documents:

TPL-003-0a (25)

TPL-004-0 (26)</td><td>Recirculation Ballot

Info>> (27)

Vote>></td><td>01/22/13 - 01/31/13 (closed)</td><td>Summary>> (28)

Full Record>> (29)</td><td></td></tr>
<tr><td rowspan="3">Draft 2
SPCS Interpretation of TPL-003-0a and TPL-004-0

Interpretation
Clean (9) | Redline to Last Posted (10)

Request for Interpretation (11)

Supporting Documents:

Unofficial Comment Form (Word) (12)

TPL-003-0a (13)
TPL-004-0 (14)</td><td>Initial Ballot

Updated Info>> (15)

Info>> (16)

Vote>></td><td>11/26/12 - 12/05/12 (closed)</td><td>Summary>> (18)

Full Record>> (19)</td><td></td></tr>
<tr><td>Formal Comment Period

Info>> (17)

Submit Comments>></td><td>10/22/12 - 12/05/12 (closed)</td><td>Comments Received>> (20)</td><td>Consideration of Comments>> (21)</td></tr>
<tr><td>Join Ballot Pool</td><td>10/22/12 - 11/20/12 (closed)</td><td></td><td></td></tr>
</table>

Draft 1 SPCS Interpretation of TPL-003-0a and TPL-004-0 Interpretation (1) Request for Interpretation (2) **Supporting Documents:** Unofficial Comment Form (Word) (3) TPL-003-0a (4) TPL-004-0 (5)	Comment Period Info>> (6) Submit Comments>>	06/20/12 - 07/19/12 (closed)	Comments Received>> (7)	Consideration of Comments>> (8)

Response for Interpretation of TPL-003 and TPL-004 for SPCS

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to model a single point of failure of a protection system component that may prevent correct operation of

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.

There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by:

- Potential non-compliance if the correct contingencies are not studied
- Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required
- Potential negative impact to grid reliability if the correct contingencies are not assessed

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	
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.
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] of either "stuck breaker" or "protection system failure" contingency[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	

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance. Therefore, the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.

Standard	Requirement (and text)
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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[14] require an entity to model a single point of failure of a protection system component that may prevent correct operation of

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. Any failure of a protection system component that increases clearing times of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance.

Revision History (To be removed upon Final)

Version	Date	Description
1.0	5/9/2012	Draft 1 of the response to the request for interpretation.

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Interpretation Request Form

2012-INT-02 TPL-003-0a and TPL-004-0

When completed, email this form to:
laura.hussey@nerc.net

For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com
Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.			
Standard	**Title**		
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)		
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)		
Identify specifically what Requirement needs clarification.			
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

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.
Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.
There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by: • Potential non-compliance if the correct contingencies are not studied • Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required • Potential negative impact to grid reliability if the correct contingencies are not assessed

[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,"

Unofficial Comment Form

Project 2012-INT-02 – Interpretation of TPL-003-0a and TPL-004-0 for SPCS

Please **DO NOT** use this form to submit comments. Please use the electronic form located at the link below to submit comments on the Interpretation of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee (Project 2012-INT-02). The electronic comment form must be completed by **July 19, 2012.**

http://www.nerc.com/filez/standards/2012-INT-02_Interpretation_TPL-003-0a_and_TPL-004-0_SPCS.html

If you have questions please contact Scott Barfield-McGinnis at Scott.Barfield@nerc.net or by telephone at (404) 446-9689.

Background Information
This posting is soliciting formal comment.

Order 754 is the Final Rule approving the interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern about single points of failure of protection systems and issued a directive for further investigation. From the Order, "…the Commission believes that there is an issue concerning the study of the non-operation of non-redundant primary protection systems; e.g., the study of a single point of failure on protection systems" (P19). In the first part of the directive (P20), the Commission directed FERC staff to meet with NERC and its appropriate subject matter experts to explore this reliability concern, including where it can best be addressed, and identify any additional actions necessary to address the matter. This portion of the directive was satisfied by the October 24-25, 2011 Technical Conference. In the second part (P20), NERC must complete an informational filing within six months of the Order (March 15, 2012) explaining whether there is a further system protection issue that needs to be addressed and, if so, what forum and process should be used to address that issue and what priority it should be accorded relative to other reliability initiatives planned by NERC. In its filing last March, NERC provided a status report on the approaches identified at the technical conference, including this interpretation.

This Request for Interpretation (RFI) was submitted by the System Protection and Control Subcommittee (SPCS) to NERC as one of the approaches identified at the technical conference to address the Federal Energy Regulatory Commission's concern about the study of single point of failure in protection systems documented in Order No. 754. The Standards Committee

Executive Committee accepted the RFI of TPL-003-0a and TPL-004-0 for SPCS on February 3, 2012. A number of members from the Assess Transmission Future Needs Standards Drafting Team (ATFNSDT), Protection System Misoperations Standard Development Team (PSMSDT), and Protection System Maintenance and Testing Standard Drafting Team (PSMTSDT) formed the Interpretation Drafting Team (IDT) to respond to the RFI. The IDT has reviewed the SPCS request and developed this interpretation pursuant to the NERC Guidelines for Interpretation Drafting Teams, which is available at:

http://www.nerc.com/files/Guidelines_for_Interpretation_Drafting_Teams_Approved_April_2011.pdf)

Summary

The IDT was informed about the issues concerning Order No. 754 for background into the basis for the interpretation request. The SPCS requests clarification about the comprehensiveness of simulations required by the standards because it is not clear if the assessment must include the evaluation of shared or non-redundant protection system components. As discussed at the technical conference, there have been events where a single failed component has affected more than one protection system. For example, the Westwing Outage occurring June 14, 2004 in the Western Interconnection was one of three events identified in the March 30, 2009 NERC Industry Advisory (i.e., NERC Alert), Protection System Single Point of Failure.

First, the SPCS is requesting clarification concerning the parenthetical "(stuck breaker or protection system failure)" in Table 1, Category C and D as to whether an entity has the choice of evaluating either or if both must be evaluated. Second, the SPCS is requesting clarification regarding footnote 'e' as to the extent an entity must model a component failure.

The IDT is comprised of both transmission planning and protection system engineers to provide balanced input to the interpretation. The IDT discussed the application and performance required under the specified standards and requirements. In preliminary reviews, the IDT considered several approved NERC glossary terms such as: Protection System, Normal Clearing, and Delayed Fault Clearing. The IDT notes that the term Delayed Clearing as defined in Footnote 'e' of the referenced standards is similar, but not the same as the glossary term. The term Delayed Clearing in footnote 'e' coupled with the ambiguity of defined terms being used in the standard that were not capitalized presented difficulty in preparing a response to the SPCS request.

Furthermore, there can be areas of confusion when speaking about protection systems in general. This is especially true regarding the lower case use of "protection system" in the standards and its connection with the definition. Also, footnote 'e' and its use of "such as" adds confusion as to whether it means "for example" or "including, but not limited to." In the case of the interpretation response, the IDT applied the meaning of "such as" to mean "for example" and the list of terms should not be construed to be an exhaustive or complete list.

You do not have to answer all questions. Enter All Comments in Simple Text Format.

Please review the request for an interpretation, the associated standard, and the draft interpretation and then answer the following questions.

1. Do you agree with **Response 1** of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

   ☐ Yes
   ☐ No

   Comments:

2. Do you agree with **Response 2** of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

   ☐ Yes
   ☐ No

   Comments:

A. Introduction

1. **Title:** **System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

2. **Number:** TPL-003-0a

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:** April 23, 2010

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.

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.

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.

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

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-003-0_R1 and TPL-003-0_R2.

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-003-0_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	February 8, 2005	Adopted by NERC Board of Trustees	New
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	July 30, 2008	Adopted by NERC Board of Trustees	
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
0a	April 23, 2010	FERC approval of interpretation of TPL-003-0 R1.3.12	Interpretation

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing [e] (stuck breaker or protection system failure): 1. Generator 3. Transformer 2. Transmission Circuit 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local Network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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 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.*

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)
2. **Number**: TPL-004-0
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:** April 1, 2005

B. Requirements

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

- **R1.1.** Be made annually.
- **R1.2.** Be conducted for near-term (years one through five).
- **R1.3.** Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).
  - **R1.3.1.** Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.
  - **R1.3.2.** Cover critical system conditions and study years as deemed appropriate by the responsible entity.
  - **R1.3.3.** Be conducted annually unless changes to system conditions do not warrant such analyses.
  - **R1.3.4.** Have all projected firm transfers modeled.
  - **R1.3.5.** Include existing and planned facilities.
  - **R1.3.6.** Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

R1.3.8. Include the effects of existing and planned control devices.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

R1.4. Consider all contingencies applicable to Category D.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-0_R1.

M2. The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-0_R1.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

1.2. Compliance Monitoring Period and Reset Timeframe

Annually.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: A valid assessment, as defined above, for the near-term planning horizon is not available.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Not applicable.

B. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing[e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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.

Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Formal Comment Period Open: June 20 – July 19, 2012

Now Available

A formal comment period for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) is open through 8 p.m. Eastern on Thursday, July 19, 2012.

Instructions for Commenting

A formal comment period is open through **8 p.m. Eastern on Thursday, July 19, 2012.** Please use the electronic form to submit comments. If you experience any difficulties in using the electronic form, please contact Monica Benson at monica.benson@nerc.net. An off-line, unofficial copy of the comment form is posted on the project page.

Next Steps

The drafting team will consider all comments and determine whether to make changes to the interpretation response. If significant changes are made to the interpretation response the drafting team will submit the interpretation response for quality review prior to the next posting.

Background

Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

Additional information is available on the project page.

Standards Development Process

The Standards Processes Manual contains all the procedures governing the standards development process. The success of the NERC standards development process depends on stakeholder participation. We extend our thanks to all those who participate.

For more information or assistance, please contact Monica Benson, Standards Process Administrator, at monica.benson@nerc.net or at 404-446-2560.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Name (18 Responses)
Organization (18 Responses)
Group Name (13 Responses)
Lead Contact (13 Responses)
Question 1 (30 Responses)
Question 1 Comments (31 Responses)
Question 2 (30 Responses)
Question 2 Comments (31 Responses)

Individual
Aaron Staley
Orlando Utilities Commision
Yes
Yes
I recommend adding an example. If by "protection system components" you mean more then just the protective relay itself, an example that lists other components essential to the operation of the protective relay itself. For example "Protection system components including DC systems, fuses, auxiliary relays, PTs, CT,s and other equipment that could fail and is crucial to the proper operation of one or more protective system."
Individual
Chris Mattson
Tacoma Power
Yes
Yes
Group
Northeast Power Coordinating Council
Guy Zito
Yes
Yes
Group
Southwest Power Pool NERC Reliability Standards Development Team
Jonathan Hayes
Yes
Yes
Individual
Thad Ness
American Electric Power
Yes
Yes
Individual

Michael Falvo
Independent Electricity System Operator
Yes
Yes
Group
PacifiCorp
Sandra Shaffer
Yes
Yes
Individual
Kasia Mihalchuk
Manitoba Hydro
Yes
MH agrees with the response. In order to determine the more severe result due to delayed clearing of a fault (as defined in footnote (e)), the planner will have to consider the stuck breaker fault and the protection system failure.
Individual
Jay
Campbell
Yes
Yes
Individual
John Pearson
ISO New England
Yes
Yes
While we generally agree with the response, we would like to request further clarification from NERC relating to the distinction (if any) between what is termed a “protection system failure” and a “DC supply or battery system failure”. Part of the PG&E clarification request (page 2) mentions that “…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.” The NERC Response 1 (page 5-6) indicates “…the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.” So it seems clear from this response that the most limiting failure condition must be tested, however, does NERC make a distinction between a “protection system failure” and a “DC supply or battery system failure” or is a battery system inherently considered a component of protection system? At many single battery stations the answer to this question could significantly affect stability studies. For example, some stations may have full protection redundancy except for the battery system which means that a failed battery condition would be the most limiting single point failure in that it would disable all local fault clearing protection. The result would be significantly longer fault

clearing times than would occur for any other individual protection component failure at that same station including a stuck breaker condition. Please clarify if the intent is to include the effects of a failed DC Supply system.
Group
Arizona Public Service Company
Janet Smith
Yes
Yes
Group
Hydro One
Sasa Maljukan
Yes
Yes
Individual
Brett Holland
KCP&L/ KCP&L-GMO
Yes
Yes
Individual
Anthony Jablonski
ReliabilityFirst
Yes
ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 1, but offers the following additional language for added clarity: Response 1 - TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker is evaluated to examine its impact on BES performance. Therefore, the transmission planner considers the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Yes
ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 2, but offers the following additional language for added clarity: Response 2 - The term “Delayed Clearing” that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system’s normally expected clearing time. The Transmission Planner and Planning Authority is required to simulate the full impact on the Bulk Electric System performance of a failure

of a protection system that increases clearing times of one or more protection systems. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Individual
Kirit Shah
Ameren
Yes
We agree with the SDT that the more severe system results or impacts due to a delayed clearing condition should be evaluated.
No
We do not believe that it is necessary to evaluate every possible delayed clearing time due to system component failures. As we have stated in question 1 above, the goal should be to evaluate the more severe system results or impacts which usually correlates with the longest clearing time.
Individual
Milorad Papic
Idaho Power Company
Yes
We support the following response from SPCS to a Question No. 1 TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance. Therefore, the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.
Yes
We support the following response from SPCS to Question No. 2. The term “Delayed Clearing” that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system’s normally expected clearing time. Any failure of a protection system component that increases clearing times of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance.
Group
Pepco Holdings Inc. & Affiliates
David Thorne
No
1)TPL-001-2 was designed to be a single, comprehensive, and coordinated standard that merges the requirements of four existing standards: TPL-001-1; TPL-002-1b; TPL-003-1a; TPL-004-1 and also results in the retirement of TPL-005 and TPL-006. TPL-001-2 went through the industry vetting process and was approved by the NERC Board of Trustees on August 4, 2011. The language in TPL-001-2 was debated extensively within the industry, including the reference to “protection system failures”. It was a balloted consensus to replace that phrase with the term “failure of a non-redundant relay”, which was clarified in footnote 13 of Table 1. As such, it would appear that the language in TPL-001-2, if approved, would preclude the need for this interpretation of TPL-003-0a and TPL-004-0. Although TPL-001-2 has not yet been FERC approved, the perceived objection centered around footnote 12 (consequential load loss) and not footnote 13 and the elimination of the term “protection system failure”. 2)In addition, there is presently a data request on Order 754 to ascertain the

significance of protection system single points of failure. In that data request it provides a method for identifying single points of failure. However, dynamic simulations involving faults coupled with the failure of a single battery system are not required, even though it could render all protection systems at a station inoperable, requiring remote clearing. Neither the existing sets of TPL standards that use the term "protection system failure", nor this interpretation, makes any attempt to define what single points of failure need to be evaluated, or whether a failure of a single battery system needs to studied. 3)Considering the uncertainty of how to address certain single points of failure, coupled with the numerous industry comments supporting the language change in TPL-001-2, it would seem prudent at this time to delay a response to this interpretation in order to allow the standards development process to play out, and FERC review of TPL-001-2 to proceed. The Order 754 data request should proceed as planned and FERC approval of TPL-001-2 should be pursued. The outcome of both could significantly impact this proposed interpretation response, or render it unnecessary.
No
See #1
Group
NERC System Protection and Control Subcommittee (SPCS)
Bill Miller
Yes
No
The SPCS generally agrees with the proposed interpretation. However, we believe the reference to a failure that “increases clearing time” is too narrow and implies it is not necessary to consider failures that disable a protection system, therefore affecting both the clearing time and the number of elements that may be tripped by remote protection systems. The SPCS proposes revising the interpretation to address “failure of a protection system component that affects the operation (disables or increases clearing times) of one or more protection systems,” and recommends adding an example for clarification. The full text would then be as proposed below. Note: Added text is identified by square brackets. The term “Delayed Clearing” that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system’s normally expected clearing time. Any failure of a protection system component that [affects the operation (disables or] increases clearing times[)] of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance. [For example, if a single current transformer provides AC current input to both a local primary and secondary protection system, then simulating failure of the current transformer must include the effect of disabling both local protection systems. This may require modeling clearing from remote terminals to expose the full impact on BES performance.]
Individual
J. S. Stonecipher, PE
City of Jacksonville Beach dba/Beaches Energy Services
Yes
Yes
Consider deleting the word “full” in the phrase “full impact”. The word seems to add ambiguity to the phrase, e.g., what is the difference between “impact” and “full impact”?
Individual
RoLynda Shumpert
South Carolina Electric and Gas
Yes
Yes
Group
Western Electricity Coordinating Council

Steve Rueckert
Yes
That would be my understanding
Yes
That would be my understanding
Group
MRO NSRF
WILL SMITH
Yes
This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate “protection system components”. However, if Interpreation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.
No
The interpretation does not address the key issue that is implied by Question 2, namely whether “any protection system component” in the TPL-003 and TPL-004 must be interpreted to include “single point of failure components”. Several thoughts to consider with regard to this issue are: 1. The term, “protection system component” in footnote ‘e’ of TPL-003 and TPL-004 is not a defined term (i.e. is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. 2. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact all efforts by regulatory entities and industry groups so far have failed to reach agreement on what types and what granularity of system protection components should be subject to “single point of failure” assessment and establish written list of all components that must be taken into account.. 3. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly stipulate the component that must be considered to be fully compliance, if the TPL standards were revised to “any Protection System component”, then the components to be considered would at least include “ protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits”. We suggest that Response 2 be revised to acknowledge say that the wording, “any protection system component”, in Footnote “e” is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers and are at liberty to judge what additional components are appropriate to be assessed. Transmission Planners and Planning Coordinators may also include associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components, but they are not obliged to assess these components based on the present wording of footnote ‘e’.
Group
ISO/RTO Council Standards Review Committee
Al DiCaprio
Yes
The SRC Standards Review Committee agrees that Response 1 duly addresses Question 1 within the scope of the requirement, the contingency type and its footnote.
Yes
The SRC Standards Review Committee agrees that Response 2 duly addresses Question 2 within the scope of the requirement, the contingency type and its footnote.
Group
Southwest Power Pool Regional Entity
Emily Pennel
Yes
Yes

Group
Bonneville Power Administration
Chris Higgins
Yes
Yes
BPA thanks you for the opportunity to comment on Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee. BPA stands in support of the Interpretation of TPL-003-0a and TPL-004-0 and has no further comments or concerns at this time.
Individual
Andrew Z. Pusztai
American Transmission Company
Yes
This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate "protection system components." However, if Interpretation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.
No
The interpretation does not address the key issue that is implied by Question 2, namely whether "any protection system component" in the TPL-003 and TPL-004 must be interpreted to include "single point of failure components." ATC recommends the following comments be considered by the SDT regarding this issue: a. The term, "protection system component" in footnote 'e' of TPL-003 and TPL-004 is not a defined term (i.e., is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. b. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact, all efforts by regulatory entities and industry groups so far have failed to reach agreement on what types and what granularity of system protection components should be subject to "single point of failure" assessment and establish a written list of all components that must be taken into account. c. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly specify the component that must be considered to be fully compliant if the TPL standards are revised to apply to "any Protection System component." Incorporating this list would ensure the components to be considered would include, at a minimum, "protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits." d. ATC recommends that Response 2 be revised to acknowledge that the wording, "any protection system component," if Footnote "e" is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers in their assessment. However, Transmission Planners and Planning Coordinators may decide, in their discretion, whether additional components not covered by the current wording of footnote 'e' are appropriate to be assessed, such as associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components.
Individual
Oliver Burke
Entergy Serivces, Inc.
Yes
Yes
Individual
Greg Rowland
Duke Energy
Yes
The interpretation appears to expand upon historical industry practices implying that more detailed

evaluation and complex analysis will be required. The change in practices would require definition of an implementation plan to achieve compliance with the interpretation's requirements.
Yes
Group
ACES Power Marketing Standards Collaborators
Jason Marshall
No
Conceptually, we think the first response largely captures the intent and language of the standard. However, we think additional clarity is needed. What does the drafting team mean by evaluate? If the intention is simply that the TP or PC must consider these stuck breaker or failed protection system contingencies, we agree. If the intention is that the TP or PC must simulate each of these stuck breaker or failed protection system contingencies, then we disagree. R1.3.1 compels the PC and TP to perform or evaluate Category C contingencies "that would produce the more severe system results or impacts" while R1.5 requires the TP and PC to consider all Category C contingencies in their studies. Thus, if the stuck breaker or failed protection systems are not expected to be among the "more severe system results or impacts", the PC and TP do not have to perform simulations for them. The standard does not specify how the TP or PC makes this determination but there are a myriad of ways (i.e. experience, previous studies) that they could arrive at the conclusion that a contingency will not produce "more severe system results or impacts". Either way, the single points of failure are considered and studied if needed. One simple modification that would address our concern would be to state explicitly that the PC or TP would only have to perform simulations if the contingencies are expected to produce "more severe system results or impacts". Otherwise, simulations are not required.
No
Response 2 is inconsistent with the plain meaning of the standards and actually modifies both standards. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for "any failure of a protection system component that increases clearing times of one or more protection systems ". Both standards say that a study or simulation is required only for the contingencies "that would produce the more severe system results or impacts" R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider all Category C and D contingencies respectively. Thus, if a protection system failure that would increase clearing times and would produce "more severe system results and impacts", it would be required to be studied and simulated. However, if it did not produce the "more severe system results and impacts", it would not be required to be studied and simulated. The manner in which the PC or TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. However, we offer that there are many ways that a PC or TP could reasonably determine the need to fully simulate a contingency and, thus, ensure that single points of failure are addressed. For instance, the TP or PC could rely on actual system experience or past studies. They could also rely on steady state screening studies. If there are not problems in the steady state and the contingency is electrically far from any generators, it is not likely there will be any transient or dynamic stability problems either.
Individual
Patrick Brown
Essential Power, LLC
Yes
Yes
Individual
Keira Kazmerski
Xcel Energy
No
We agree with the underlying intent in the proposed interpretation; however, the response verbiage

needs some improvements. The phrase “normally expected clearing time” in the first sentence is ambiguous since it is not standard terminology used by system protection or planning engineers. The more widely accepted and better understood term in protection engineering jargon is “maximum expected clearing time” of a protection scheme – but this term is equally applicable to both normal and delayed clearing by a protection scheme. Since both Normal Clearing and Delayed Clearing are terms extensively employed in Table I (and are defined in footnote e), we suggest using these existing terms rather than introducing any new term in the interpretation. One way to achieve this is to omit the first sentence in the interpretation – it appears unnecessary to explain the term Delayed Clearing in the interpretation when it is already described in footnote e. Recommend deleting the first sentence and modifying the second sentence as follows: “The Transmission Planner and Planning Authority is required to simulate the Delayed Clearing resulting from the failure of any protection system component (as described in footnote e) that impacts the maximum expected clearing time of one or more protection systems based on as-built design.”

NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Interpretation of TPL-003-0a and TPL-004-0 for SPCS
Project 2012-INT-02

The Project 2012-INT-02 Interpretation Drafting Team (IDT) thanks all commenters who submitted comments on the Interpretation of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee (SPCS). This interpretation was posted for a 30-day public comment period from June 20, 2012 through July 19, 2012. Stakeholders were asked to provide feedback on the standards and associated documents through a special electronic comment form. There were 31 sets of comments, including comments from approximately 102 different people from approximately 69 companies representing 9 of the 10 industry segments as shown in the table on the following pages.

Summary Consideration

The IDT received overwhelmingly supportive comments regarding the interpretation for both questions posed by the SPCS. Revisions made to the interpretation are summarized in the following sections by question.

Question 1

The IDT made clarifying edits to the interpretation response. The quotes and parentheses around the parenthetical for "stuck breaker and protection system failure" were swapped to more accurately reflect the information referenced by the IDT. The phrase "in either standard" was added to clarify that the Table I reference pertains to both standards identified in the interpretation. The last sentence was improved for readability and clarity. The word "either" was removed as it was not necessary for clarity. The actual answer to the question was moved to the first part of the IDT's response for clarity. The IDT added the Planning Authority to the interpretation to remove confusion that both registered entities applicable to the standard are both identified in the interpretation. The parenthetical "(i.e., TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1)" was added to provide greater clarity to the specific requirement being identified by the IDT. Last, the IDT added "of" between "regardless of whether" to improve readability.

Question 2

The IDT received the most comments on the interpretation concerning question 2. The revision provides additional clarity about the failure of a protection system component that impacts one or more protection systems where the total fault clearing time increases. This clarification was made to address the confusion about the phrase "Delayed Clearing" used in footnote (e) of both standards. In response to commenters, the IDT made several revisions and added substantively more language to provide further clarity to industry stakeholders about what protection system components are to be evaluated within the standards.

The additional text discusses the IDT's conclusion about the use of the lowercase phrase "protection system" rather than the defined NERC glossary phrase. Furthermore, the IDT notes that the applicable entities are permitted the use of engineering judgment in their evaluation of Category C and D assessments in regard to those components that would produce the more sever system results or impacts. Last, the actual answer to the question was moved to the first part of the IDT's response for clarity.

Additional Information

All comments submitted may be reviewed in their original format on the standard's project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President of Standards, Mark Lauby, at 404-446-9723 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners

2 — RTOs, ISOs

3 — Load-serving Entities

4 — Transmission-dependent Utilities

5 — Electric Generators

6 — Electricity Brokers, Aggregators, and Marketers

7 — Large Electricity End Users

8 — Small Electricity End Users

9 — Federal, State, Provincial Regulatory or other Government Entities

10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Guy Zito	Northeast Power Coordinating Council										X

	Additional Member	Additional Organization	Region	Segment Selection
1.	Alan Adamson	New York State Reliability Council, LLC	NPCC	10
2.	Carmen Agavriloai	Independent Electricity System Operator	NPCC	2
3.	Greg Campoli	New York Independent System Operator	NPCC	2
4.	Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
5.	Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1
6.	Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
7.	Mike Garton	Dominion Resources Services		5
8.	Kathleen Goodman	ISO - New England	NPCC	2
9.	Michael Jones	National Grid	NPCC	1
10.	David Kiguel	Hydro One Networks Inc.	NPCC	1

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

11.	Michael R. Lombardi	Northeast Utilities	NPCC	1
12.	Randy MacDonald	New Brunswick Power Transmission	NPCC	9
13.	Bruce Metruck	New York Power Authority	NPCC	6
14.	Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
15.	Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
16.	Robert Pellegrini	The United Illuminating Company	NPCC	1
17.	Si-Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
18.	David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
19.	Brian Robinson	Utility Services	NPCC	8
20.	Michael Schiavone	National Grid	NPCC	1
21.	Wayne Sipperly	National Grid	NPCC	5
22.	Donald Weaver	New Brunswick System Operatorator		2
23.	Ben Wu	Orange and Rockland Utilities	NPCC	1
24.	Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
2. Group	Jonathan Hayes	Southwest Power Pool NERC Reliability Standards Development Team	X		X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Jonathan Hayes	Southwest Power Pool	SPP	NA
2.	Robert Rhodes	Southwest Power Pool	SPP	NA
3.	Don Taylor	WESTAR	SPP	1, 3, 5, 6
4.	Tiffany Lake	WESTAR	SPP	1, 3, 5, 6
5.	Mo Awad	WESTAR	SPP	1, 3, 5, 6
6.	John Allen	City Utilities of Springfield	SPP	1, 4
7.	Mohsen Ghavami	Xcel Energy	SPP	1, 3, 5, 6
8.	Helal Islam	Xcel Energy	SPP	1, 3, 5, 6
9.	Buyanni	Xcel Energy	SPP	1, 3, 5, 6
10.	Mark Hamilton	Oklahoma Gas and Electric	SPP	1, 3, 5
11.	Stephen McGie	City of Coffeyville	SPP	NA
12.	Valerie Pinamonti	American Electric Power	SPP	1, 3, 5
13.	Terri Pyle	Oklahoma Gas and Electric	SPP	1, 3, 5
14.	Lynn Schroeder	WESTAR	SPP	1, 3, 5, 6

Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
3. Group	Sasa Maljukan	Hydro One	X									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10

	Additional Member	Additional Organization	Region	Segment Selection
1.	David Kiguel	Hydro One NEtworks Inc.	NPCC	1
2.	Hamid HAMADANIZADEH	Hydro One NEtworks Inc.	NPCC	1

				1	2	3	4	5	6	7	8	9	10
4.	Group	David Thorne	Pepco Holdings Inc. & Affiliates	X		X							

	Additional Member	Additional Organization	Region	Segment Selection
1.	Carl Kinsley	Delmarva Power & Light	RFC	1

				1	2	3	4	5	6	7	8	9	10
5.	Group	Bill Miller	NERC System Protection and Control Subcommittee (SPCS)	X			X	X				X	X

No additional members listed.

				1	2	3	4	5	6	7	8	9	10
6.	Group	Steve Rueckert	Western Electricity Coordinating Council										X

No additional members listed.

				1	2	3	4	5	6	7	8	9	10
7.	Group	WILL SMITH	MRO NSRF	X	X	X	X	X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	MAHMOOD SAFI	OPPD	MRO	1, 3, 5, 6
2.	CHUCK LAWRENCE	ATC	MRO	1
3.	TOM WEBB	WPS	MRO	3, 4, 5, 6
4.	JODI JENSON	WAPA	MRO	1, 6
5.	KEN GOLDSMITH	ALTW	MRO	4
6.	ALICE IRELAND	XCEL	MRO	1, 3, 5, 6
7.	DAVE RUDOLPH	BEPC	MRO	1, 3, 5, 6
8.	ERIC RUSKAMP	LES	MRO	1, 3, 5, 6
9.	JOE DEPOORTER	MGE	MRO	3, 4, 5, 6
10.	SCOTT NICKELS	RPU	MRO	4
11.	TERRY HARBOUR	MEC	MRO	5, 6, 1, 3
12.	MARIE KNOX	MISO	MRO	2
13.	LEE KITTELSON	OTP	MRO	1, 3, 5, 6
14.	SCOTT BOS	MPW	MRO	1, 3, 5, 6
15.	TONY EDDLEMAN	NPPD	MRO	1, 3, 5
16.	MIKE BRYTOWSKI	GRE	MRO	1, 3, 5, 6
17.	DAN INMAN	MPC	MRO	1, 3, 5, 6

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
8.	Group	Al DiCaprio	ISO/RTO Council Standards Review Committee		X								

	Additional Member	Additional Organization	Region	Segment Selection
1.	Terry Bilke	MISO	MRO	2
2.	Greg Campoli	NYISO	NPCC	2
3.	Gary DeShazo	CAISO	WECC	2
4.	Kathleen Goodman	ISO-NE	NPCC	2
5.	Ben Li	IESO	NPCC	2
6.	Ken Gardner	AESO	WECC	2
7.	Charles Yeung	SPP	SPP	2
8.	Don Weaver	NBSO	NPCC	2

				1	2	3	4	5	6	7	8	9	10
9.	Group	Emily Pennel	Southwest Power Pool Regional Entity										X

No additional members listed.

				1	2	3	4	5	6	7	8	9	10
10.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Berhanu	Tesema	WECC	1

				1	2	3	4	5	6	7	8	9	10
11.	Group	Jason Marshall	ACES Power Marketing Standards Collaborators						X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	John Shaver	Southwest Transmission Cooperative	WECC	1
2.	Chris Bradley	Big Rivers Electric Corporation	SERC	1
3.	Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
4.	Patrick Woods	East Kentucky Power Cooperative	SERC	1, 3, 5

				1	2	3	4	5	6	7	8	9	10
12.	Individual	Sandra Shaffer	PacifiCorp	X		X		X	X				
13.	Individual	Janet Smith	Arizona Public Service Company	X		X		X	X				
14.	Individual	Aaron Staley	Orlando Utilities Commission	X									
15.	Individual	Chris Mattson	Tacoma Power	X		X	X	X	X				
16.	Individual	Thad Ness	American Electric Power	X		X		X	X				
17.	Individual	Michael Falvo	Independent Electricity System Operator		X								

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
18.	Individual	Kasia Mihalchuk	Manitoba Hydro	X		X		X	X				
19.	Individual	Jay	Campbell	X		X	X	X					
20.	Individual	John Pearson	ISO New England		X								
21.	Individual	Brett Holland	KCP&L/ KCP&L-GMO	X		X		X	X				
22.	Individual	Anthony Jablonski	ReliabilityFirst										X
23.	Individual	Kirit Shah	Ameren	X		X		X	X				
24.	Individual	Milorad Papic	Idaho Power Company	X		X							
25.	Individual	J. S. Stonecipher, PE	City of Jacksonville Beach dba/Beaches Energy Services	X								X	
26.	Individual	RoLynda Shumpert	South Carolina Electric and Gas	X		X		X	X				
27.	Individual	Andrew Z. Pusztai	American Transmission Company	X									
28.	Individual	Oliver Burke	Entergy Services, Inc.	X		X		X	X				
29.	Individual	Greg Rowland	Duke Energy	X		X		X	X				
30.	Individual	Patrick Brown	Essential Power, LLC					X					
31.	Individual	Keira Kazmerski	Xcel Energy	X		X		X	X				

1. **Do you agree with Response 1 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration:

Industry comments vastly support the Interpretation Drafting Team's (IDT) interpretation to Question 1. The IDT made minor clarifications to support the interpretation including a reference to TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1.

A stakeholder questioned the need for the interpretation based on parallel initiatives such as the development of TPL-001-2 and the Order No. 754 Request for Data or Information ("data request"). The Federal Energy Regulatory Commission (FERC) Order No. 754[2] (i.e., approval of the interpretation of TPL-002-0) addresses the concern about the non-operation of non-redundant protection systems. The Request for Interpretation along with the data request both support approaches that were formed at the October 24-25, 2011 FERC Technical Conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach.

A stakeholder raised a concern that an implementation plan may be needed if the Planning Authority and Transmission Planner might have only been studying one or the other (i.e., stuck breaker or protection system failure) for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing,[e] Elements C6, C7, C8, and C9. The IDT believes that when the Planning Authority and Transmission Planner's consideration of the situation(s) that produce the more severe system results or impacts of stuck breaker or protection system failure indicates an inability of the system to meet the performance requirements of the standard (i.e., TPL-003-0a), that the implementation plan associated with achieving the desired performance is addressed by TPL-003-0, Requirement R2 and its sub-requirements.

Organization	Yes or No	Question 1 Comment
Pepco Holdings Inc. & Affiliates	No	1) TPL-001-2 was designed to be a single, comprehensive, and coordinated standard that merges the requirements of four existing standards: TPL-001-1; TPL-002-1b; TPL-003-1a; TPL-004-1 and also results in the retirement of TPL-005 and TPL-006. TPL-001-2 went through the industry vetting process

[2] Order No. 754, *Interpretation of Transmission Planning Reliability Standard, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)*

Organization	Yes or No	Question 1 Comment
		and was approved by the NERC Board of Trustees on August 4, 2011. The language in TPL-001-2 was debated extensively within the industry, including the reference to "protection system failures". It was a balloted consensus to replace that phrase with the term "failure of a non-redundant relay", which was clarified in footnote 13 of Table 1. As such, it would appear that the language in TPL-001-2, if approved, would preclude the need for this interpretation of TPL-003-0a and TPL-004-0. Although TPL-001-2 has not yet been FERC approved, the perceived objection centered around footnote 12 (consequential load loss) and not footnote 13 and the elimination of the term "protection system failure". **Response:** The IDT thanks you for your comment and believes that the NERC Board of Trustees-adopted and not yet FERC-approved TPL-001-2 standard aims to resolve and improve certain aspects of the TPL standards, including protection system failures. The NERC Board of Trustees-adopted TPL-001-2 (8/2011) preceded subsequent milestone events such as the Order No. 754 (9/2011) and FERC Technical Conference (10/2011), which provided further direction on the Commission's concern regarding "…the study of the non-operation of non-redundant primary protection systems; e.g., the study of a single point of failure on protection systems."[3] NERC's Order No. 754 Informational Filing[4] describes how this interpretation along with the Order No. 754 Data Request is part an overall approach formed at the October 24-25, 2011 FERC Technical Conference to address FERC's concern. The comment provided has not addressed the IDT's question. No change made. 2) In addition, there is presently a data request on Order 754 to ascertain the significance of protection system single points of failure. In that data request it provides a method for identifying single points of failure.

[3] Interpretation of Transmission Planning Reliability Standard, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)

[4] http://www.nerc.com/files/Final_Order_754_Informational_Filing_3-15-12_complete.pdf

Organization	Yes or No	Question 1 Comment
		However, dynamic simulations involving faults coupled with the failure of a single battery system are not required, even though it could render all protection systems at a station inoperable, requiring remote clearing. Neither the existing sets of TPL standards that use the term "protection system failure", nor this interpretation, makes any attempt to define what single points of failure need to be evaluated, or whether a failure of a single battery system needs to studied. **Response:** The IDT thanks you for your comment; however, the comment provided has not addressed the IDT's question. The interpretation is responsive to the System Protection and Control Subcommittee's question raised and clarifies that the parenthetical (i.e., "stuck breaker or protection system failure") portion of the Table I, Category C6-C9, contingencies applicable to TPL-003-0a does not establish other or optional approaches for addressing a delayed clearing mode for a SLG Fault. No change made. The IDT clarifies the interpretation in response to the System Protection and Control Subcommittee's Question #2 comment that the use of "protection system" in the existing TPL standards does not explicitly use the defined NERC glossary term "Protection System." The IDT believes that an entity is not precluded from evaluating a DC supply component failure and revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1). 3) Considering the uncertainty of how to address certain single points of failure, coupled with the numerous industry comments supporting the language change in TPL-001-2, it would seem prudent at this time to delay a response to this interpretation in order to allow the standards development process to play out, and FERC review of TPL-001-2 to proceed. The Order 754 data request should proceed as planned and FERC approval of TPL-001-2

Organization	Yes or No	Question 1 Comment
		should be pursued. The outcome of both could significantly impact this proposed interpretation response, or render it unnecessary. **Response:** The IDT thanks you for your comment. This interpretation is one approach, in addition to the Order No. 754 Request for Data or Information, to address FERC's concern raised in paragraphs 19 and 20 of the Order No. 754.[5] The interpretation clarifies that the existing TPL standards (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) require both stuck breaker and protection system failure must be considered within a Planning Authority and Transmission Planner system assessment. The comment provided has not addressed the IDT's question. No change made.
Response: Please see the responses above.		
ACES Power Marketing Standards Collaborators	No	Conceptually, we think the first response largely captures the intent and language of the standard. However, we think additional clarity is needed. What does the drafting team mean by evaluate? **Response:** The IDT thanks you for your comment and clarifies the interpretation by adding the parenthetical for "(i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1)" to note the reference to "evaluate[d]," see R1.3.1 below. Clarification made. *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.* If the intention is simply that the TP or PC must consider these stuck breaker

[5] *Interpretation of Transmission Planning Reliability Standard*, 136 FERC ¶ 61,186 (http://www.nerc.com/filez/standards/order_754.html)

Organization	Yes or No	Question 1 Comment
		or failed protection system contingencies, we agree. If the intention is that the TP or PC must simulate each of these stuck breaker or failed protection system contingencies, then we disagree. R1.3.1 compels the PC and TP to perform or evaluate Category C contingencies "that would produce the more severe system results or impacts" while R1.5 requires the TP and PC to consider all Category C contingencies in their studies. Thus, if the stuck breaker or failed protection systems are not expected to be among the "more severe system results or impacts", the PC and TP do not have to perform simulations for them. The standard does not specify how the TP or PC makes this determination but there are a myriad of ways (i.e. experience, previous studies) that they could arrive at the conclusion that a contingency will not produce "more severe system results or impacts". **Response:** The IDT thanks you for your comment. The interpretation does not imply that the Planning Authority and Transmission Planner must simulate each stuck breaker or protection system failure contingency. The interpretation states that the Planning Authority and Transmission Planner must consider 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. No change made.
Response: See responses above.		
Western Electricity Coordinating Council	Yes	That would be my understanding
Response: The IDT thanks you for your support. No change made.		

Organization	Yes or No	Question 1 Comment
MRO NSRF	Yes	This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate "protection system components". However, if Interpretation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.
Response: The IDT thanks you for your support. No change made.		
ISO/RTO Council Standards Review Committee	Yes	The SRC Standards Review Committee agrees that Response 1 duly addresses Question 1 within the scope of the requirement, the contingency type and its footnote.
Response: The IDT thanks you for your support. No change made.		
ReliabilityFirst	Yes	ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 1, but offers the following additional language for added clarity: Response 1 – TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused

Organization	Yes or No	Question 1 Comment
		by a failure of a protection system or circuit breaker is evaluated to examine its impact on BES performance. Therefore, the transmission planner considers the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Note: The IDT has applied formatting (proposing/~~deleting~~) to bring attention to ReliabilityFirst's proposed suggestion above: ***ReliabilityFirst (from above):*** *"Response 1 – TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker is ~~must be~~ evaluated to examine its impact on BES performance. Therefore, the transmission planner considers ~~must consider~~ the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure."* **Response:** This IDT thanks you for your comment and decided not to incorporate the two modifications in the interpretation as proposed because it is important to be clear that the Planning Authority and Transmission Planner must consider the situation that produces the more severe system results or impacts. No change made.		
Ameren	Yes	We agree with the SDT that the more severe system results or impacts due to a delayed clearing condition should be evaluated.

Organization	Yes or No	Question 1 Comment
Response: The IDT thanks you for your support. No change made.		
Idaho Power Company	Yes	We support the following response from SPCS to a Question No. 1 TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a SLG (TPL-003-0a, Category C) and Three-phase (TPL-004-0, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance. Therefore, the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.
Response: The IDT thanks you for your support. No change made.		
American Transmission Company	Yes	This interpretation is reasonable and obvious. The system assessment impact should be minor if Transmission Planners and Planning Coordinators are allowed to continue to use their present interpretation of appropriate "protection system components." However, if Interpretation Response 2 expands the interpretation of appropriate protection system components, then the system assessment impact of Response 1 may be of major significance.

<table>
<tr><th>Organization</th><th>Yes or No</th><th>Question 1 Comment</th></tr>
<tr><td colspan="3">Response: The IDT thanks you for your support, please see response for American Transmission Company in Question 2 below. No change made.</td></tr>
<tr><td>Duke Energy</td><td>Yes</td><td>The interpretation appears to expand upon historical industry practices implying that more detailed evaluation and complex analysis will be required. The change in practices would require definition of an implementation plan to achieve compliance with the interpretation’s requirements.</td></tr>
<tr><td colspan="3">Response: The IDT recognizes there may be cases where a Planning Authority and Transmission Planner may have only been studying one or the other (i.e., stuck breaker or protection system failure) for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing,[e] Elements 6, 7, 8, and 9. The IDT believes that when the Planning Authority and Transmission Planner’s consideration of the situation(s) that produce the more severe system results or impacts of stuck breaker or protection system failure indicate an inability of the system to meet the performance requirements of the standard (i.e., TPL-003-0a), that the implementation plan associated with achieving the desired performance is addressed by TPL-003-0a, Requirement R2 and its sub-requirements. No change made.

TPL-003-0a, R2:

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.

The Reliability Standard, TPL-004-0, only requires the documented results of three-phase faults for stuck breaker or protection</td></tr>
</table>

Organization	Yes or No	Question 1 Comment
system failure and does not require corrective action implementation plans.		
Manitoba Hydro	Yes	MH agrees with the response. In order to determine the more severe result due to delayed clearing of a fault (as defined in footnote (e)), the planner will have to consider the stuck breaker fault and the protection system failure.
Response: The IDT thanks you for your support. No change made.		
Northeast Power Coordinating Council	Yes	
Southwest Power Pool NERC Reliability Standards Development Team	Yes	
Hydro One	Yes	
NERC System Protection and Control Subcommittee (SPCS)	Yes	
Southwest Power Pool Regional Entity	Yes	
Bonneville Power Administration	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Orlando Utilities Commission	Yes	

Organization	Yes or No	Question 1 Comment
Tacoma Power	Yes	
American Electric Power	Yes	
Independent Electricity System Operator	Yes	
Campbell	Yes	
ISO New England	Yes	
KCP&L/ KCP&L-GMO	Yes	
City of Jacksonville Beach dba/Beaches Energy Services	Yes	
South Carolina Electric and Gas	Yes	
Entergy Services, Inc.	Yes	
Essential Power, LLC	Yes	

2. **Do you agree with Response 2 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration: Several industry stakeholders provided comments that the IDT's interpretation did not adequately address the underlying key issue implied by the request for interpretation, Question 2, namely whether "any protection system component" in the TPL-003-0a and TPL-004-0 must include "single point of failure components". Other commenters felt the reference to "full impact" was vague and subjective. The IDT clarified the interpretation based on these industry stakeholder comments.

The System Protection and Control Subcommittee raised a valid comment and the IDT has modified the interpretation. The IDT's revised interpretation clarifies that the term, "Delay Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Additionally, the IDT now indicates that simulating the "full impact" covers both the clearing time and the facilities removed.

Several commenters raised concerns the interpretation did not provide adequate clarity regarding the components the Planning Authority and Transmission Planner must consider. The IDT concurs with these comments and has revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component.

A commenter raised a concern about the evaluation of batteries. The IDT believes that an entity is not precluded from evaluating a DC supply component failure. The potential risk of batteries with regard to single component failure is currently being assessed through the Order No. 754 data request which became effective September 1, 2012. The IDT's revised the interpretation to clarify the performance expectations with regard to components for the current version of these two standards.

Organization	Yes or No	Question 2 Comment
Pepco Holdings Inc. & Affiliates	No	See #1
Response: The IDT refers the commenter to the response in Question 1. No change made.		
NERC System Protection and Control Subcommittee (SPCS)	No	The SPCS generally agrees with the proposed interpretation. However, we believe the reference to a failure that "increases clearing time" is too narrow and implies it is

Organization	Yes or No	Question 2 Comment
*This IDT has highlighted the SPCS proposed text to the right to make their suggestion more identifiable.		not necessary to consider failures that disable a protection system, therefore affecting both the clearing time and the number of elements that may be tripped by remote protection systems. The SPCS proposes revising the interpretation to address "failure of a protection system component that affects the operation (disables or increases clearing times) of one or more protection systems," and recommends adding an example for clarification. The full text would then be as proposed below. Note: Added text is identified by square brackets. The term "Delayed Clearing" that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. Any failure of a protection system component that [affects the operation (disables or] increases clearing times[)] of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance. [For example, if a single current transformer provides AC current input to both a local primary and secondary protection system, then simulating failure of the current transformer must include the effect of disabling both local protection systems. This may require modeling clearing from remote terminals to expose the full impact on BES performance.]
Response: The IDT thanks you for using the brackets for emphasis and clarity to note the suggested changes. The System Protection and Control Subcommittee have a valid comment and the IDT has modified the interpretation. The IDT revised the interpretation to clarify that the term, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Additionally, the IDT now indicates that simulating the "full impact" covers both the clearing time and the facilities removed. Clarification made.		
MRO NSRF	No	The interpretation does not address the key issue that is implied by Question 2, namely whether "any protection system component" in the TPL-003 and TPL-004 must be interpreted to include "single point of failure components". Several thoughts to consider with regard to this issue are:

Organization	Yes or No	Question 2 Comment
		1. The term, “protection system component” in footnote ‘e’ of TPL-003 and TPL-004 is not a defined term (i.e. is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. **Response:** The IDT concurs with the comment and has revised the interpretation to clarify the scope of “any component” found in footnote (e). Clarification made. 2. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact all efforts by regulatory entities and industry groups so far have failed to reach agreement on what types and what granularity of system protection components should be subject to “single point of failure” assessment and establish written list of all components that must be taken into account. **Response:** The comment provided has not addressed the IDT’s question. No change made. 3. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly stipulate the component that must be considered to be fully compliance, if the TPL standards were revised to “any Protection System component”, then the components to be considered would at least include “protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits”. We suggest that Response 2 be revised to acknowledge say that the wording, “any protection system component”, in Footnote “e” is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers and are at liberty to judge what additional components are appropriate to be assessed. Transmission Planners and Planning Coordinators may also include associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components, but they are not obliged to assess these components based on the

Organization	Yes or No	Question 2 Comment
		present wording of footnote 'e'. **Response:** The IDT concurs with the comments and has revised the interpretation to indicate engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.
Response: Please see the responses above.		
ACES Power Marketing Standards Collaborators	No	Response 2 is inconsistent with the plain meaning of the standards and actually modifies both standards. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for "any failure of a protection system component that increases clearing times of one or more protection systems ". Both standards say that a study or simulation is required only for the contingencies "that would produce the more severe system results or impacts" R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider all Category C and D contingencies respectively. Thus, if a protection system failure that would increase clearing times and would produce "more severe system results and impacts", it would be required to be studied and simulated. However, if it did not produce the "more severe system results and impacts", it would not be required to be studied and simulated. The manner in which the PC or TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. However, we offer that there are many ways that a PC or TP could reasonably determine the need to fully simulate a contingency and, thus, ensure that single points of failure are addressed. For instance, the TP or PC could rely on actual system experience or past studies. They could also rely on steady state screening studies. If there are not problems in the steady state and the contingency is electrically far from any generators, it is not likely there will be any transient or dynamic stability

Organization	Yes or No	Question 2 Comment
		problems either.
Response: The IDT thanks you for your comments. In consideration of ACES' suggestions, along with other industry stakeholders, the IDT made adjustments to the interpretation. The revised interpretation clarifies that the two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Ameren	No	We do not believe that it is necessary to evaluate every possible delayed clearing time due to system component failures. As we have stated in question 1 above, the goal should be to evaluate the more severe system results or impacts which usually correlates with the longest clearing time.
Response: The IDT thanks you for your comment and concurs in general with Ameren's view; however, the IDT does not believe that the two standards as written mandate the determination of the "longest clearing time." The IDT is not interpreting the two standards to require review (or evaluation) of all clearing time impacts for a given component failure. The interpretation now clarifies that, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems." Clarification made.		
American Transmission Company	No	The interpretation does not address the key issue that is implied by Question 2, namely whether "any protection system component" in the TPL-003 and TPL-004 must be interpreted to include "single point of failure components." ATC recommends the following comments be considered by the SDT regarding this issue: a. The term, "protection system component" in footnote 'e' of TPL-003 and TPL-004 is not a defined term (i.e., is not capitalized) and was not a defined term when the TPL standards were written and became mandatory. b. There is no definitive Regulatory body document or electric industry document that stipulates (lists) which protection system components are required by TPL-003 and TPL-004. If fact, all efforts by regulatory entities and industry groups so far have

Organization	Yes or No	Question 2 Comment
		failed to reach agreement on what types and what granularity of system protection components should be subject to "single point of failure" assessment and establish a written list of all components that must be taken into account. c. There is a list of components in the latest NERC Glossary of Terms under Protection System that could be used in the TPL standards to more explicitly specify the component that must be considered to be fully compliant if the TPL standards are revised to apply to "any Protection System component." Incorporating this list would ensure the components to be considered would include, at a minimum, "protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuits." d. ATC recommends that Response 2 be revised to acknowledge that the wording, "any protection system component," if Footnote "e" is not defined. Therefore, each Transmission Planner and Planning Coordinator must include relays, circuit breakers, and current transformers in their assessment. However, Transmission Planners and Planning Coordinators may decide, in their discretion, whether additional components not covered by the current wording of footnote 'e' are appropriate to be assessed, such as associated communication systems, voltage and current sensing devices, station batteries, DC control circuits, and any other shared protection system components.
Response: The IDT thanks you for your comments and has revised the interpretation in consideration of this comment and other stakeholder comments. The revised interpretation clarifies that these two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.2.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Xcel Energy	No	We agree with the underlying intent in the proposed interpretation; however, the response verbiage needs some improvements. The phrase "normally expected clearing time" in the first sentence is ambiguous since it is not standard terminology

Organization	Yes or No	Question 2 Comment
		used by system protection or planning engineers. The more widely accepted and better understood term in protection engineering jargon is “maximum expected clearing time” of a protection scheme - but this term is equally applicable to both normal and delayed clearing by a protection scheme. Since both Normal Clearing and Delayed Clearing are terms extensively employed in Table I (and are defined in footnote e), we suggest using these existing terms rather than introducing any new term in the interpretation. One way to achieve this is to omit the first sentence in the interpretation - it appears unnecessary to explain the term Delayed Clearing in the interpretation when it is already described in footnote e. Recommend deleting the first sentence and modifying the second sentence as follows: “The Transmission Planner and Planning Authority is required to simulate the Delayed Clearing resulting from the failure of any protection system component (as described in footnote e) that impacts the maximum expected clearing time of one or more protection systems based on as-built design.”
Response: The IDT thanks you for your comments. The two standards do not specify that that the “maximum” clearing time be assessed or the “most” severe system result determined throughout its system. The IDT believes the interpretation describes what defines this condition and now emphasizes that the term, “Delayed Clearing,” as used in footnote (e) refers to a protection system failure that “increases the fault total clearing time” rather than “increases the times of one or more protection systems.” The revised interpretation clarifies that these two standards do not explicitly identify the single component failures that must be evaluated for a given protection system. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
ReliabilityFirst	Yes	ReliabilityFirst fundamentally agrees with the drafted interpretation for Question 2, but offers the following additional language for added clarity: Response 2 - The term “Delayed Clearing” that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system’s

Organization	Yes or No	Question 2 Comment
		normally expected clearing time. The Transmission Planner and Planning Authority is required to simulate the full impact on the Bulk Electric System performance of a failure of a protection system that increases clearing times of one or more protection systems. The standard specifically states that not all possible Category C and D events are required to be simulated. All events are to be considered (TPL-003-0a R1.5 and TPL-004-0 R1.4) and with supporting rationale and RRO agreement, only those that would produce the more sever system results or impacts are required to be simulated (TPL-003-0a R1.3.1 and TPL-004-0 R1.3.1).
Response: The IDT thanks you for your comments and has revised the interpretation in consideration of this comment and other stakeholder comments. Although RFC's suggestions were not specifically incorporated, the IDT believes the revised interpretation addresses the points raised by RFC. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
Idaho Power Company	Yes	We support the following response from SPCS to Question No. 2. The term "Delayed Clearing" that is described in Table 1, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. Any failure of a protection system component that increases clearing times of one or more protection systems requires the Transmission Planner and Planning Authority to simulate the full impact on the Bulk Electric System performance.
Response: The IDT thanks you for your support. Although this comment supports the IDT's initial interpretation, the System Protection and Control Subcommittee raised a valid comment that led to the IDT modifying the interpretation. The IDT's revised interpretation clarifies that the term, "Delayed Clearing," as used in footnote (e) refers to a protection system failure that "increases the fault total clearing time" rather than "increases the times of one or more protection systems". Additionally, the IDT has further clarified the phrase "full impact" with the parenthetical text "(clearing time and facilities removed).". Clarification made.		

Organization	Yes or No	Question 2 Comment
City of Jacksonville Beach dba/Beaches Energy Services	Yes	Consider deleting the word “full” in the phrase “full impact”. The word seems to add ambiguity to the phrase, e.g., what is the difference between “impact” and “full impact”?
Response: The IDT thanks you for your comments. The IDT has further clarified the phrase “full impact” with the parenthetical text “(clearing time and facilities removed).” Clarification made.		
Western Electricity Coordinating Council	Yes	That would be my understanding
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
ISO/RTO Council Standards Review Committee	Yes	The SRC Standards Review Committee agrees that Response 2 duly addresses Question 2 within the scope of the requirement, the contingency type and its footnote.
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
Bonneville Power Administration	Yes	BPA thanks you for the opportunity to comment on Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee. BPA stands in support of the Interpretation of TPL-003-0a and TPL-004-0 and has no further comments or concerns at this time.
Response: The IDT thanks you for your support. The IDT revised the interpretation based on other stakeholder comments.		
Orlando Utilities Commission	Yes	I recommend adding an example. If by “protection system components” you mean more then just the protective relay itself, an example that lists other components essential to the operation of the protective relay itself. For example “Protection system components including DC systems, fuses, auxiliary relays, PTs, CT,s and other equipment that could fail and is crucial to the proper operation of one or more protective system.”

Organization	Yes or No	Question 2 Comment
Response: The IDT thanks you for your support. The interpretation now indicates engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. Clarification made.		
ISO New England	Yes	While we generally agree with the response, we would like to request further clarification from NERC relating to the distinction (if any) between what is termed a "protection system failure" and a "DC supply or battery system failure". Part of the PG&E clarification request (page 2) mentions that *"...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."* The NERC Response 1 (page 5-6) indicates *"...the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure."* So it seems clear from this response that the most limiting failure condition must be tested, however, does NERC make a distinction between a "protection system failure" and a "DC supply or battery system failure" or is a battery system inherently considered a component of protection system? At many single battery stations the answer to this question could significantly affect stability studies. For example, some stations may have full protection redundancy except for the battery system which means that a failed battery condition would be the most limiting single point failure in that it would disable all local fault clearing protection. The result would be significantly longer fault clearing times than would occur for any other individual protection component failure at that same station including a stuck

Organization	Yes or No	Question 2 Comment
		breaker condition. Please clarify if the intent is to include the effects of a failed DC Supply system.
Response: The IDT thanks you for your comments. Concerning the request for clarification in the above comments, the interpretation now indicates that engineering judgment is permitted when considering a protection system component failure for evaluation that would produce the more severe system results or impact (TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1) and would include addressing all protection systems affected by the selected component. An entity is not precluded from evaluating a DC supply component failure. The potential risk of batteries with regard to single component failure is currently being assessed through the Order No. 754 data request which became effective September 1, 2012. The IDT's revised interpretation clarifies the performance expectations with regard to components for the current version of these two standards. Clarification made.		
Northeast Power Coordinating Council	Yes	
Southwest Power Pool NERC Reliability Standards Development Team	Yes	
Hydro One	Yes	
Southwest Power Pool Regional Entity	Yes	
PacifiCorp	Yes	
Arizona Public Service Company	Yes	
Tacoma Power	Yes	
American Electric Power	Yes	

Organization	Yes or No	Question 2 Comment
Independent Electricity System Operator	Yes	
Campbell	Yes	
KCP&L/ KCP&L-GMO	Yes	
South Carolina Electric and Gas	Yes	
Entergy Services, Inc.	Yes	
Duke Energy	Yes	
Essential Power, LLC	Yes	

END OF REPORT

Response for Interpretation of TPL-003 and TPL-004 for SPCS

When completed, email this form to:
laura.hussey@nerc.net
For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

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[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.
Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.
There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by: • Potential non-compliance if the correct contingencies are not studied • Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required • Potential negative impact to grid reliability if the correct contingencies are not assessed

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	
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.
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] of either "stuck breaker" or "protection system failure" contingency[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 consider 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. Evaluation of a single line ground (SLG) (TPL-003-0a, Table I, Category C) Fault and 3-phase (3ø) (TPL-004-0, Table I, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance.

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.

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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. The Planning Authority and Transmission Planner is permitted engineering judgment in its Category C or D contingencies to select the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this 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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Revision History (To be removed upon Final)

Version	Date	Description
1.0	5/9/2012	Draft 1 of the response to the request for interpretation.
2.0	10/16/2012	Draft 2 of the response to the request for interpretation.

Response for Interpretation of TPL-003 and TPL-004 for SPCS

When completed, email this form to:
laura.hussey@nerc.net
For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

☒ Clarify the required performance

☐ Clarify the conditions under which the performance is required

☐ Clarify which functional entity is responsible for performing an action in a requirement

☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.
Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.
There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by: • Potential non-compliance if the correct contingencies are not studied • Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required • Potential negative impact to grid reliability if the correct contingencies are not assessed

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

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.

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] of either "stuck breaker" or "protection system failure" contingency[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 consider 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, ~~TPL-003-0a (Category C contingencies 6-9) and TPL-004-0 (~~Category D contingencies 1-4) involve an assessment of the effects of either a stuck breaker or a protection system failure. Evaluation of a single line ground (SLG) (TPL-003-0a, Table I, Category C) Fault and 3~~Three~~-phase (3ø) (TPL-004-0, Table I, Category D) Fault with delayed clearing is required and 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 ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance.~~ Therefore, the transmission planner must consider the situation that produces the more severe system results or impacts due to a delayed clearing condition regardless whether the condition resulted from either a stuck breaker or protection system failure.~~

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

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

	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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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~~1~~, footnote (e) refers to fault clearing that results from a failure to achieve the protection system's normally expected clearing time. The Planning Authority and Transmission Planner is permitted engineering judgment in its Category C or D contingencies to select the~~Any failure of a~~ protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.

A protection system component failure that impacts ~~increases clearing times of~~ one or more protection systems and increases the total fault clearing time requires the Planning Authority and Transmission Planner ~~and Planning Authority~~ to simulate the full impact (clearing time and facilities removed) on the Bulk Electric System performance.

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[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Revision History (To be removed upon Final)

Version	Date	Description
1.0	5/9/2012	Draft 1 of the response to the request for interpretation.
2.0	10/16/2012	Draft 2 of the response to the request for interpretation.

Interpretation Request Form

2012-INT-02 TPL-003-0a and TPL-004-0

When completed, email this form to:
laura.hussey@nerc.net

For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	**Title**
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

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[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

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.

Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.

There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by:

- Potential non-compliance if the correct contingencies are not studied
- Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required
- Potential negative impact to grid reliability if the correct contingencies are not assessed

[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,"

Unofficial Comment Form

Project 2012-INT-02 – Interpretation of TPL-003-0a and TPL-004-0 for SPCS

Please **DO NOT** use this form to submit comments. Please use the electronic form to submit comments on the Interpretation of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee (Project 2012-INT-02). The electronic comment form must be completed by 8 p.m. ET **December 5, 2012.**

Project page

If you have questions please contact Scott Barfield-McGinnis at Scott.Barfield@nerc.net or by telephone at (404) 446-9689.

Background Information

This posting is soliciting formal comment through a 45-day formal comment period with an initial ballot in the last 10 days of the formal comment period.

Order 754 is the Final Rule approving the interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern about single points of failure of protection systems and issued a directive for further investigation. From the Order, "…the Commission believes that there is an issue concerning the study of the non-operation of non-redundant primary protection systems; e.g., the study of a single point of failure on protection systems" (P19). In the first part of the directive (P20), the Commission directed FERC staff to meet with NERC and its appropriate subject matter experts to explore this reliability concern, including where it can best be addressed, and identify any additional actions necessary to address the matter. This portion of the directive was satisfied by the October 24-25, 2011 Technical Conference. In the second part (P20), NERC must complete an informational filing within six months of the Order (March 15, 2012) explaining whether there is a further system protection issue that needs to be addressed and, if so, what forum and process should be used to address that issue and what priority it should be accorded relative to other reliability initiatives planned by NERC. In its filing last March, NERC provided a status report on the approaches identified at the technical conference, including this interpretation.

This Request for Interpretation (RFI) was submitted by the System Protection and Control Subcommittee (SPCS) to NERC as one of the approaches identified at the technical conference to address the Federal Energy Regulatory Commission's concern about the study of single point of failure in protection systems documented in Order No. 754. The Standards Committee Executive Committee accepted the RFI of TPL-003-0a and TPL-004-0 for SPCS on February 3,

2012. A number of members from the Assess Transmission Future Needs Standards Drafting Team (ATFNSDT), Protection System Misoperations Standard Development Team (PSMSDT), and Protection System Maintenance and Testing Standard Drafting Team (PSMTSDT) formed the Interpretation Drafting Team (IDT) to respond to the RFI. The IDT has reviewed the SPCS request and developed this interpretation pursuant to the NERC Guidelines for Interpretation Drafting Teams, which is available here.

Summary

The IDT was informed about the issues concerning Order No. 754 for background into the basis for the interpretation request. The SPCS requests clarification about the comprehensiveness of simulations required by the standards because it is not clear if the assessment must include the evaluation of shared or non-redundant protection system components. As discussed at the technical conference, there have been events where a single failed component has affected more than one protection system. For example, the Westwing Outage occurring June 14, 2004 in the Western Interconnection was one of three events identified in the March 30, 2009 NERC Industry Advisory (i.e., NERC Alert), Protection System Single Point of Failure.

First, the SPCS is requesting clarification concerning the parenthetical "(stuck breaker or protection system failure)" in Table 1, Category C and D as to whether an entity has the choice of evaluating either or if both must be evaluated. Second, the SPCS is requesting clarification regarding footnote 'e' as to the extent an entity must model a component failure.

The IDT is comprised of both transmission planning and protection system engineers to provide balanced input to the interpretation. The IDT discussed the application and performance required under the specified standards and requirements. In preliminary reviews, the IDT considered several approved NERC glossary terms such as: Protection System, Normal Clearing, and Delayed Fault Clearing. The IDT notes that the term Delayed Clearing as defined in Footnote 'e' of the referenced standards is similar, but not the same as the glossary term. The term Delayed Clearing in footnote 'e' coupled with the ambiguity of defined terms being used in the standard that were not capitalized presented difficulty in preparing a response to the SPCS request.

Furthermore, there can be areas of confusion when speaking about protection systems in general. This is especially true regarding the lower case use of "protection system" in the standards and its connection with the definition. The IDT did not apply the NERC glossary term definition as that definition was inconsistent with those components listed in the footnote 'e' description. Also, footnote 'e' and its use of "such as" adds confusion as to whether it means "for example" or "including, but not limited to." In the case of the interpretation response, the IDT applied the meaning of "such as" to mean "for example" and the list of terms should not be construed to be an exhaustive or complete list.

You do not have to answer all questions. Enter All Comments in Simple Text Format.
Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.

Please review the request for an interpretation, the associated standard, and the draft interpretation and then answer the following questions.

1. Do you agree with the revised **Response 1** of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

   ☐ Yes
   ☐ No

   Comments:

2. Do you agree with **Response 2** of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

   ☐ Yes
   ☐ No

   Comments:

A. Introduction

1. **Title:** **System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

2. **Number:** TPL-003-0a

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:** April 23, 2010

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.

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.

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.

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

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-003-0_R1 and TPL-003-0_R2.

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-003-0_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	February 8, 2005	Adopted by NERC Board of Trustees	New
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	July 30, 2008	Adopted by NERC Board of Trustees	
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
0a	April 23, 2010	FERC approval of interpretation of TPL-003-0 R1.3.12	Interpretation

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing [e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local Network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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 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.*

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

2. **Number**: TPL-004-0

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:** April 1, 2005

B. Requirements

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

R1.1. Be made annually.

R1.2. Be conducted for near-term (years one through five).

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

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

R1.3.4. Have all projected firm transfers modeled.

R1.3.5. Include existing and planned facilities.

R1.3.6. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

R1.3.8. Include the effects of existing and planned control devices.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

R1.4. Consider all contingencies applicable to Category D.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-0_R1.

M2. The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-0_R1.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

1.2. Compliance Monitoring Period and Reset Timeframe

Annually.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: A valid assessment, as defined above, for the near-term planning horizon is not available.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Not applicable.

B. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing[e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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.

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Initial Ballot now open through 8 p.m. Wednesday, December 5, 2012

Now Available

An initial ballot for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) is open through **8 p.m. Eastern on Wednesday, December 5, 2012.**

Instructions

Members of the ballot pool associated with this project may log in and submit their votes for the footnote in both standards by clicking here.

Next Steps

The drafting team will consider all comments received during the formal comment period and initial ballot and, if needed, make revisions to the interpretation.

Background

Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

Additional information can be found on the project page.

Standards Development Process

The Standards Processes Manual contains all the procedures governing the standards development process. The success of the NERC standards development process depends on stakeholder participation. We extend our thanks to all those who participate.

For more information or assistance, please contact Monica Benson,
Standards Development Administrator, at monica.benson@nerc.net or at 404-446-2560.

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Atlanta, GA 30326
404-446-2560 | www.nerc.com

Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Formal Comment Period Open: October 22 – December 5, 2012

Join Ballot Pool: October 22 – November 20, 2012

Upcoming
Initial Ballot: November 26 – December 5, 2012

Now Available

A formal comment period for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) is open through 8 p.m. Eastern on **Wednesday, December 5, 2012.**

Instructions for Joining Ballot Pool(s)

A ballot pool is being formed. Registered Ballot Body members must join the ballot pool to be eligible to vote in the balloting of the interpretations for TPL-003-0a and TPL-004-0. Registered Ballot Body members may join the ballot pool by 8 a.m. ET on November 20, 2012 at the following page: Join Ballot Pool

During the pre-ballot window, members of the ballot pool may communicate with one another by using the "ballot pool list server." (Once the balloting begins, ballot pool members are prohibited from using the ballot pool list server.) The ballot pool list server for this ballot pool is:

bp-2012-INT-02_TPL3_4_in@nerc.com

Instructions for Commenting

A formal comment period is open through **8 p.m. Eastern on Wednesday, December 5, 2012.** Please use the electronic form to submit comments. If you experience any difficulties in using the electronic form, please contact Monica Benson at monica.benson@nerc.net. An off-line, unofficial copy of the comment form is posted on the project page.

Please read carefully: All stakeholders with comments (both members of the ballot pool as well as other stakeholders, including groups such as trade associations and committees) must submit comments through the electronic comment form. During the ballot window, balloters who wish to submit comments with their ballot *may no longer enter comments on the balloting screen*, but may still enter the comments through the electronic comment form. Balloters who wish to express support for comments submitted by another entity or group will have an opportunity to enter that information and are not required to answer any other questions.

Next Steps

An initial ballot will be conducted November 26 through 8 p.m. Friday, December 5, 2012

Background

Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

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Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Formal Comment Period Open: October 22 – December 5, 2012

Join Ballot Pool: October 22 – November 20, 2012

Upcoming
Initial Ballot: November 26 – December 5, 2012

Now Available

A formal comment period for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) is open through 8 p.m. Eastern on **Wednesday, December 5, 2012.**

Instructions for Joining Ballot Pool(s)
A ballot pool is being formed. Registered Ballot Body members must join the ballot pool to be eligible to vote in the balloting of the interpretations for TPL-003-0a and TPL-004-0. Registered Ballot Body members may join the ballot pool by 8 a.m. ET on November 20, 2012 at the following page: Join Ballot Pool

During the pre-ballot window, members of the ballot pool may communicate with one another by using the "ballot pool list server." (Once the balloting begins, ballot pool members are prohibited from using the ballot pool list server.) The ballot pool list server for this ballot pool is:

bp-2012-INT-02_TPL3_4_in@nerc.com

Instructions for Commenting
A formal comment period is open through **8 p.m. Eastern on Wednesday, December 5, 2012.** Please use the electronic form to submit comments. If you experience any difficulties in using the electronic form, please contact Monica Benson at monica.benson@nerc.net. An off-line, unofficial copy of the comment form is posted on the project page.

Please read carefully: All stakeholders with comments (both members of the ballot pool as well as other stakeholders, including groups such as trade associations and committees) must submit comments through the electronic comment form. During the ballot window, balloters who wish to submit comments with their ballot *may no longer enter comments on the balloting screen*, but may still enter the comments through the electronic comment form. Balloters who wish to express support for comments submitted by another entity or group will have an opportunity to enter that information and are not required to answer any other questions.

Next Steps

An initial ballot will be conducted November 26 through 8 p.m. Friday, December 5, 2012

Background

Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

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Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Initial Ballot Results

Now Available

An initial ballot for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) concluded on **Thursday, December 6, 2012.**

Voting statistics are listed below, and the Ballot Results page provides a link to the detailed results.

Approval
Quorum: 84.81% Approval: 72.57%

Next Steps

The drafting team will consider all comments received during the formal comment period and initial ballot and, if needed, make revisions to the interpretation. If the comments do not show the need for significant revisions, the interpretation will proceed to a recirculation ballot.

Background

Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

Additional information can be found on the project page.

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Ballot Results	
Ballot Name:	Project 2012-INT-02 Initial Ballot TPL-003 and TPL-004 Interpret Nov 2012_in
Ballot Period:	11/26/2012 - 12/6/2012
Ballot Type:	Initial
Total # Votes:	307
Total Ballot Pool:	362
Quorum:	**84.81 % The Quorum has been reached**
Weighted Segment Vote:	72.57 %
Ballot Results:	**The Standard has Passed**

Summary of Ballot Results

Segment	Ballot Pool	Segment Weight	Affirmative		Negative		Abstain	No Vote
			# Votes	Fraction	# Votes	Fraction	# Votes	
1 - Segment 1.	106	1	54	0.675	26	0.325	9	17
2 - Segment 2.	10	0.8	5	0.5	3	0.3	0	2
3 - Segment 3.	83	1	48	0.814	11	0.186	12	12
4 - Segment 4.	24	1	11	0.688	5	0.313	4	4
5 - Segment 5.	74	1	35	0.714	14	0.286	12	13
6 - Segment 6.	51	1	30	0.789	8	0.211	8	5
7 - Segment 7.	0	0	0	0	0	0	0	0
8 - Segment 8.	8	0.6	5	0.5	1	0.1	0	2
9 - Segment 9.	0	0	0	0	0	0	0	0
10 - Segment 10.	6	0.6	4	0.4	2	0.2	0	0
Totals	**362**	**7**	**192**	**5.08**	**70**	**1.921**	**45**	**55**

Individual Ballot Pool Results

Segment	Organization	Member	Ballot	Comments
1		Vijay Sankar		
1	Ameren Services	Kirit Shah	Affirmative	
1	American Electric Power	Paul B. Johnson	Affirmative	
1	American Transmission Company, LLC	Andrew Z Pusztai	Affirmative	
1	Arizona Public Service Co.	Robert Smith	Affirmative	
1	Associated Electric Cooperative, Inc.	John Bussman	Affirmative	
1	Austin Energy	James Armke	Affirmative	
1	Avista Corp.	Scott J Kinney	Affirmative	

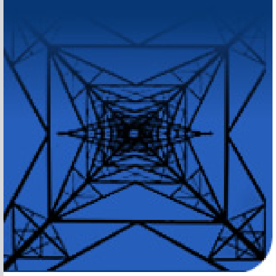
1	Balancing Authority of Northern California	Kevin Smith	Affirmative	
1	Baltimore Gas & Electric Company	Christopher J Scanlon	Affirmative	
1	BC Hydro and Power Authority	Patricia Robertson	Affirmative	
1	Beaches Energy Services	Joseph S Stonecipher		
1	Big Rivers Electric Corp.	Chris Bradley	Negative	
1	Black Hills Corp	Eric Egge		
1	Bonneville Power Administration	Donald S. Watkins	Affirmative	
1	Brazos Electric Power Cooperative, Inc.	Tony Kroskey		
1	Bryan Texas Utilities	John C Fontenot	Affirmative	
1	CenterPoint Energy Houston Electric, LLC	John Brockhan	Negative	
1	Central Electric Power Cooperative	Michael B Bax	Affirmative	
1	Central Maine Power Company	Joseph Turano Jr.	Negative	
1	City of Tacoma, Department of Public Utilities, Light Division, dba Tacoma Power	Chang G Choi	Affirmative	
1	Clark Public Utilities	Jack Stamper	Negative	
1	Colorado Springs Utilities	Paul Morland	Affirmative	
1	Consolidated Edison Co. of New York	Christopher L de Graffenried	Affirmative	
1	Corporate Risk Solutions, Inc.	Joseph Doetzl	Affirmative	
1	CPS Energy	Richard Castrejana	Affirmative	
1	Dairyland Power Coop.	Robert W. Roddy	Negative	
1	Dayton Power & Light Co.	Hertzel Shamash	Affirmative	
1	Deseret Power	James Tucker	Abstain	
1	Dominion Virginia Power	Michael S Crowley	Abstain	
1	Duke Energy Carolina	Douglas E. Hils	Affirmative	
1	East Kentucky Power Coop.	Amber Anderson	Negative	
1	Entergy Transmission	Oliver A Burke	Negative	
1	FirstEnergy Corp.	William J Smith	Affirmative	
1	Florida Keys Electric Cooperative Assoc.	Dennis Minton	Negative	
1	Florida Power & Light Co.	Mike O'Neil	Abstain	
1	FortisBC	Curtis Klashinsky		
1	Gainesville Regional Utilities	Richard Bachmeier	Negative	
1	Georgia Transmission Corporation	Jason Snodgrass	Affirmative	
1	Great River Energy	Gordon Pietsch	Negative	
1	Hoosier Energy Rural Electric Cooperative, Inc.	Bob Solomon		
1	Hydro One Networks, Inc.	Ajay Garg	Affirmative	
1	Idaho Power Company	Molly Devine	Affirmative	
1	International Transmission Company Holdings Corp	Michael Moltane	Negative	
1	JEA	Ted Hobson		
1	KAMO Electric Cooperative	Walter Kenyon	Affirmative	
1	Kansas City Power & Light Co.	Jennifer Flandermeyer	Negative	
1	Keys Energy Services	Stanley T Rzad		
1	Lakeland Electric	Larry E Watt	Negative	
1	Lee County Electric Cooperative	John W Delucca	Negative	
1	Lincoln Electric System	Doug Bantam	Affirmative	
1	Long Island Power Authority	Robert Ganley		
1	Lower Colorado River Authority	Martyn Turner	Affirmative	
1	M & A Electric Power Cooperative	William Price	Affirmative	
1	Manitoba Hydro	Nazra S Gladu	Affirmative	
1	MEAG Power	Danny Dees	Abstain	
1	MidAmerican Energy Co.	Terry Harbour	Affirmative	
1	Minnkota Power Coop. Inc.	Daniel L Inman	Affirmative	
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey	Affirmative	
1	National Grid USA	Michael Jones	Affirmative	
1	Nebraska Public Power District	Cole C Brodine		
1	New Brunswick Power Transmission Corporation	Randy MacDonald	Negative	
1	New York Power Authority	Bruce Metruck	Affirmative	
1	Northeast Missouri Electric Power Cooperative	Kevin White		
1	Northeast Utilities	David Boguslawski	Affirmative	
1	Northern Indiana Public Service Co.	Kevin M Largura	Affirmative	
1	NorthWestern Energy	John Canavan	Negative	
1	Ohio Valley Electric Corp.	Robert Mattey	Affirmative	
1	Oklahoma Gas and Electric Co.	Marvin E VanBebber	Abstain	
1	Omaha Public Power District	Doug Peterchuck	Affirmative	
1	Oncor Electric Delivery	Jen Fiegel	Negative	
1	Orlando Utilities Commission	Brad Chase		
1	Otter Tail Power Company	Daryl Hanson		

1	Pacific Gas and Electric Company	Bangalore Vijayraghavan	Negative	
1	PacifiCorp	Ryan Millard	Affirmative	
1	Platte River Power Authority	John C. Collins	Affirmative	
1	Portland General Electric Co.	John T Walker	Affirmative	
1	Potomac Electric Power Co.	David Thorne	Abstain	
1	PowerSouth Energy Cooperative	Larry D Avery	Affirmative	
1	PPL Electric Utilities Corp.	Brenda L Truhe	Affirmative	
1	Public Service Company of New Mexico	Laurie Williams	Affirmative	
1	Public Service Electric and Gas Co.	Kenneth D. Brown	Affirmative	
1	Public Utility District No. 2 of Grant County, Washington	Rod Noteboom		
1	Puget Sound Energy, Inc.	Denise M Lietz	Negative	
1	Rochester Gas and Electric Corp.	John C. Allen	Negative	
1	Sacramento Municipal Utility District	Tim Kelley	Affirmative	
1	Salt River Project	Robert Kondziolka	Negative	
1	Santee Cooper	Terry L Blackwell	Abstain	
1	Seattle City Light	Pawel Krupa	Negative	
1	Sho-Me Power Electric Cooperative	Denise Stevens	Affirmative	
1	Snohomish County PUD No. 1	Long T Duong	Negative	
1	South Carolina Electric & Gas Co.	Tom Hanzlik	Abstain	
1	Southern California Edison Company	Steven Mavis	Negative	
1	Southern Company Services, Inc.	Robert A. Schaffeld	Affirmative	
1	Southern Illinois Power Coop.	William Hutchison		
1	Southwest Transmission Cooperative, Inc.	John Shaver	Negative	
1	Sunflower Electric Power Corporation	Noman Lee Williams	Negative	
1	Tampa Electric Co.	Beth Young		
1	Tennessee Valley Authority	Howell D Scott	Affirmative	
1	Tri-State G & T Association, Inc.	Tracy Sliman	Affirmative	
1	Tucson Electric Power Co.	John Tolo	Affirmative	
1	Turlock Irrigation District	Esteban Martinez	Abstain	
1	United Illuminating Co.	Jonathan Appelbaum		
1	Westar Energy	Allen Klassen	Affirmative	
1	Western Area Power Administration	Brandy A Dunn	Affirmative	
1	Xcel Energy, Inc.	Gregory L Pieper	Affirmative	
2	BC Hydro	Venkataramakrishnan Vinnakota	Affirmative	
2	California ISO	Rich Vine	Negative	
2	Electric Reliability Council of Texas, Inc.	Cheryl Moseley	Affirmative	
2	Independent Electricity System Operator	Barbara Constantinescu	Affirmative	
2	ISO New England, Inc.	Kathleen Goodman	Negative	
2	Midwest ISO, Inc.	Marie Knox	Affirmative	
2	New Brunswick System Operator	Alden Briggs	Negative	
2	New York Independent System Operator	Gregory Campoli		
2	PJM Interconnection, L.L.C.	stephanie monzon		
2	Southwest Power Pool, Inc.	Charles H. Yeung	Affirmative	
3	AEP	Michael E Deloach	Affirmative	
3	Alabama Power Company	Robert S Moore	Affirmative	
3	Ameren Services	Mark Peters	Affirmative	
3	APS	Steven Norris	Affirmative	
3	Associated Electric Cooperative, Inc.	Chris W Bolick	Affirmative	
3	Atlantic City Electric Company	NICOLE BUCKMAN	Abstain	
3	Avista Corp.	Robert Lafferty		
3	BC Hydro and Power Authority	Pat G. Harrington	Affirmative	
3	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
3	Central Electric Power Cooperative	Adam M Weber	Affirmative	
3	City of Austin dba Austin Energy	Andrew Gallo	Affirmative	
3	City of Green Cove Springs	Gregg R Griffin	Negative	
3	City of Homestead	Orestes J Garcia		
3	City of Redding	Bill Hughes	Affirmative	
3	City of Tallahassee	Bill R Fowler	Abstain	
3	Cleco Corporation	Michelle A Corley		
3	Colorado Springs Utilities	Charles Morgan	Affirmative	
3	ComEd	John Bee	Affirmative	
3	Consolidated Edison Co. of New York	Peter T Yost	Affirmative	
3	Consumers Energy	Richard Blumenstock	Abstain	
3	CPS Energy	Jose Escamilla	Affirmative	
3	Delmarva Power & Light Co.	Michael R. Mayer	Abstain	

3	Detroit Edison Company	Kent Kujala	Affirmative	
3	Dominion Resources, Inc.	Connie B Lowe	Abstain	
3	Duke Energy Carolina	Henry Ernst-Jr		
3	East Kentucky Power Coop.	Patrick Woods	Negative	
3	Entergy	Joel T Plessinger	Negative	
3	FirstEnergy Energy Delivery	Stephan Kern	Affirmative	
3	Florida Municipal Power Agency	Joe McKinney	Negative	
3	Florida Power Corporation	Lee Schuster	Affirmative	
3	Georgia Power Company	Danny Lindsey	Affirmative	
3	Great River Energy	Brian Glover	Negative	
3	Gulf Power Company	Paul C Caldwell		
3	Hydro One Networks, Inc.	David Kiguel	Affirmative	
3	JEA	Garry Baker	Affirmative	
3	KAMO Electric Cooperative	Theodore J Hilmes	Affirmative	
3	Kansas City Power & Light Co.	Charles Locke		
3	Kissimmee Utility Authority	Gregory D Woessner		
3	Lakeland Electric	Mace D Hunter		
3	Lincoln Electric System	Jason Fortik	Affirmative	
3	Los Angeles Department of Water & Power	Daniel D Kurowski	Abstain	
3	Louisville Gas and Electric Co.	Charles A. Freibert	Affirmative	
3	M & A Electric Power Cooperative	Stephen D Pogue	Affirmative	
3	Manitoba Hydro	Greg C. Parent	Affirmative	
3	MidAmerican Energy Co.	Thomas C. Mielnik	Affirmative	
3	Mississippi Power	Jeff Franklin	Affirmative	
3	Modesto Irrigation District	Jack W Savage	Abstain	
3	Municipal Electric Authority of Georgia	Steven M. Jackson	Negative	
3	Muscatine Power & Water	John S Bos	Affirmative	
3	Nebraska Public Power District	Tony Eddleman	Abstain	
3	New York Power Authority	David R Rivera	Affirmative	
3	Niagara Mohawk (National Grid Company)	Michael Schiavone	Affirmative	
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann	Affirmative	
3	Northern Indiana Public Service Co.	William SeDoris	Affirmative	
3	NW Electric Power Cooperative, Inc.	David McDowell	Affirmative	
3	Oklahoma Gas and Electric Co.	Gary Clear		
3	Orange and Rockland Utilities, Inc.	David Burke	Affirmative	
3	Orlando Utilities Commission	Ballard K Mutters	Abstain	
3	Owensboro Municipal Utilities	Thomas T Lyons	Affirmative	
3	Pacific Gas and Electric Company	John H Hagen	Negative	
3	PacifiCorp	Dan Zollner	Affirmative	
3	Platte River Power Authority	Terry L Baker	Affirmative	
3	PNM Resources	Michael Mertz	Affirmative	
3	Portland General Electric Co.	Thomas G Ward	Abstain	
3	Potomac Electric Power Co.	Mark Yerger	Abstain	
3	Public Service Electric and Gas Co.	Jeffrey Mueller	Affirmative	
3	Puget Sound Energy, Inc.	Erin Apperson	Negative	
3	Sacramento Municipal Utility District	James Leigh-Kendall	Affirmative	
3	Salt River Project	John T. Underhill	Negative	
3	Santee Cooper	James M Poston	Abstain	
3	Seattle City Light	Dana Wheelock	Negative	
3	Seminole Electric Cooperative, Inc.	James R Frauen		
3	Sho-Me Power Electric Cooperative	Jeff L Neas	Affirmative	
3	Snohomish County PUD No. 1	Mark Oens	Negative	
3	South Carolina Electric & Gas Co.	Hubert C Young		
3	Tacoma Public Utilities	Travis Metcalfe	Affirmative	
3	Tampa Electric Co.	Ronald L. Donahey	Affirmative	
3	Tennessee Valley Authority	Ian S Grant	Affirmative	
3	Tri-County Electric Cooperative, Inc.	Mike Swearingen	Affirmative	
3	Tri-State G & T Association, Inc.	Janelle Marriott	Affirmative	
3	Turlock Irrigation District	James Ramos		
3	Westar Energy	Bo Jones	Affirmative	
3	Xcel Energy, Inc.	Michael Ibold	Affirmative	
4	American Municipal Power	Kevin Koloini		
4	Blue Ridge Power Agency	Duane S Dahlquist	Affirmative	
4	City of Austin dba Austin Energy	Reza Ebrahimian	Affirmative	
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle	Negative	
4	City of Redding	Nicholas Zettel	Affirmative	
4	City Utilities of Springfield, Missouri	John Allen	Affirmative	

4	Constellation Energy Control & Dispatch, L.L.C.	Margaret Powell	Affirmative	
4	Consumers Energy	David Frank Ronk	Abstain	
4	Detroit Edison Company	Daniel Herring		
4	Flathead Electric Cooperative	Russ Schneider	Affirmative	
4	Florida Municipal Power Agency	Frank Gaffney	Negative	
4	Fort Pierce Utilities Authority	Cairo Vanegas	Negative	
4	Georgia System Operations Corporation	Guy Andrews	Affirmative	
4	Integrys Energy Group, Inc.	Christopher Plante	Abstain	
4	Modesto Irrigation District	Spencer Tacke	Abstain	
4	Ohio Edison Company	Douglas Hohlbaugh	Affirmative	
4	Public Utility District No. 1 of Snohomish County	John D Martinsen	Negative	
4	Sacramento Municipal Utility District	Mike Ramirez	Affirmative	
4	Seattle City Light	Hao Li	Negative	
4	Seminole Electric Cooperative, Inc.	Steven R Wallace	Affirmative	
4	South Mississippi Electric Power Association	Steven McElhaney		
4	Tacoma Public Utilities	Keith Morisette	Affirmative	
4	Turlock Irrigation District	Steven C Hill		
4	Wisconsin Energy Corp.	Anthony Jankowski	Abstain	
5	AEP Service Corp.	Brock Ondayko	Affirmative	
5	Amerenue	Sam Dwyer	Affirmative	
5	Arizona Public Service Co.	Scott Takinen	Affirmative	
5	Associated Electric Cooperative, Inc.	Matthew Pacobit		
5	Avista Corp.	Edward F. Groce	Affirmative	
5	BC Hydro and Power Authority	Clement Ma	Affirmative	
5	Boise-Kuna Irrigation District/dba Lucky peak power plant project	Mike D Kukla	Negative	
5	Bonneville Power Administration	Francis J. Halpin	Affirmative	
5	Brazos Electric Power Cooperative, Inc.	Shari Heino	Negative	
5	BrightSource Energy, Inc.	Chifong Thomas	Negative	
5	City and County of San Francisco	Daniel Mason	Abstain	
5	City of Austin dba Austin Energy	Jeanie Doty	Affirmative	
5	City of Redding	Paul A. Cummings	Affirmative	
5	City of Tallahassee	Karen Webb	Abstain	
5	City Water, Light & Power of Springfield	Steve Rose		
5	Cleco Power	Stephanie Huffman		
5	Colorado Springs Utilities	Jennifer Eckels	Affirmative	
5	Consolidated Edison Co. of New York	Wilket (Jack) Ng	Affirmative	
5	Consumers Energy Company	David C Greyerbiehl	Abstain	
5	Dairyland Power Coop.	Tommy Drea		
5	Detroit Edison Company	Alexander Eizans	Affirmative	
5	Dominion Resources, Inc.	Mike Garton	Abstain	
5	Duke Energy	Dale Q Goodwine	Affirmative	
5	East Kentucky Power Coop.	Stephen Ricker	Negative	
5	Electric Power Supply Association	John R Cashin		
5	Energy Services, Inc.	Tracey Stubbs	Negative	
5	Exelon Nuclear	Mark F Draper	Affirmative	
5	FirstEnergy Solutions	Kenneth Dresner		
5	Florida Municipal Power Agency	David Schumann	Negative	
5	Gainesville Regional Utilities	Karen C Alford		
5	Great River Energy	Preston L Walsh	Negative	
5	JEA	John J Babik	Affirmative	
5	Kansas City Power & Light Co.	Brett Holland	Negative	
5	Kissimmee Utility Authority	Mike Blough		
5	Lakeland Electric	James M Howard		
5	Lincoln Electric System	Dennis Florom	Affirmative	
5	Los Angeles Department of Water & Power	Kenneth Silver		
5	Manitoba Hydro	S N Fernando	Affirmative	
5	Massachusetts Municipal Wholesale Electric Company	David Gordon	Abstain	
5	MEAG Power	Steven Grego	Negative	
5	MidAmerican Energy Co.	Neil D Hammer	Affirmative	
5	Muscatine Power & Water	Mike Avesing	Affirmative	
5	Nebraska Public Power District	Don Schmit	Abstain	
5	New York Power Authority	Wayne Sipperly	Affirmative	
5	NextEra Energy	Allen D Schriver	Abstain	
5	Northern Indiana Public Service Co.	William O. Thompson	Affirmative	
5	Oklahoma Gas and Electric Co.	Kim Morphis		

5	Omaha Public Power District	Mahmood Z. Safi	Affirmative	
5	Orlando Utilities Commission	Richard K Kinas		
5	PacifiCorp	Bonnie Marino-Blair	Affirmative	
5	Platte River Power Authority	Roland Thiel	Affirmative	
5	Portland General Electric Co.	Matt E. Jastram	Affirmative	
5	PPL Generation LLC	Annette M Bannon	Affirmative	
5	PSEG Fossil LLC	Tim Kucey	Affirmative	
5	Public Utility District No. 1 of Lewis County	Steven Grega	Abstain	
5	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		
5	Puget Sound Energy, Inc.	Lynda Kupfer	Negative	
5	Salt River Project	William Alkema	Negative	
5	Santee Cooper	Lewis P Pierce	Abstain	
5	Seattle City Light	Michael J. Haynes	Negative	
5	Seminole Electric Cooperative, Inc.	Brenda K. Atkins	Affirmative	
5	Snohomish County PUD No. 1	Sam Nietfeld	Negative	
5	South Carolina Electric & Gas Co.	Edward Magic	Abstain	
5	Southern California Edison Company	Denise Yaffe	Negative	
5	Southern Company Generation	William D Shultz	Affirmative	
5	Tacoma Power	Chris Mattson	Affirmative	
5	Tampa Electric Co.	RJames Rocha	Affirmative	
5	Tenaska, Inc.	Scott M. Helyer	Abstain	
5	Tennessee Valley Authority	David Thompson	Affirmative	
5	Tri-State G & T Association, Inc.	Mark Stein	Affirmative	
5	Turlock Irrigation District	Marty Rojas	Abstain	
5	U.S. Army Corps of Engineers	Melissa Kurtz	Affirmative	
5	Westar Energy	Bryan Taggart	Affirmative	
5	Xcel Energy, Inc.	Liam Noailles	Affirmative	
6	AEP Marketing	Edward P. Cox	Affirmative	
6	Ameren Energy Marketing Co.	Jennifer Richardson	Affirmative	
6	APS	Randy A. Young	Affirmative	
6	Associated Electric Cooperative, Inc.	Brian Ackermann	Affirmative	
6	Bonneville Power Administration	Brenda S. Anderson	Affirmative	
6	City of Austin dba Austin Energy	Lisa L Martin	Affirmative	
6	City of Redding	Marvin Briggs	Affirmative	
6	Cleco Power LLC	Robert Hirchak		
6	Consolidated Edison Co. of New York	Nickesha P Carrol	Affirmative	
6	Constellation Energy Commodities Group	David J Carlson	Affirmative	
6	Dominion Resources, Inc.	Louis S. Slade	Abstain	
6	Duke Energy	Greg Cecil	Affirmative	
6	Entergy Services, Inc.	Terri F Benoit	Negative	
6	FirstEnergy Solutions	Kevin Querry	Affirmative	
6	Florida Municipal Power Agency	Richard L. Montgomery	Negative	
6	Florida Municipal Power Pool	Thomas Washburn	Negative	
6	Florida Power & Light Co.	Silvia P. Mitchell	Abstain	
6	Imperial Irrigation District	Cathy Bretz	Abstain	
6	Kansas City Power & Light Co.	Jessica L Klinghoffer	Negative	
6	Lakeland Electric	Paul Shipps	Abstain	
6	Lincoln Electric System	Eric Ruskamp	Affirmative	
6	Los Angeles Department of Water & Power	Brad Packer	Abstain	
6	Manitoba Hydro	Daniel Prowse	Affirmative	
6	MidAmerican Energy Co.	Dennis Kimm	Affirmative	
6	Modesto Irrigation District	James McFall	Abstain	
6	Muscatine Power & Water	John Stolley	Affirmative	
6	New York Power Authority	Saul Rojas	Affirmative	
6	Northern Indiana Public Service Co.	Joseph O'Brien	Affirmative	
6	Omaha Public Power District	David Ried		
6	Orlando Utilities Commission	Claston Augustus Sunanon		
6	PacifiCorp	Kelly Cumiskey	Affirmative	
6	Platte River Power Authority	Carol Ballantine	Affirmative	
6	Portland General Electric Co.	Ty Bettis	Affirmative	
6	PPL EnergyPlus LLC	Elizabeth Davis	Affirmative	
6	PSEG Energy Resources & Trade LLC	Peter Dolan	Affirmative	
6	Sacramento Municipal Utility District	Diane Enderby	Affirmative	
6	Salt River Project	Steven J Hulet	Negative	
6	Santee Cooper	Michael Brown	Abstain	
6	Seattle City Light	Dennis Sismaet	Negative	



6	Seminole Electric Cooperative, Inc.	Trudy S. Novak	Affirmative	
6	Snohomish County PUD No. 1	Kenn Backholm	Negative	
6	Southern California Edison Company	Lujuanna Medina	Negative	
6	Southern Company Generation and Energy Marketing	John J. Ciza	Affirmative	
6	Tacoma Public Utilities	Michael C Hill	Affirmative	
6	Tampa Electric Co.	Benjamin F Smith II		
6	Tenaska Power Services Co.	John D Varnell		
6	Tennessee Valley Authority	Marjorie S. Parsons	Affirmative	
6	Turlock Irrigation District	Amy Petersen	Abstain	
6	Westar Energy	Grant L Wilkerson	Affirmative	
6	Western Area Power Administration - UGP Marketing	Peter H Kinney	Affirmative	
6	Xcel Energy, Inc.	David F Lemmons	Affirmative	
8		Edward C Stein		
8		Roger C Zaklukiewicz	Affirmative	
8	JDRJC Associates	Jim Cyrulewski	Affirmative	
8	Massachusetts Attorney General	Frederick R Plett	Affirmative	
8	Power Energy Group LLC	Peggy Abbadini		
8	Utility Services, Inc.	Brian Evans-Mongeon	Negative	
8	Utility System Effeciencies, Inc. (USE)	Robert L Dintelman	Affirmative	
8	Volkmann Consulting, Inc.	Terry Volkmann	Affirmative	
10	Midwest Reliability Organization	William S Smith	Affirmative	
10	New York State Reliability Council	Alan Adamson	Negative	
10	Northeast Power Coordinating Council	Guy V. Zito	Negative	
10	ReliabilityFirst Corporation	Anthony E Jablonski	Affirmative	
10	Southwest Power Pool RE	Emily Pennel	Affirmative	
10	Texas Reliability Entity, Inc.	Donald G Jones	Affirmative	

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Individual or group. (39 Responses)
Name (22 Responses)
Organization (22 Responses)
Group Name (17 Responses)
Lead Contact (17 Responses)
IF YOU WISH TO EXPRESS SUPPORT FOR ANOTHER ENTITY'S COMMENTS WITHOUT ENTERING ANY ADDITIONAL COMMENTS, YOU MAY DO SO HERE. (5 Responses)
Comments (39 Responses)
Question 1 (33 Responses)
Question 1 Comments (34 Responses)
Question 2 (33 Responses)
Question 2 Comments (34 Responses)

Individual
Oliver Burke
Entergy Services, Inc. (Transmission)
No
While we agree that protection system failures should be studied in TPL assessments, we have numerous concerns about the implementation difficulties of such studies. In many instances, breaker failure events were studied as a proxy for protection system failures because breaker failure events were not overly burdensome to simulate in TPL assessments such that assessments could be completed in a timely manner. A breaker failure event was independent of fault location, what types of redundancies were present, and the complexities associated with protection systems. The currently proposed interpretation is not a trivial expansion of scope. The technical and process challenges in completing such studies annually is overly burdensome and may result in overall study quality degradation as entities struggle to complete the analyses every year, especially in regions where rapid transmission expansion is occurring changing system characteristics substantially each year. Simply adding engineering resources is not a viable option due to extremely limited resource pools with the qualifications to perform such work and no end in sight to the shortage. The current definition of a protection system is too broad for application to TPL standards. DC control circuitry is not adequately defined. Is the ground grid part of DC circuitry? What about cable troughs? Failure modes of different protection system components are likewise inadequately defined. For example, what failure mode in a voltage sensing device is required to be studied? Loss of potential is usually a single phase loss of potential. Should planners simulate the loss of all three phases or just one, or all possible scenarios? Loss of potential is one mode but others could include introduction of harmonic content or noise into protective relays – how would relay response be predicted? In some cases, failures can result in inappropriate operation; others can result in failure to operate. Would all such permutations need to be assessed to have a valid assessment? How are the protection system engineers and planning engineers to develop valid assumptions such that TPL assessments are valid? This issue was explored in the TPL-001-2 ATFNSTD process and the standard proposes limiting failure analyses to specific protective relay types to reduce complexity and uncertainty in assumptions and analyses. The specific types of relays listed, in the opinion of the ATFNSDT, cover all historical failures which have led to BES events as well as every relay type that performs significant BES protection functions. While some obscure failure in an actual DC circuit wire, terminal block, CT, PT, etc. could occur, would those events not be replicated adequately by simulating a limited set of relay failures such as that proposed by the ATFNSDT? Mitigation plans could certainly focus on developing complete redundancy (not just the relay) for each instance where the relay failure (and potentially related protection system components) could result in BES reliability issues. The other simple but costly potential approach for the industry is to simply make all protection systems redundant. This poses similar challenges due to the inadequate protection system definitions. How would a redundant ground grid be installed? Is a terminal block part of the DC control circuitry? What about the primary winding of a PT or CT – would they need redundancy? What about a multiplexer in a communications circuit? Additionally, the attempt to add redundancy poses additional BES risk. Since protection systems cannot be modified with the facilities they protect in service in many cases, BES outages will have to occur. The proposed TPL has a 7 year implementation plan. Is that long enough to do the massive overhaul this interpretation may result in? What will be the operational risk we have to take to make upgrades? The industry could be forced to choose between violating operating standards and violating planning standards. We appreciate the efforts of the team on these extremely complex industry issues and we realize that perfection is not going to occur. However, we are convinced that limiting the complexity associated with these studies will provide for better overall study quality. The approach contemplated in the proposed TPL substantially raises the bar where protection systems are concerned and will result in more thorough assessments without introducing unmanageable complexity. We support that approach but cannot support the approach contemplated by this interpretation.
Yes
Group

TVA Transmission Reliability Engineering and Controls
Tim Ponseti, VP
Yes
While we agree with the response, we prefer the approach taken in the proposed standard TPL-001-2 which specifies failure of certain types of relays to test.
Yes
Group
SERC EC Planning Standards Subcommittee
Jim Kelley
Yes
While we agree with the response we are concerned with the technical feasibility of evaluating all possible protection system failures. We prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Yes
Group
Northeast Power Coordinating Council
Guy Zito
Yes
No
The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and second paragraphs together, it appears that failure of the battery system is a required aspect of testing. Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The Drafting Team should explicitly state that “protection system” (lower case) referred to in Footnote (e) does not include station batteries (unlike “Protection System” in NERC Glossary of Terms). Additionally, because TPL-003 and TPL-004 refer to “protection system” in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 are likely to be superseded by TPL-001-2 after regulatory approvals. In the development of TPL-001-2, the reference to “protection system” was clarified to be “relay” with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that “protection system” (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13.
Individual
Thad Ness
American Electric Power
Yes
Yes
Group
NERC System Protection and Control Subcommittee (SPCS)
Bill Miller
Yes

Yes
The SPCS appreciates the consideration of its previous comment. The IDT revision to the interpretation addresses the SPCS concern noted during the first posting.
Individual
Nazra Gladu
Manitoba Hydro
Yes
No comment.
Yes
We generally agree with the respose. However, we suggest that the wording provided by Duke Energy should be adopted to add clarity: 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.
Individual
Andrew Z. Pusztai
American Transmission Company, LLC
Yes
Yes
Individual
Carter B. Edge
SERC Reliability Corporation
Yes
While I agree with the response I am concerned with the technical feasibility of evaluating all possible protection system failures. I prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Individual
Michael Falvo
Independent Electricity System Operator
Yes
Yes
Individual
Alice Ireland
Xcel Energy
Agree
Duke Energy
Group
Duke Energy
Greg Rowland
Yes
While Duke Energy is voting affirmative on this ballot, we note that the interpretation appears to expand upon historical industry practices. Some entities will need to expand their annual assessment to include more detailed

evaluation and complex analysis. As a result, mitigation plans may need to be developed. Therefore, an implementation plan should be developed to accompany this interpretation. We suggest an effective date of the first day of the first calendar quarter eighteen months after applicable regulatory approval.
Yes
Also, while Duke Energy agrees with Response 2, we believe wording changes are needed for clarity in the first paragraph to align it with the third paragraph. Suggest rewording : 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.
Group
Bonneville Power Administration
Chris Higgins
Yes
Yes
Group
Florida Municipal Power Agency
Frank Gaffney
Yes, Yes
No
FMPA does not agree with the conclusion of the last paragraph that: "the two standards do not prescribe the specific protection system components that must be addressed". The operative word of footnote e is "any" as in: "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" (emphasis added). In addition, the use of the phrase "such as" by definition is an introduction to a list that is not exhaustive. Hence, it is beyond argument footnote e includes consideration of delayed clearing due to failure of relays, circuit breakers, current transformers, and at least one additional protection system component. Common use of the term "protection system" includes the NERC glossary definition plus breakers (e.g., Wikipedia at: http://en.wikipedia.org/wiki/Power_system_protection). Consequently, FMPA believes that the term "protection system" as used in footnote e is more inclusive than the definition of Protection System in the NERC glossary (i.e., to include breakers). As such, footnote e is prescriptive of the minimum set of protection system components that must be considered: the components that comprise the glossary definition of Protection System, plus circuit breakers.
Group
Hydro One Networks Inc.
Sasa Maljukan
Yes
Yes
Individual
Kathleen Goodman
ISO New England, Inc
Yes
No
ISO New England disagrees with the wording for response 2. The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a

significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and second paragraph's together, it appears that failure of the battery system is a required aspect of testing. Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The cost of retrofitting redundant battery protection systems would clearly outweigh any reliability benefit possibly gained.
Group
Salt River Project
Bob Steiger
No
As written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, "….. The ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP must "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. We suggest that 1) the last sentence be changed to read, "The ordered reading of the text in Table 1 in either standard explains that THE MORE SEVERE CONTINGENCIES DUE TO delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance" and 2) the sentence "the Planning Authority and Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation and make available the explanation of why the remaining simulations would produce less severe system results as supporting information" be added to end of Response 1.
Yes
Individual
Milorad Papic
Idaho Power Company
Yes
However, we do support a corrected response 1 made by Duke Energy.
Yes
However, we do support a corrected response 2 made by Duke Energy.
Individual
Mark Westendorf
Midwest Independent Transmission System Operator, Inc.
Yes
Yes
Group
Southwest Power Pool Realibility Standards development Team
Jonathan Hayes

Yes
Yes
We would suggest that the drafting team take a look at the effort surrounding FERC Order No. 754 which is clearly laid out for what to look at and how to look at single point of failure.
Group
Exelon
Chris Scanlon
Yes
Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Yes
Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Group
Western Electricity Coordinating Council
Steve Rueckert
No
It appears that the revised interpretation removes the discretion for the Planning Authority and Transmission Planner to use engineering judgement and system knowledge as rational for the contingencies selected in determining the "more severe system results" and now instead reqires studies of bothstuck breakers and protection system failure to determine the more severe system results or impacts. Was that the intent of the changes?
Yes
Group
Puget Sound Energy
Sunitha Kothapalli
No
The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
No
The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
Individual
Kenn Backholm
Public Utility District No. 1 of Snohomish County
Agree
Public Utility District No. 1 of Snohomish County supports the comments of Salt River Project.
Group
pacificorp
ryan millard
Yes

Yes
Group
ACES Standards Collaborators
Ben Engelby
No
(1) We appreciate the drafting team's response to our previous comment and thank them for addressing the term "evaluated" by adding the parenthetical. However, we do not think inclusion of the parenthetical clarifies what is meant by evaluation. We are concerned that auditors will read "evaluate" to mean that a simulation must be performed for all single line-to-ground (SLG) faults. For example, the interpretation states that evaluation of a SLG and three-phase fault "with delayed clearing is required and further defined by footnote (e)" and the statement is not qualified by indicating only those faults with delayed clearing that produce the more severe results. Because footnote (e) simply explains what is meant by delayed clearing and does not qualify it is only those delayed clearing faults that produce the more severe system results or impacts, this interpretation may cause an auditor to expect that simulations are required for all delayed clearing faults. Furthermore, a current simulation is not even required for those delayed clearing faults with more severe system results or impacts but rather "a current or past study and/or system simulation." (2) We continue to ask the team to state explicitly that the PC or TP would only have to perform simulations if the contingencies are expected to produce "more severe system results or impacts," otherwise, simulations are not required. We still believe this clarification is needed to allow PC/TP to consider actual system experience, previous studies, or steady state screening studies for the determination to include stuck breakers or protection system failures. (3) We think the response to Q1 is overly broad, redundant, and is still not consistent with the requirements of TPL-003 and TPL-004. We suggest revising the interpretation to make it more succinct and to answer the question directly. We suggest the following as the response to Q1 which addresses our issues in points (1) and (2). "The applicable entity must consider all Category C contingenices per R1.5 in its assessment. However, it is not required to evaluate or perform simulations for all Category C contingencies. Rather, it is only required to perform and evaluate 'only those Category C contingencies that would produce the more severe system results or impacts.' This is further supported by R1.3.1 that states the 'rationale for the contingencies selected for evaluation shall be available for supporting information' and an explanation of why the remaining simulations would produced less severe system results shall be available as supporting information." (4) The interpretation causes a lot of confusion because of the inconsistent use of "evaluation" in the interpretation as compared to in the standard. The standard appears to consider an evaluation to have a more detailed and specific meaning in R1.3.1 that would include simulation. Whereas the interpretation appears to use "evaluate" more consistently with "consider" in R1.5. Use of "evaluation" in the interpretation appears to be a high level review through engineering judgment. The inconsistent use of the language continues cause us confusion over exactly what is required. We suggest consistent use of these terms so they are aligned with the interpretation and the applicable requirements.
No
(1) Response 2 departs from the plain language of the requirements and actually expands the application of both standards which is not consistent with the standards process. According to the Standards Process Manual, "a valid interpretation response provides additional clarity about one or more requirements, but does not expand on any requirement." The interpretation clearly states in response 2 that 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." This language is contradictory with the earlier statement that the PA and TP are permitted to use engineering judgment in selecting Category C and D contingencies. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for faults with delayed clearing. This is only required if they would produce the "more severe system results or impacts." The interpretation that the drafting team is proposing expands on the requirements and should not instruct the PC/TP to perform simulations beyond the existing language in the requirements. The manner in which the PC/TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. (2) The interpretation states that the Planning Authority and Transmission Planner must "consider 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. We have concerns regarding how the PC/TP must document these "considerations" and whether the PC/TP must maintain paperwork when they decide that the delayed clearing condition would not produce a more severe system impact. We believe that the interpretation is requiring additional actions outside the requirements of the standard. (3) The interpretation should clearly state that there is no clear bright line about what constitutes "more severe" results. Thus, applicable entities may use engineering judgment in determining what more severe system results are. There is no clear bright line threshold for when a PC/TP must study and simulate stuck breakers or protection system failures. There are adverse impacts on the industry without clear direction, and the Interpretation Drafting Team may not be able to provide that clarity within the bounds of the Standards Process Manual. For example, if a protection system failure would increase clearing times and would produce "more severe system results and impacts," it would be required to be studied and simulated. However, if

it did not produce the "more severe system results and impacts," it would not be required to be studied and simulated. There is no clarity on what makes an impact more severe and therefore, the interpretation is requiring the PC/TP to study and simulate all contingencies because not doing so may result in a finding of noncompliance, even though some of those studies would not meet the threshold of "more severe." (4) The interpretation team should consider adding flexibility to considerations that a PC or TP could use to determine the need to simulate single points of failure. As example, actual system experience, past studies, or steady state screening studies could be relied upon. For instance, if there are not problems in the steady state and the contingency is electrically far from any generators, system experience or past studies could prove that transient or dynamic stability problems are not likely to occur. (5) We think both parts of the interpretation would benefit from clarifying what is meant by consideration of contingencies in TPL-003-0a R1.5 and TPL-004-0 R1.4 and evaluation in R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider Category C and D contingencies respectively. However, both standards say that a study or simulation is required only for the contingencies "that would produce the more severe system results or impacts" R1.3.1. We would like the drafting team to further clarify this issue. (6) We found a few typos, confusing clauses, and sentences that needed grammatical changes in Q2. In particular, the second sentence in Response 2 in confusing. We believe the sentence would be clearer if stated, "The PC and TP is permitted engineering judgment in its [selection of] Category C and D contingencies for protection system component failures…" (7) Second, the clause in the last sentence after (R1.3.1) "and this would include addressing all protection systems affected by the selected component" should be struck. It's a run-on sentence and adds more confusion than clarity. (8) Finally, we suggest striking everything in response 2 after the first paragraph because it only adds confusion. The first paragraph is clear that the TP and PC can apply engineering judgment in selecting Category C and D contingencies. What else needs to be said? (9) Thank you for the opportunity to comment.
Individual
Donald Weaver
New Brunswick System Operator
Agree
NPCC Reliability Standards Committee
Group
seattle City Light
paul haase
Agree
Salt River Project (SRP)
Individual
Jason Marshall
New England States Committee on Electricity (NESCOE)
No
The New England States Committee on Electricity (NESCOE) appreciates this opportunity to comment on a narrow issue raised by ISO New England (ISO-NE) regarding the intended meaning of "protection system component failure" in Response 2. In comments on Draft One of the proposed interpretation, ISO-NE requested clarification on whether a battery system is considered a component of a protection system for purposes of the standard. ISO-NE stated that the answer to this question could have significant implications for the outcome of stability studies, citing as an example that substations may have full redundancy protection in all aspects except for the battery system. NESCOE understands that ISO-NE will provide comments on this Draft 2 version noting that modeling non-redundant DC supply or battery failure was not intended in the drafting of the interpretation and that the cost of requiring redundant battery protection systems in all cases will be clearly outweighed by any reliability benefit gained. NESCOE shares ISO-NE's concern that the latest version of Response 2 does not resolve the ambiguity related to modeling protection system failures and whether battery systems are distinguished from other components. Specifically, the language in paragraph one provides that the planning authority and transmission planner may exercise "engineering judgment" in selecting protection system component failures for study. However, the subsequent paragraph appears to require study of the most severe event, which absent clarification could be read to mandate the modeling of battery failure. New England consumers should not be exposed to cost increases due to a lack of clarity. Nor, as in all cases, should consumers bear costs that are not justified by measurable reliability benefits. NESCOE requests that the IDT squarely address and resolve this ambiguity in a subsequent version of the proposed interpretation. Thank you for your consideration of these comments.
Individual
David Jendras
Ameren
Agree

SERC PSS
Individual
Steven Mavis
Southern California Edison Company
No
The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgement to choose between the scenarios when assessing system performance for Category C and D contingencies.
No
same as for question 1
Individual
Chifong Thomas
BrightSource Energy
No
While BSE does not disagree with the proposed Response 1 to Question 1, however, as written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, "….. The ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that only the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with rationale and explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation, and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. BSE suggests that 1) the last sentence be changed to read, "The ordered reading of the text in Table 1 in either standard explains that the more severe contingencies due to delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine their impact on BES performance" and 2) the sentence, "the Planning Authority or Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation, and make available the explanation of why the remaining simulations would produce less severe system results as supporting information", be added to end of Response 1.
Yes
Individual
Darryl Curtis
Oncor Electric Delivery Conpany LLC
No
Oncor takes the position that the interpretation request by the System Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0 in light of other NERC initiatives. Many of the concerns expressed (i.e. single point of failure) are already being addressed under the NERC Order 754 data request. Likewise the development of TPL-001-2 under Project 2006-02 Assess Transmission Future Needs and Develop Transmission Plans intends to combine six (6) Transmission Planning standards under a single standard, resulting in the retirement of TPL-003-0a and TPL-004-0.
No
Again, Oncor takes the position that the interpretation request by the System Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0. Oncor does agrees with the statement in Response 2, "The Planning Authority and Transmission Planner is permitted engineering judgment in its Category C or D contingencies to select the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component." However, Oncor takes the position,

that current NERC initiatives including NERC Order 754 Data request and current efforts under Project 2006-02 will ultimately address all concerns related to contingency selection validation.
Group
Iberdrola USA
John Allen
Yes
No
Since TPL-003 and TPL-004 refer to “protection system” in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 have been superceded by TPL-001-2, approved by the NERC Board of Trustees in August 2011. In the development of TPL-001-2, the reference to “protection system” was clarified to be “relay” with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that “protection system” (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13.
Individual
Cheryl Moseley
Electric Reliability Council of Texas, Inc.
Yes
Yes
Individual
Teresa Czyz
GTC
Yes
Yes
Individual
Michael Moltane
ITC
Yes
No
We have concerns regarding the use of terms like "engineering judgement" in requirments or interpretations. Such terms are vague and will lead to coninued uncertainty as to whether an auditor will find an entity in compliance (i.e,, will the "engineering judgement" applied by an entity be acceptable to an auditor?
Individual
Daniela Hammons
CenterPoint Energy Houston Electric, LLC
No
CenterPoint Energy agrees that the situation that produces the more severe system impacts due to delayed clearing conditions should be considered, regardless of whether the condition resulted from a stuck breaker or protection system failure; however, CenterPoint Energy believes that the interpretation appears to expand upon historical industry practices. Some entities may need to expand their annual assessments to include more detailed evaluations and analyses, which will take a finite period of time. CenterPoint Energy would vote "affirmative" if an implementation period were developed to accompany this interpretation.
Yes
Individual
Richard Vine

California Independent System Operator
No
The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgment to choose between the scenarios when assessing system performance for Category C and D contingencies.
No

Consideration of Comments

Project 2012-INT-02 Interpretation of Interpretation of TPL-003-0a and TPL-004-0 for SPCS

The Project 2012-INT-02 Drafting Team thanks all commenters who submitted comments on the proposed interpretations of TPL-003-0a (R1.3.1, R1.3.10, and R1.5) and TPL-004-0 (R1.3.1, R1.3.7, and R1.4), for System Protection and Control Subcommittee. The interpretations were posted for a 45-day public comment period from October 22, 2012 through December 5, 2012. Stakeholders were asked to provide feedback on the interpretations and associated documents through a special electronic comment form. There were 39 sets of comments, including comments from approximately 103 different people from approximately 69 companies representing 8 of the 10 Industry Segments as shown in the table on the following pages.

Summary Consideration

In the previous initial posting and first formal comment period, the interpretation received supportive comments overall. The interpretation drafting team ("IDT") made minor non-substantive clarifications to the interpretation based on these comments. The IDT believes it has addressed stakeholder comments in such a way that the interpretation clarity is improved and meets the expectations expressed in comments for reliability and industry approval.

Clarifications Made to Response 1

The IDT replaced the word "consider" with "evaluate" to better align with its use in the standards. There were concerns that entities should be allowed to exercise their professional "engineering judgment" to choose between the scenarios when assessing system performance for Category C and D contingencies and that all scenarios should not require simulation. The IDT clarified that "engineering judgment" is permitted and clarified that in draft 3. Minority comments suggested a need for an implementation plan to the extent the Planning Authority and Transmission Planner might have only been studying either stuck breaker or protection system failure. Based on IDT experience, planning practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering its selection of what produces the "more severe system results or impacts;" therefore, the IDT notes an implementation plan is not needed.

Clarifications Made to Response 2

The IDT also made only minor clarifications to response two. The IDT rephrased the second sentence and added a reference to the requirement being addressed in the two standards for clarity. The clarifying revisions were based on a suggestion regarding minor wording changes to the 2nd sentence of the response which some in industry stakeholders found confusing and awkwardly worded. The sentence was a "run-on" sentence and is now two separate sentences in the draft 3 interpretation.

Additional Information

All comments submitted may be reviewed in their original format on the interpretations' project page.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Mark Lauby, at 404-446-2560 or at mark.lauby@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

Index to Questions, Comments, and Responses

[1] The appeals process is in the Standard Processes Manual: http://www.nerc.com/files/Appendix_3A_StandardsProcessesManual_20120131.pdf

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Jim Kelley	SERC EC Planning Standards Subcommittee	X				X					

	Additional Member	Additional Organization	Region	Segment Selection
1.	John	Sullivan	SERC	1
2.	Charles	Long	SERC	1
3.	Edin	Habibovich	SERC	1
4.	James	Manning	SERC	1
5.	Philip	Kleckley	SERC	1
6.	Bob	Jones	SERC	1
7.	Darrin	Church	SERC	1
8.	Pat	Huntley	SERC	10

Group/Individual		Commenter	Organization	1	2	3	4	5	6	7	8	9	10
2.	Group	Guy Zito	Northeast Power Coordinating Council										X

	Additional Member	Additional Organization	Region	Segment Selection

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

1.	Alan Adamson	New York State Reliability Council, LLC	NPCC	10
2.	Carmen Agavriloai	Independent Electricity System Operator	NPCC	2
3.	Greg Campoli	New York Independent System Operator	NPCC	2
4.	Chris de Graffenried	Consolidated Edison Co. of New York, Inc.	NPCC	1
5.	Gerry Dunbar	Northeast Power Coordinating Council	NPCC	10
6.	Sylvain Clermont	Hydro-Quebec TransEnergie	NPCC	1
7.	Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3
8.	Kathleen Goodman	ISO - New England	NPCC	2
9.	Michael Jones	National Grid	NPCC	1
10.	David Kiguel	Hydro One Networks Inc.	NPCC	1
11.	Christina Koncz	PSEG Power LLC	NPCC	5
12.	Randy MacDonald	New Brunswick Power Transmission	NPCC	9
13.	Bruce Metruck	New York Power Authority	NPCC	6
14.	Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5
15.	Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10
16.	Robert Pellegrini	The United Illuminating Company	NPCC	1
17.	Si-Truc Phan	Hydro-Quebec TransEnergie	NPCC	1
18.	David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5
19.	Brian Robinson	Utility Services	NPCC	8
20.	Brian Shanahan	National Grid	NPCC	1
21.	Wayne Sipperly	New York Power Authority	NPCC	5
22.	Donald Weaver	New Brunswick System Operator	NPCC	2
23.	Ben Wu	Orange and Rockland Utilities	NPCC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
3.	Group	Greg Rowland	Duke Energy	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection
1.	Doug Hils	Duke Energy	RFC	1
2.	Lee Schuster	Duke Energy	FRCC	3
3.	Dale Goodwine	Duke Energy	SERC	5
4.	Greg Cecil	Duke Energy	RFC	6

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
4.	Group	Chris Higgins	Bonneville Power Administration	X		X		X	X				

	Additional Member	Additional Organization	Region	Segment Selection

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

1. Berhanu Tesema	Transmission Planning	WECC	1
2. Deanna Phillips	FERC Compliance	WECC	1, 3, 5, 6

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
5.	Group	Frank Gaffney	Florida Municipal Power Agency	X		X	X	X	X				

Additional Member	Additional Organization	Region	Segment Selection
1. Timothy Beyrle	City of New Smyrna Beach	FRCC	4
2. Jim Howard	Lakeland Electric	FRCC	3
3. Greg Woessner	Kissimmee Utility Authority	FRCC	3
4. Lynne Mila	City of Clewiston	FRCC	3
5. Cairo Vanegas	Fort Pierce Utility Authority	FRCC	4
6. Randy Hahn	Ocala Utility Service	FRCC	3

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
6.	Group	Sasa Maljukan	Hydro One Networks Inc.	X									

Additional Member	Additional Organization	Region	Segment Selection
1. David Kiguel	Hydro One Networks Inc.	NPCC	1
2. Hamid HAMADANIZADEH	Hydro One Networks Inc.	NPCC	1
3. Ibrahim El-Nahas	Hydro One Networks Inc.	NPCC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
7.	Group	Chris Scanlon	Exelon	X		X							

Additional Member	Additional Organization	Region	Segment Selection
1. Baltimore Gas and Electric		RFC	1
2. ComEd		RFC	1
3. PECO		RFC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
8.	Group	Sunitha Kothapalli	Puget Sound Energy	X		X							

Additional Member	Additional Organization	Region	Segment Selection
1. Zachary Sanford	Puget Sound Energy	WECC	1, 3
2. Kebede Jimma	Puget Sound Energy	WECC	1, 3
3. Joe Seabrook	Puget Sound Energy	WECC	1, 3
4. Ron Forster	Puget Sound Energy	WECC	1, 3
5. Eleanor Ewry	Puget Sound Energy	WECC	1, 3

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
9.	Group	Ben Engelby	ACES Standards Collaborators						X				

Additional Member	Additional Organization	Region	Segment Selection
1. Michael Brytowski	Great River Energy	MRO	1, 3, 5, 6

Group/Individual	Commenter	Organization	Registered Ballot Body Segment									
			1	2	3	4	5	6	7	8	9	10

2. John Shaver	Arizona Electric Power Cooperative/Southwest Transmission Cooperative, Inc.	WECC	1, 4, 5
3. Amber Anderson	East Kentucky Power Cooperative	SERC	3, 5, 6, 1
4. Shari Heino	Brazos Electric Power Cooperative, Inc.	ERCOT	1, 5
5. Bob Solomon	Hoosier Energy Rural Electric Cooperative, Inc.	RFC	1
6. Megan Wagner	Sunflower Electric Power Corporation	SPP	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
10.	Group	paul haase	seattle City Light	X		X	X	X	X				

Additional Member	Additional Organization	Region	Segment Selection
1. pawel krupa	seattle city light	WECC	1
2. dana wheelock	seattle city light	WECC	3
3. hao li	seattle city light	WECC	4
4. mike haynes	seattle city light	WECC	5
5. dennis sismaet	seattle city light	WECC	6

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
11.	Group	John Allen	Iberdrola USA	X									

Additional Member	Additional Organization	Region	Segment Selection
1. Joseph Turano	Central Maine Power	NPCC	1
2. Raymond Kinney	New York State Electric & Gas	NPCC	1

	Group/Individual	Commenter	Organization	1	2	3	4	5	6	7	8	9	10
12.	Individual	Tim Ponseti, VP	TVA Transmission Reliability Engineering and Controls	X								X	
13.	Individual	Bill Miller	NERC System Protection and Control Subcommittee (SPCS)	X			X	X				X	X
14.	Individual	Bob Steiger	Salt River Project	X		X		X	X				
15.	Individual	Jonathan Hayes	Southwest Power Pool Realibility Standards development Team		X								
16.	Individual	Steve Rueckert	Western Electricity Coordinating Council										X
17.	Individual	ryan millard	pacificorp	X		X		X	X				
18.	Individual	Oliver Burke	Entergy Services, Inc. (Transmission)	X									
19.	Individual	Thad Ness	American Electric Power	X		X		X	X				
20.	Individual	Nazra Gladu	Manitoba Hydro	X		X		X	X				
21.	Individual	Andrew Z. Pusztai	American Transmission Company, LLC	X									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
22.	Individual	Carter B. Edge	SERC Reliability Corporation										X
23.	Individual	Michael Falvo	Independent Electricity System Operator		X								
24.	Individual	Alice Ireland	Xcel Energy	X		X		X	X				
25.	Individual	Kathleen Goodman	ISO New England, Inc		X								
26.	Individual	Milorad Papic	Idaho Power Company	X		X							
27.	Individual	Mark Westendorf	Midwest Independent Transmission System Operator, Inc.		X								
28.	Individual	Kenn Backholm	Public Utility District No. 1 of Snohomish County	X		X	X	X	X			X	
29.	Individual	Donald Weaver	New Brunswick System Operator		X								
30.	Individual	Jason Marshall	New England States Committee on Electricity (NESCOE)										
31.	Individual	David Jendras	Ameren	X		X		X	X				
32.	Individual	Steven Mavis	Southern California Edison Company	X									
33.	Individual	Chifong Thomas	BrightSource Energy					X					
34.	Individual	Darryl Curtis	Oncor Electric Delivery Conpany LLC	X									
35.	Individual	Cheryl Moseley	Electric Reliability Council of Texas, Inc.		X								
36.	Individual	Teresa Czyz	GTC	X									
37.	Individual	Michael Moltane	ITC	X									
38.	Individual	Daniela Hammons	CenterPoint Energy Houston Electric, LLC	X									
39.	Individual	Richard Vine	California Independent System Operator		X								

If you support the comments submitted by another entity and would like to indicate you agree with their comments, please select "agree" below and enter the entity's name in the comment section (please provide the name of the organization, trade association, group, or committee, rather than the name of the individual submitter).

Organization	Supporting Comments of “Entity Name”
Xcel Energy	Duke Energy
New Brunswick System Operator	NPCC Reliability Standards Committee
Public Utility District No. 1 of Snohomish County	Public Utility District No. 1 of Snohomish County supports the comments of Salt River Project.
seattle City Light	Salt River Project (SRP)
Ameren	SERC PSS

1. **Do you agree with the revised Response 1 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.**

Summary Consideration:

The majority of industry stakeholder comments support the interpretation drafting team's ("IDT") draft 2 version of the interpretation to question 1.

Based on the comments received, the IDT made clarifications to the interpretation in regard to the use of the word "evaluate" to better align with its use in the standards. Some commenters raised a concern that the response implied that all possible breaker failures and protection system failures require "evaluation" or simulation. This is not the IDT's intent and this has been clarified in the response to better reflect the original intent that each contingency condition (i.e., stuck breaker or protection system failure) must be "considered," however, the selected contingencies evaluated are those deemed to produce the more severe results or impacts (i.e., TPL-003-0a, R1.3.1 and TPL-004-0, R1.3.1).

Some industry comments expressed that the Planning Authority and Transmission Planner should be allowed to exercise professional engineering judgment to choose between the scenarios when assessing system performance for Category C and D contingencies, and that all scenarios should not require simulation. The IDT clarifies that "engineering judgment" is permitted and that clarifications made in the draft 3 version clarify the IDT's original intent.

A minority opinion was raised by some commenters suggesting a need for an implementation plan to the extent the Planning Authority and Transmission Planner might have only been studying either stuck breaker or protection system failure for TPL-003-0a, Category C, SLG Fault, with Delayed Clearing, Elements C6, C7, C8, and C9 and TPL-004-0, Category D, 3ø Fault, with Delayed Clearing, Elements D1, D2, D3, and D4. Based on the IDT's experience, entities' historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering the selection of what produces the "more severe system results or impacts;" therefore, the IDT notes an implementation plan is not needed.

Organization	Yes or No	Question 1 Comment
ACES Standards Collaborators	No	(1) We appreciate the drafting team's response to our previous comment and thank them for addressing the term "evaluated" by adding the parenthetical. However,

		we do not think inclusion of the parenthetical clarifies what is meant by evaluation. We are concerned that auditors will read “evaluate” to mean that a simulation must be performed for all single line-to-ground (SLG) faults. For example, the interpretation states that evaluation of a SLG and three-phase fault “with delayed clearing is required and further defined by footnote (e)” and the statement is not qualified by indicating only those faults with delayed clearing that produce the more severe results. Because footnote (e) simply explains what is meant by delayed clearing and does not qualify it is only those delayed clearing faults that produce the more severe system results or impacts, this interpretation may cause an auditor to expect that simulations are required for all delayed clearing faults. Furthermore, a current simulation is not even required for those delayed clearing faults with more severe system results or impacts but rather “a current or past study and/or system simulation.” **Response: The IDT agrees with the concerns raised by the commenter regarding specific contingencies that must be evaluated (simulated) by the Planning Authority and Transmission Planner. The interpretation has been clarified in the use of the word “evaluate” to better align with its use in the standards. Change made.** (2) We continue to ask the team to state explicitly that the PC or TP would only have to perform simulations if the contingencies are expected to produce “more severe system results or impacts,” otherwise, simulations are not required. We still believe this clarification is needed to allow PC/TP to consider actual system experience, previous studies, or steady state screening studies for the determination to include stuck breakers or protection system failures. **Response: The IDT believes that Requirements R1.3 and R1.3.1 (both standards) are clear on this matter. The interpretation has been clarified in the use of the word “evaluate” to better align with its use in the standards. Change made.** (3) We think the response to Q1 is overly broad, redundant, and is still not consistent with the requirements of TPL-003 and TPL-004. We suggest revising the interpretation to make it more succinct and to answer the question directly. We suggest the following as the response to Q1 which addresses our issues in points (1)

		and (2). “The applicable entity must consider all Category C contingenices per R1.5 in its assessment. However, it is not required to evaluate or perform simulations for all Category C contingencies. Rather, it is only required to perform and evaluate ‘only those Category C contingencies that would produce the more severe system results or impacts.’ This is further supported by R1.3.1 that states the ‘rationale for the contingencies selected for evaluation shall be available for supporting information’ and an explanation of why the remaining simulations would produced less severe system results shall be available as supporting information.” **Response: The IDT believes the interpretation response addresses the chief question asked in the interpretation – “does an entity have the option of evaluating the effects of either a stuck breaker or protection system failure contingency.” No change made.** (4) The interpretation causes a lot of confusion because of the inconsistent use of “evaluation” in the interpretation as compared to in the standard. The standard appears to consider an evaluation to have a more detailed and specific meaning in R1.3.1 that would include simulation. Whereas the interpretation appears to use “evaluate” more consistently with “consider” in R1.5. Use of “evaluation” in the interpretation appears to be a high level review through engineering judgment. The inconsistent use of the language continues cause us confusion over exactly what is required. We suggest consistent use of these terms so they are aligned with the interpretation and the applicable requirements. **Response: The IDT has clarified the interpretation to address the commenter’s concerns. The interpretation has been clarified in the use of the word “evaluate” to better align with its use in the standards. Change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Salt River Project	No	As written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, “..... The ordered reading of the text in

		Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP must "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. We suggest that 1) the last sentence be changed to read, "The ordered reading of the text in Table 1 in either standard explains that THE MORE SEVERE CONTINGENCIES DUE TO delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance" and 2) the sentence "the Planning Authority and Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation and make available the explanation of why the remaining

		simulations would produce less severe system results as supporting information" be added to end of Response 1.
Response: The IDT thanks you for your comment and suggestion, although not used, the IDT concurs with yours and other stakeholder concerns on what must be "evaluated." The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.		
CenterPoint Energy Houston Electric, LLC	No	CenterPoint Energy agrees that the situation that produces the more severe system impacts due to delayed clearing conditions should be considered, regardless of whether the condition resulted from a stuck breaker or protection system failure; however, CenterPoint Energy believes that the interpretation appears to expand upon historical industry practices. Some entities may need to expand their annual assessments to include more detailed evaluations and analyses, which will take a finite period of time. CenterPoint Energy would vote "affirmative" if an implementation period were developed to accompany this interpretation.
Response: The IDT thanks you for your comment. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. The concern about the consideration of whether both are considered was raised at the October 24-25, 2011 technical conference at FERC that led to this interpretation request. Requirement R1.3.1, the same in both standards, describes what an entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Western Electricity Coordinating Council	No	It appears that the revised interpretation removes the discretion for the Planning Authority and Transmission Planner to use engineering judgement and system knowledge as rational for the contingencies selected in determining the "more severe system results" and now instead reqires studies of both stuck breakers and protection system failure to determine the more severe system results or impacts. Was that the intent of the changes?
Response: The IDT thanks you for your comment and in regard to the concern that the interpretation "removes discretion" for selecting the contingencies evaluated by the entity, the IDT has clarified that "engineering judgment" is permitted in selecting the		

contingencies for evaluation. Change made.		
Oncor Electric Delivery Company LLC	No	Oncor takes the position that the interpretation request by the System Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0 in light of other NERC initiatives. Many of the concerns expressed (i.e. single point of failure) are already being addressed under the NERC Order 754 data request. Likewise the development of TPL-001-2 under Project 2006-02 Assess Transmission Future Needs and Develop Transmission Plans intends to combine six (6) Transmission Planning standards under a single standard, resulting in the retirement of TPL-003-0a and TPL-004-0.
Response: The IDT thanks you for your comment. As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation. **The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC).**		
Southern California Edison Company	No	The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgement to choose between the scenarios when assessing system performance for Category C and D contingencies.
Response: The IDT thanks you for your comment and notes that both contingencies (stuck breaker or protection system failure) must be considered (i.e., “engineering judgment) when determining the situation that produces the “more severe system results or impacts.” The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. No change made.		

California Independent System Operator	No	The additional time and resources entities would need to devote to the study of all "stuck breaker" and "protection system failure" scenarios in-order to determine which would produce the most severe system results/ impacts would be of marginal benefit for system reliability. Entities should be allowed to exercise their professional engineering judgment to choose between the scenarios when assessing system performance for Category C and D contingencies.
Response: The IDT thanks you for your comment and notes that both contingencies (stuck breaker or protection system failure) must be considered (i.e., "engineering judgment) when determining the situation that produces the "more severe system results or impacts." The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. No change made.		
Puget Sound Energy	No	The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
Response: The IDT thanks you for your comment and believes that the interpretation response addresses the chief question asked in the interpretation with regard to the evaluation of "stuck breaker or protection system failure." For further information on the genesis of the interpretation, single-point of failure, and the Order No. 754 Data Request, refer to the detailed meeting notes from the October 24-25, 2011 technical conference held at FERC in response to Order No. 754. The project "Order 754" may be found on the NERC website under "Standards/Standards Under Development." No change made. **The concerns about the non-operation of non-redundant (i.e., "single-point of failure") protection systems is being addressed in the data request that became effective September 1, 2012. The data request aims to determine if "single-point of failure" on protection system is a problem and, if so, to what extent. The results of the data request will lead to further discussion and evaluation of single-point of failure on protection systems.** **The commenter's concern regarding non-redundant DC supply loss is more appropriately addressed by the IDT's response to Question 2. The IDT's Question 2 response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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" and therefore the IDT's response does not mandate review of DC supply loss. No change made.		
BrightSource Energy	No	While BSE does not disagree with the proposed Response 1 to Question 1, however, as written, Response 1 appears to go beyond the requirement of the existing standards. The statement in Response 1, "..... The ordered reading of the text in Table 1 in either standard explains that delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance", seems to require that the PA and TP "evaluate" both breaker failure and protection system failures to determine whether one is more severe than the other. However, R1.3.1 of both Standards states that only the "rationale for the contingencies selected for evaluation shall be available as supporting information" and "an explanation of why the remaining simulations would produce less severe system results", for example: "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." Since the wording in these standards seems to make a distinction between "evaluation" and "explanation", the proposed would seem to disallow use of the engineering judgment (accompanied with rationale and explanation) by the PA and TP to select the contingencies (breaker failure or protection system failure) for study and evaluation, and thus go beyond what is required in both existing standards, and could result in significant increase in planning efforts for only marginally increase in reliability benefits. BSE suggests that 1) the last sentence be changed to read, "The ordered reading of the text in

		Table 1 in either standard explains that the more severe contingencies due to delayed clearing caused by a failure of a protection system or circuit breaker must be evaluated to examine their impact on BES performance" and 2) the sentence, "the Planning Authority or Transmission Planner is expected to provide the rationale for the contingencies selected for evaluation, and make available the explanation of why the remaining simulations would produce less severe system results as supporting information", be added to end of Response 1.
Response: The IDT thanks you for your comment and suggestion, although not used, the IDT concurs with yours and other stakeholder concerns on what must be "evaluated." The interpretation has been clarified in the use of the word "evaluate" to better align with its use in the standards. Change made.		
Entergy Services, Inc. (Transmission)	No	While we agree that protection system failures should be studied in TPL assessments, we have numerous concerns about the implementation difficulties of such studies. In many instances, breaker failure events were studied as a proxy for protection system failures because breaker failure events were not overly burdensome to simulate in TPL assessments such that assessments could be completed in a timely manner. A breaker failure event was independent of fault location, what types of redundancies were present, and the complexities associated with protection systems. The currently proposed interpretation is not a trivial expansion of scope. The technical and process challenges in completing such studies annually is overly burdensome and may result in overall study quality degradation as entities struggle to complete the analyses every year, especially in regions where rapid transmission expansion is occurring changing system characteristics substantially each year. Simply adding engineering resources is not a viable option due to extremely limited resource pools with the qualifications to perform such work and no end in sight to the shortage. The current definition of a protection system is too broad for application to TPL standards. DC control circuitry is not adequately defined. Is the ground grid part of DC circuitry? What about cable troughs? Failure modes of different protection

		system components are likewise inadequately defined. For example, what failure mode in a voltage sensing device is required to be studied? Loss of potential is usually a single phase loss of potential. Should planners simulate the loss of all three phases or just one, or all possible scenarios? Loss of potential is one mode but others could include introduction of harmonic content or noise into protective relays - how would relay response be predicted? In some cases, failures can result in inappropriate operation; others can result in failure to operate. Would all such permutations need to be assessed to have a valid assessment? How are the protection system engineers and planning engineers to develop valid assumptions such that TPL assessments are valid? This issue was explored in the TPL-001-2 ATFNSTD process and the standard proposes limiting failure analyses to specific protective relay types to reduce complexity and uncertainty in assumptions and analyses. The specific types of relays listed, in the opinion of the ATFNSDT, cover all historical failures which have led to BES events as well as every relay type that performs significant BES protection functions. While some obscure failure in an actual DC circuit wire, terminal block, CT, PT, etc. could occur, would those events not be replicated adequately by simulating a limited set of relay failures such as that proposed by the ATFNSDT? Mitigation plans could certainly focus on developing complete redundancy (not just the relay) for each instance where the relay failure (and potentially related protection system components) could result in BES reliability issues. The other simple but costly potential approach for the industry is to simply make all protection systems redundant. This poses similar challenges due to the inadequate protection system definitions. How would a redundant ground grid be installed? Is a terminal block part of the DC control circuitry? What about the primary winding of a PT or CT - would they need redundancy? What about a multiplexer in a communications circuit? Additionally, the attempt to add redundancy poses additional BES risk. Since protection systems cannot be modified with the facilities they protect in service in many cases, BES outages will have to occur. The proposed TPL has a 7 year implementation plan. Is that long enough to do the massive overhaul this interpretation may result in? What will be the operational risk we have to take to make upgrades? The industry could be forced to choose between

		violating operating standards and violating planning standards. We appreciate the efforts of the team on these extremely complex industry issues and we realize that perfection is not going to occur. However, we are convinced that limiting the complexity associated with these studies will provide for better overall study quality. The approach contemplated in the proposed TPL substantially raises the bar where protection systems are concerned and will result in more thorough assessments without introducing unmanageable complexity. We support that approach but cannot support the approach contemplated by this interpretation.

Response: The IDT thanks you for your comments.

The commenter raises a question regarding the need for an implementation plan and states that "the currently proposed interpretation is not a trivial expansion of scope." The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.

The comment provided indicates that the "current definition of a protection system is too broad for application to TPL standards." This concern is better addressed by the IDT's response to Question 2 and the IDT concluded that the NERC Glossary of Term for "Protection System" is not intended for use in the TPL standards subject to this interpretation request. The IDT clarifies in Question 1 that both contingencies (stuck breaker or protection system failure) must be considered (i.e., "engineering judgment) when determining the situation that produces the "more severe system results or impacts." The applicable entity does not have the option of using one or the other (stuck breaker or protection system failure) when it considers the contingency. The interpretation does not preclude the use of engineering judgment for the contingencies selected. The IDT did revise its Question 1 response to better align with TPL requirement language in regard to what must be "evaluated" and this may alleviate some of the concerns raised.

The feedback provided by Entergy Services, Inc. (Transmission) in some instances goes outside the scope of the questions raised by the SPCS's questions. For example, one item discussed at length is a question of required redundancy of protection system components and the IDT notes that this topic is being addressed by the on-going Order 754 Data Request and is not relevant to the interpretation request.

Exelon	Yes	Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Response: The IDT thanks you for your comments. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Idaho Power Company	Yes	However, we do support a corrected response 1 made by Duke Energy.
Response: The IDT thanks you for your comment.		
Manitoba Hydro	Yes	No comment.
Duke Energy	Yes	While Duke Energy is voting affirmative on this ballot, we note that the interpretation appears to expand upon historical industry practices. Some entities will need to expand their annual assessment to include more detailed evaluation and complex analysis. As a result, mitigation plans may need to be developed. Therefore, an implementation plan should be developed to accompany this interpretation. We suggest an effective date of the first day of the first calendar quarter eighteen months after applicable regulatory approval.
Response: The IDT thanks you for your comments. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1 describes what the entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		

SERC Reliability Corporation	Yes	While I agree with the response I am concerned with the technical feasibility of evaluating all possible protection system failures. I prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
SERC EC Planning Standards Subcommittee	Yes	While we agree with the response we are concerned with the technical feasibility of evaluating all possible protection system failures. We prefer the approach taken in proposed standard TPL-001-2 that specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
TVA Transmission Reliability Engineering and Controls	Yes	While we agree with the response, we prefer the approach taken in the proposed standard TPL-001-2 which specifies failure of certain types of relays to test.
Response: The IDT thanks you for your comment.		
Northeast Power Coordinating Council	Yes	
Bonneville Power Administration	Yes	
Hydro One Networks Inc.	Yes	
Iberdrola USA	Yes	
NERC System Protection and Control Subcommittee (SPCS)	Yes	
Southwest Power Pool Realibility Standards development Team	Yes	

pacificorp	Yes	
American Electric Power	Yes	
American Transmission Company, LLC	Yes	
Independent Electricity System Operator	Yes	
ISO New England, Inc	Yes	
Midwest Independent Transmission System Operator, Inc.	Yes	
Electric Reliability Council of Texas, Inc.	Yes	
GTC	Yes	
ITC	Yes	
Florida Municipal Power Agency	Yes	

2. Do you agree with Response 2 of this interpretation? If not, what, specifically, do you disagree with? Please provide specific suggestions or proposals for any alternative language.

Summary Consideration:

The majority of industry stakeholder comments support the interpretation drafting team's ("IDT") draft 2 version of the interpretation to question 2.

In response to industry feedback, the IDT made only minor clarifications to the interpretation for response two. The IDT accepted minor wording changes to the 2nd sentence which some in industry stakeholders found confusing and awkwardly worded. The sentence was a "run-on" sentence and is now two separate sentences in the draft 3 interpretation.

A minority opinion is noted in that some commenters believe that the interpretation response was requiring the evaluation of a non-redundant DC supply or review of the "most severe" protection system component failure. The IDT states in its response to those concerns that the interpretation does not mandate the evaluation of a non-redundant DC supply loss. Additionally, the IDT notes that Requirement R1.3.1 (TPL-003-0a and TPL-004-0) requires the evaluation of contingencies that would produce the "more severe system results or impacts," not "most severe event." As clarified in the interpretation, the Planning Authority and Transmission Planner is permitted "engineering judgment" in the selection of those components of a protection system that may lead to "more severe results or impacts."

Additionally, the interpretation concludes that the NERC defined term for Protection System is not implicitly used in the subject TPL standards. This is emphasized in the last sentence of response two which states, "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."

Organization	Yes or No	Question 2 Comment
ACES Standards Collaborators	No	(1) Response 2 departs from the plain language of the requirements and actually expands the application of both standards which is not consistent with the standards process. According to the Standards Process Manual, "a valid interpretation response provides additional clarity about one or more requirements, but does not expand on any requirement." The interpretation clearly states in response 2 that 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." This language is contradictory with the earlier statement that the PA and TP are permitted to use engineering judgment in selecting Category C and D contingencies. Nowhere in TPL-003-0a or TPL-004-0 does it say that the TP or PC have to perform full simulations for faults with delayed clearing. This is only required if they would produce the "more severe system results or impacts." The interpretation that the drafting team is proposing expands on the requirements and should not instruct the PC/TP to perform simulations beyond the existing language in the requirements. The manner in which the PC/TP determines which contingencies would produce "more severe system results and impacts" is not addressed in the standard. **Response: The standard allows for engineering judgment in the selection of contingencies to be studied; once the contingency is selected for study, then a simulation has to assess the full impact (delayed clearing and facilities removed).** (2) The interpretation states that the Planning Authority and Transmission Planner must "consider 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. We have concerns regarding how the PC/TP must document these "considerations" and whether the PC/TP must maintain paperwork when they decide that the delayed clearing condition would not produce a more severe system impact. We believe that the interpretation is requiring additional actions outside the requirements of the standard. **Response: The concern raised by the commenter is out of the scope of the request for interpretation and addresses a compliance evidence concern related to "paperwork needed" for selecting (and excluding) contingencies deemed to produce the "more severe system results or impacts." No change made.** (3) The interpretation should clearly state that there is no clear bright line about what constitutes "more severe" results. Thus, applicable entities may use engineering judgment in determining what more severe system results are. There is no clear bright line threshold for when a PC/TP must study and simulate stuck

		breakers or protection system failures. There are adverse impacts on the industry without clear direction, and the Interpretation Drafting Team may not be able to provide that clarity within the bounds of the Standards Process Manual. For example, if a protection system failure would increase clearing times and would produce “more severe system results and impacts,” it would be required to be studied and simulated. However, if it did not produce the “more severe system results and impacts,” it would not be required to be studied and simulated. There is no clarity on what makes an impact more severe and therefore, the interpretation is requiring the PC/TP to study and simulate all contingencies because not doing so may result in a finding of noncompliance, even though some of those studies would not meet the threshold of “more severe.” **Response: The IDT concludes that the concern raised by the stakeholder is out of scope for the SCPC interpretation request. No change made.** (4) The interpretation team should consider adding flexibility to considerations that a PC or TP could use to determine the need to simulate single points of failure. As example, actual system experience, past studies, or steady state screening studies could be relied upon. For instance, if there are not problems in the steady state and the contingency is electrically far from any generators, system experience or past studies could prove that transient or dynamic stability problems are not likely to occur. **Response: The IDT concludes that the concern raised by the stakeholder is out of the scope of the request for interpretation. The standards are clear in R1.3.1 (TPL-003-0a and TPL-004-0) that the Planning Authority and Transmission Planner must provide “The rationale for the contingencies selected for evaluation shall be available as supporting information.” The request for interpretation does not question the clarity of this language. No change made.** (5) We think both parts of the interpretation would benefit from clarifying what is meant by consideration of contingencies in TPL-003-0a R1.5 and TPL-004-0 R1.4 and evaluation in R1.3.1. TPL-003-0a R1.5 and TPL-004-0 R1.4 only require that the TP and PC consider Category C and D contingencies respectively. However, both standards say that a study or simulation is required only for the contingencies “that

		would produce the more severe system results or impacts" R1.3.1. We would like the drafting team to further clarify this issue. **Response: No change made. See responses to items 3 and 4 above.** (6) We found a few typos, confusing clauses, and sentences that needed grammatical changes in Q2. In particular, the second sentence in Response 2 in confusing. We believe the sentence would be clearer if stated, "The PC and TP is permitted engineering judgment in its [selection of] Category C and D contingencies for protection system component failures..." **Response: The IDT has inserted the clarifying words, "selection of," as suggested. Change made.** (7) Second, the clause in the last sentence after (R1.3.1) "and this would include addressing all protection systems affected by the selected component" should be struck. It's a run-on sentence and adds more confusion than clarity. **Response: The IDT did not strike the interpretation text as suggested and instead broke the 2nd sentence up into two sentences for readability. Change made.** (8) Finally, we suggest striking everything in response 2 after the first paragraph because it only adds confusion. The first paragraph is clear that the TP and PC can apply engineering judgment in selecting Category C and D contingencies. What else needs to be said? **Response: The IDT believes the entire response is important. For example, the third paragraph contains important insights regarding how the IDT reached its conclusion. No change made.** (9) Thank you for the opportunity to comment. **Response: The IDT appreciates your thorough review and participation in the NERC standard development process.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Oncor Electric Delivery Conpany	No	Again, Oncor takes the position that the interpretation request by the System

LLC		Protection and Control Subcommittee (SPCS) is not timely and will not provide additional clarity to complying with TPL-003-0a and TPL-004-0. Oncor does agrees with the statement in Response 2, “The Planning Authority and Transmission Planner is permitted engineering judgment in its Category C or D contingencies to select the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.” However, Oncor takes the position, that current NERC initiatives including NERC Order 754 Data request and current efforts under Project 2006-02 will ultimately address all concerns related to contingency selection validation.
Response: The IDT thanks you for your comment. As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation. **The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC).** **The IDT appreciates Oncor’s support of the views stated in our Q2 response.**		
Florida Municipal Power Agency	No	FMPA does not agree with the conclusion of the last paragraph that: “the two standards do not prescribe the specific protection system components that must be addressed”. The operative word of footnote e is “any” as in: “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” (emphasis added). In addition, the use of the phrase “such as” by definition is an introduction to a list that is not exhaustive. Hence, it is beyond argument footnote e includes consideration of delayed clearing due to failure of relays, circuit breakers, current transformers, and at least one additional protection system component. Common use of the term “protection system” includes the NERC glossary definition

		plus breakers (e.g., Wikipedia at: http://en.wikipedia.org/wiki/Power_system_protection). Consequently, FMPA believes that the term "protection system" as used in footnote e is more inclusive than the definition of Protection System in the NERC glossary (i.e., to include breakers). As such, footnote e is prescriptive of the minimum set of protection system components that must be considered: the components that comprise the glossary definition of Protection System, plus circuit breakers.
Response: The IDT thanks you for your comments. The IDT reached the interpretation to Q2 upon further review of the standard and consideration of earlier industry comments from the draft 1 posting. The IDT fully vetted and considered this specific issue. Our reasons for the conclusions reached are clearly stated in the last paragraph of the Q2 response. This comment is a minority opinion based on the collective industry responses to the interpretation. No change made.		
ISO New England, Inc	No	ISO New England disagrees with the wording for response 2. The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. **The IDT is not mandating an evaluation of non-redundant DC supply loss. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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." No change made.** Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and

		second paragraph's together, it appears that failure of the battery system is a required aspect of testing. **Response: See above response. No change made.** Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The cost of retrofitting redundant battery protection systems would clearly outweigh any reliability benefit possibly gained. **Response: The IDT notes that explicitly stating in the interpretation that DC supply or battery failure is excluded would be an expansion of the standard and is beyond the scope of the request for interpretation. No change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Southern California Edison Company	No	same as for question 1
Response: The IDT thanks you for your comments and refers to the response in question 1 for Southern California Edison Company.		
Iberdrola USA	No	Since TPL-003 and TPL-004 refer to "protection system" in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 have been superceded by TPL-001-2, approved by the NERC Board of Trustees in August 2011. In the development of TPL-001-2, the reference to "protection system" was clarified to be "relay" with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that "protection system" (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13.
Response: The IDT thanks you for your comments. The IDT must interpret the existing and mandatory enforceable standards brought to question in this request for interpretation. The development and approval of TPL-001-2 remains a pending matter		

before Federal Energy Regulatory Commission (FERC). As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation.		
Northeast Power Coordinating Council	No	The interpretation would force Transmission Planners into studying non-redundant DC supply or battery failure in stability studies which would in turn cause a significantly negative effect on system performance. While the concept of engineering judgment is introduced in the first paragraph, the wording is such that it appears the most severe set of conditions is required. **Response: The IDT's interpretation does not mandate that non-redundant DC supply loss must be evaluated. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a and Category D (TPL-004-0) contingencies that would produce the more severe system results or impacts. Additionally, the last paragraph indicates "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." No change made.** Additionally, the second paragraph requires study of a protection system component failure that impacts one or more protection systems. While it may not be clearly defined as being a part of the protection system, if considered, DC supply or battery failure could have significantly longer fault clearing times if all protection system components except the battery are fully redundant. Taking the first and second paragraphs together, it appears that failure of the battery system is a required aspect of testing. **Response: The IDT notes that response 2 does not require the applicable entity to consider protection elements beyond those listed in footnote 'e'; however, for a selected protection system component 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. No change made. Transmission Planners should not be required to study the effects of a failed DC supply system as this would show significant impacts that were not intended in the drafting of the interpretation and it is inconsistent with the current draft of TPL-001-2. The DC supply or battery failure should be specifically excluded from consideration in system performance. The Drafting Team should explicitly state that "protection system" (lower case) referred to in Footnote (e) does not include station batteries (unlike "Protection System" in NERC Glossary of Terms). **Response: See above response. No change made.** Additionally, because TPL-003 and TPL-004 refer to "protection system" in lower case, it does not refer to the NERC Glossary definition. Moreover, TPL-003 and TPL-004 are likely to be superseded by TPL-001-2 after regulatory approvals. In the development of TPL-001-2, the reference to "protection system" was clarified to be "relay" with a new footnote 13 which further specifies the types of relays to be considered. The Drafting Team should state that "protection system" (lower case) referred to in Footnote (e) includes only the relays identified in TPL-001-2 Table 1 footnote 13. **Response: The IDT thanks you for your comments. The IDT must interpret the existing and mandatory enforceable standards brought to question in this request for interpretation. The development and approval of TPL-001-2 remains a pending matter before Federal Energy Regulatory Commission (FERC). As clarified in the draft 1 consideration of comments, the FERC Order No. 754 (i.e., approval of an interpretation to TPL-002-0, R1.3.10) addresses the concern about the non-operation of non-redundant protection systems. The request for interpretation of TPL-003-0a and TPL-004-0 by the SPCS along with the Order No. 754 related data request both support approaches that were formed at the October 24-25, 2011 FERC technical conference concerning Order No. 754. The IDT has provided clarification requested through the interpretation approach. The NERC Standards Committee appropriately accepted the request for interpretation.**

Response: The IDT thanks you for your comments. Please see the responses above.		
New England States Committee on Electricity (NESCOE)	No	The New England States Committee on Electricity (NESCOE) appreciates this opportunity to comment on a narrow issue raised by ISO New England (ISO-NE) regarding the intended meaning of "protection system component failure" in Response 2. In comments on Draft One of the proposed interpretation, ISO-NE requested clarification on whether a battery system is considered a component of a protection system for purposes of the standard. ISO-NE stated that the answer to this question could have significant implications for the outcome of stability studies, citing as an example that substations may have full redundancy protection in all aspects except for the battery system. NESCOE understands that ISO-NE will provide comments on this Draft 2 version noting that modeling non-redundant DC supply or battery failure was not intended in the drafting of the interpretation and that the cost of requiring redundant battery protection systems in all cases will be clearly outweighed by any reliability benefit gained. **Response: The concern is a perception that the requirement is to address failure of a non-redundant DC supply relied upon for protection systems. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a and Category D (TPL-004-0) contingencies that would produce the more severe system results or impacts.** NESCOE shares ISO-NE's concern that the latest version of Response 2 does not resolve the ambiguity related to modeling protection system failures and whether battery systems are distinguished from other components. Specifically, the language in paragraph one provides that the planning authority and transmission planner may exercise "engineering judgment" in selecting protection system component failures for study. However, the subsequent paragraph appears to require study of the most severe event, which absent clarification could be read to mandate the modeling of battery failure. New England consumers should not be exposed to cost increases due to a lack of clarity. Nor, as in all cases, should consumers bear costs that are not justified by measurable reliability benefits.

		NESCOE requests that the IDT squarely address and resolve this ambiguity in a subsequent version of the proposed interpretation. Thank you for your consideration of these comments. **Response: The IDT notes that the standard in R1.3.1 requires evaluation of contingencies that would produce the "more severe system results or impacts," not "most severe event." As clarified in the interpretation, the Planning Authority and Transmission Planner are permitted engineering judgment in the selection of those components of a protection system that may lead to "more severe results or impacts" than others. For example, if the entity believes that a non-redundant CT failure would likely lead to more severe system results or impacts than a stuck breaker, then the entity may select that condition for evaluation. The interpretation concludes that "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." No change made.**
Response: The IDT thanks you for your comments. Please see the responses above.		
Puget Sound Energy	No	The response is vague on how to evaluate a protection system failure, as it does not reference any single-point of failure methodology. Also, there is no specific exclusion of DC supply, which should be eliminated as a system component failure. The exclusion of DC supplies is in line with the protection system redundancy evaluation in Order No. 754 Table B.
Response: The IDT thanks you for your comment and believes that the interpretation response addresses the chief question asked in the interpretation with regard to the evaluation of "stuck breaker or protection system failure." For further information on the genesis of the interpretation, single-point of failure, and the Order No. 754 Data Request, refer to the detailed meeting notes from the October 24-25, 2011 technical conference held at FERC in response to Order No. 754. The project "Order 754" may be found on the NERC website under "Standards/Standards Under Development." No change made. **The concerns about the non-operation of non-redundant (i.e., "single-point of failure") protection systems is being addressed in the Order No. 754 data request that became effective September 1, 2012. The data request aims to determine if "single-point of failure" on protection system is a problem and, if so, to what extent. The results of the data request will lead to further discussion**		

and evaluation of single-point of failure on protection systems. **The IDT's interpretation response does not mandate that non-redundant DC supply loss must be evaluated. The response clearly indicates that the applicable entity is permitted engineering judgment in its selection of Category C (TPL-003-0a) and Category D (TPL-004-0) contingencies that would produce the "more severe system results or impacts." Additionally, the last paragraph indicates "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." No change made.**		
ITC	No	We have concerns regarding the use of terms like "engineering judgement" in requirments or interpretations. Such terms are vague and will lead to coninued uncertainty as to whether an auditor will find an entity in compliance (i.e,, will the "engineering judgement" applied by an entity be acceptable to an auditor?
Response: The IDT thanks you for your comment and believes that R1.3.1 is clear that the applicable entity is permitted engineering judgment based on the wording "for the contingencies selected for evaluation." The entity must be able to provide "The rationale for the contingencies selected for evaluation shall be available as supporting information." The standard is also clear that an "explanation of why the remaining simulations would produce less severe system results shall be available as supporting information." No change made.		
California Independent System Operator	No	
Duke Energy	Yes	Also, while Duke Energy agrees with Response 2, we believe wording changes are needed for clarity in the first paragraph to align it with the third paragraph. Suggest rewording : 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.

Response: The IDT thanks you for your comment and support. The IDT revised the 2nd sentence of its Draft 2 response for clarity and readability based on yours and other industry feedback provided. The sentence now uses the wording "selection of" as suggested and is broken into two sentences in the Draft 3 version.		
Exelon	Yes	Exelon recommends that a tiered implementation plan (by voltage level, for example) be established. Exelon also recommends that a timeframe of at least 5-years be permitted to review worst-case protection system failure scenarios, perform any required studies, and implement any additional actions that might be necessary to meet the TPL standards under the proposed interpretation of the requirements
Response: The IDT thanks you for your comment. The IDT believes that historical practices do reflect consideration (i.e., "engineering judgment") of both (i.e., "stuck breaker or protection system failure") when considering what produces the "more severe system results or impacts;" therefore, the IDT believes an implementation plan is not needed. Requirement R1.3.1, the same in both standards, describes what an entity must provide as evidence that it considered the "more severe system results or impacts." No change made.		
Idaho Power Company	Yes	However, we do support a corrected response 2 made by Duke Energy.
Response: The IDT thanks you for your comment and support.		
NERC System Protection and Control Subcommittee (SPCS)	Yes	The SPCS appreciates the consideration of its previous comment. The IDT revision to the interpretation addresses the SPCS concern noted during the first posting.
Response: The IDT thanks you for your comment and support.		
Manitoba Hydro	Yes	We generally agree with the respose. However, we suggest that the wording provided by Duke Energy should be adopted to add clarity: 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. The Planning Authority and Transmission Planner are permitted engineering judgment in selection of their Category C or D contingencies, and selection of the protection system component failures for evaluation that would produce the more severe system results or impact (R1.3.1) and this would include addressing all protection systems affected by the selected component.
Response: The IDT thanks you for your comment and support. Please refer to the response provided to Duke Energy.		
Southwest Power Pool Realibility Standards development Team	Yes	We would suggest that the drafting team take a look at the effort surrounding FERC Order No. 754 which is clearly laid out for what to look at and how to look at single point of failure.
Response: The IDT thanks you for your comment and support. The NERC Standards Developer and Technical Advisor assigned to this project are also participants and involved with the Order No. 754 project. No change made.		
SERC EC Planning Standards Subcommittee	Yes	
Bonneville Power Administration	Yes	
Hydro One Networks Inc.	Yes	
TVA Transmission Reliability Engineering and Controls	Yes	
Salt River Project	Yes	
Western Electricity Coordinating Council	Yes	
pacificorp	Yes	
Entergy Services, Inc. (Transmission)	Yes	

American Electric Power	Yes	
American Transmission Company, LLC	Yes	
Independent Electricity System Operator	Yes	
Midwest Independent Transmission System Operator, Inc.	Yes	
BrightSource Energy	Yes	
Electric Reliability Council of Texas, Inc.	Yes	
GTC	Yes	
CenterPoint Energy Houston Electric, LLC	Yes	
Response:		

END OF REPORT

Response for Interpretation of TPL-003 and TPL-004 for SPCS

When completed, email this form to:
laura.hussey@nerc.net
For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.	
Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.	
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- [x] Clarify the required performance
- [ ] Clarify the conditions under which the performance is required
- [ ] Clarify which functional entity is responsible for performing an action in a requirement
- [ ] Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.

There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by:

- Potential non-compliance if the correct contingencies are not studied
- Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required
- Potential negative impact to grid reliability if the correct contingencies are not assessed

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	
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.
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] of either "stuck breaker" or "protection system failure" contingency[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.	

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.

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Revision History (To be removed upon Final)

Version	Date	Description
1.0	5/9/2012	Draft 1 of the response to the request for interpretation.
2.0	10/16/2012	Draft 2 of the response to the request for interpretation.
3.0	1/19/2013	Draft 3 of the response to the request for interpretation.

Response for Interpretation of TPL-003 and TPL-004 for SPCS

When completed, email this form to:
laura.hussey@nerc.net
For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com
Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.			
Standard	Title		
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)		
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)		
Identify specifically what Requirement needs clarification.			
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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
- ☐ Clarify the reliability outcome the requirement is intended to produce

Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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

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[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.
Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.
There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by: • Potential non-compliance if the correct contingencies are not studied • Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required • Potential negative impact to grid reliability if the correct contingencies are not assessed

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

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.

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] of either "stuck breaker" or "protection system failure" contingency[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 ~~consider~~ 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. ~~Evaluation of a~~ 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 ~~is required and~~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 ~~ordered reading of 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~~caused by a failure of a protection system or circuit breaker must be evaluated to examine its impact on BES performance~~.

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.

[9] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[10] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

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.

Question 2

For the phrase "Delayed Clearing[11]" used in Category C[12] contingencies 6-9 and Category D[13] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[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~~The~~ Planning Authority and Transmission Planner is permitted engineering judgment in its selection of~~Category C or D contingencies to select~~ 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). ~~and this~~ 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

[11] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[12] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[13] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

[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,"

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.

Revision History (To be removed upon Final)

Version	Date	Description
1.0	5/9/2012	Draft 1 of the response to the request for interpretation.
2.0	10/16/2012	Draft 2 of the response to the request for interpretation.
3.0	1/19/2013	Draft 3 of the response to the request for interpretation.

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Interpretation Request Form

2012-INT-02 TPL-003-0a and TPL-004-0

When completed, email this form to:
laura.hussey@nerc.net

For questions about this form or for assistance in completing the form, call Laura Hussey at 404-446-2579.

Note: A valid interpretation request is one that requests additional clarity about one or more requirements in approved NERC reliability standards, but does not request approval as to how to comply with one or more requirements.

Request for an Interpretation of a Reliability Standard			
Date submitted:	December 12, 2011		
Contact information for person requesting the interpretation.			
Name:	Jonathan Sykes (PG&E), Chairman SPCS		
Organization:	NERC System Protection & Control Subcommittee		
Telephone:	(510) 874-2691	**E-mail:**	jfst@pge.com

Identify the Standard (include version number, e.g., PRC-001-1) that needs clarification and its associated title.

Standard	Title
TPL-003-0a	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)
TPL-004-0	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

Identify specifically what Requirement needs clarification.

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.

Identify the nature of clarification that is requested (Check as many as applicable).

- ☒ Clarify the required performance
- ☐ Clarify the conditions under which the performance is required
- ☐ Clarify which functional entity is responsible for performing an action in a requirement
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Please explain the clarification needed.

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[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] of either "stuck breaker" or "protection system failure" contingency[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] 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]" used in Category C[6] contingencies 6-9 and Category D[7] contingencies 1-4, to what extent does the description in Table 1, footnote (e)[8] require an entity to

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[1] NERC Website: (http://www.nerc.com/fileUploads/File/Events%20Analysis/A-2009-03-30-01.pdf)

[2] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.3.10. and/or TPL-004-0, Requirement R1.3.7.

[3] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[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*."

[5] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5. and/or TPL-004-0, Requirement R1.4.

[6] As required by NERC Reliability Standard TPL-003-0a, Requirement R1.5.

[7] As required by NERC Reliability Standard TPL-004-0, Requirement R1.4.

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.

Identify the material impact to your organization or others, if known, caused by the lack of clarity or an incorrect interpretation of this standard.

There is a material impact to the entities required to perform transmission planning assessments and to the entities that may rely on these assessments. The lack of clarity in defining the required studies impacts entities by:

- Potential non-compliance if the correct contingencies are not studied
- Inefficient use of resources if contingencies are studied that are not required and mitigation plans are implemented that are not required
- Potential negative impact to grid reliability if the correct contingencies are not assessed

[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,"

A. Introduction

1. **Title:** **System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)**

2. **Number:** TPL-003-0a

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:** April 23, 2010

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.

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.

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.

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

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-003-0_R1 and TPL-003-0_R2.

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-003-0_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	February 8, 2005	Adopted by NERC Board of Trustees	New
0	April 1, 2005	Effective Date	New
0	April 1, 2005	Add parenthesis to item “e” on page 8.	Errata
0a	July 30, 2008	Adopted by NERC Board of Trustees	
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
0a	April 23, 2010	FERC approval of interpretation of TPL-003-0 R1.3.12	Interpretation

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing [e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local Network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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 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.*

A. Introduction

1. **Title:** System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)

2. **Number**: TPL-004-0

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:** April 1, 2005

B. Requirements

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

R1.1. Be made annually.

R1.2. Be conducted for near-term (years one through five).

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

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

R1.3.4. Have all projected firm transfers modeled.

R1.3.5. Include existing and planned facilities.

R1.3.6. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

R1.3.8. Include the effects of existing and planned control devices.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

R1.4. Consider all contingencies applicable to Category D.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

C. Measures

M1. The Planning Authority and Transmission Planner shall have a valid assessment for its system responses as specified in Reliability Standard TPL-004-0_R1.

M2. The Planning Authority and Transmission Planner shall provide evidence to its Compliance Monitor that it reported documentation of results of its reliability assessments per Reliability Standard TPL-004-0_R1.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Reliability Organization.

Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

1.2. Compliance Monitoring Period and Reset Timeframe

Annually.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: A valid assessment, as defined above, for the near-term planning horizon is not available.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: Not applicable.

B. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

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

D [d] Extreme event resulting in two or more (multiple) elements removed or Cascading out of service	3Ø Fault, with Delayed Clearing[e] (stuck breaker or protection system failure): 1. Generator 2. Transmission Circuit 3. Transformer 4. Bus Section 3Ø Fault, with Normal Clearing[e]: 5. Breaker (failure or internal Fault) 6. Loss of towerline with three or more circuits 7. All transmission lines on a common right-of way 8. Loss of a substation (one voltage level plus transformers) 9. Loss of a switching station (one voltage level plus transformers) 10. Loss of all generating units at a station 11. Loss of a large Load or major Load center 12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required 13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate 14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.	Evaluate for risks and consequences. ▪ May involve substantial loss of customer Demand and generation in a widespread area or areas. ▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point. ▪ Evaluation of these events may require joint studies with neighboring systems.

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) Planned or controlled interruption of electric supply to radial customers or some local network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.

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.

Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Recirculation Ballot is now open through 8 p.m. Thursday, January 31, 2013

Now Available

A recirculation ballot for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) is now open through **8 p.m. Eastern on Thursday, January 31, 2013**.

After considering stakeholders comments from the formal comment period and initial ballot that ended on December 5, 2012, the drafting team made no substantive changes to the standard, but made some clarifying changes as summarized in the Consideration of Comments posted on the project page.

Instructions
In the recirculation ballot, votes are counted by exception. Only members of the ballot pool may cast a ballot; all ballot pool members may change their previously cast votes. A ballot pool member who failed to cast a ballot during the last ballot window may cast a ballot in the recirculation ballot window. If a ballot pool member does not participate in the recirculation ballot, that member's vote cast in the previous ballot will be carried over as that member's vote in the recirculation ballot.

Members of the ballot pool associated with this project may log in and submit their vote for the interpretation by clicking here.

Next Steps
Voting results will be posted and announced after the ballot window closes. If approved, the interpretation will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

Background
Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0

(Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

Additional information can be found on the project page.

Standards Development Process

The Standards Processes Manual contains all the procedures governing the standards development process. The success of the NERC standards development process depends on stakeholder participation. We extend our thanks to all those who participate.

For more information or assistance, please contact Wendy Muller,
Standards Development Administrator, at wendy.muller@nerc.net or at 404-446-2560.

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NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Standards Announcement

Project 2012-INT-02 - Interpretation of TPL-003 and TPL-004 for System Protection and Control Subcommittee

Recirculation Ballot Results

Now Available

A recirculation ballot for the interpretation of **TPL-003-0a** – System Performance Following Loss of Two or More Bulk Electric System Elements (Category C) and **TPL-004-0** – System Performance Following Extreme Events Results in the Loss of Two or More Bulk Electric System Elements (Category D) concluded at **8 p.m. Eastern on Thursday, January 31, 2013**.

Voting statistics are listed below, and the Ballot Results page provides a link to the detailed results.

Approval
Quorum: 85.67% Approval: 77.61%

Next Steps
The interpretation will be presented to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

Background
Order No. 754, issued September 15, 2011, was the Final Rule approving the Interpretation of TPL-002-0a for PacifiCorp (Project 2009-14) regarding requirement R1.3.10. In addition to the approval, the Commission expressed a concern (Para 19 and 20) about single point of failure of protection systems and issued NERC a directive for further investigation. This request for interpretation submitted by the System Protection and Control Subcommittee (SPCS) is one of three approaches aimed to address the concern. The SPCS is seeking clarification in two areas in TPL-003-0a (Category C) and TPL-004-0 (Category D). The first regarding the comprehensive study of system performance relating to Table 1's, Category C and D contingency of a "(stuck breaker or protection system failure)." Second, to what extent does the description in the standards' Table 1, footnote (e) require an entity to model a single point of failure of a protection system component that may prevent correct operation of a protection system.

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For more information or assistance, please contact Monica Benson,
Standards Development Administrator, at monica.benson@nerc.net or at 404-446-2560.

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Ballot Results	
Ballot Name:	Project 2012-INT-02 Recirculation Ballot TPL-003-0a and TOP-004-0 Jan 2013_in
Ballot Period:	1/23/2013 - 1/31/2013
Ballot Type:	Recirculation
Total # Votes:	311
Total Ballot Pool:	363
Quorum:	85.67 % The Quorum has been reached
Weighted Segment Vote:	77.61 %
Ballot Results:	The Standard has Passed

Summary of Ballot Results

Segment	Ballot Pool	Segment Weight	Affirmative # Votes	Affirmative Fraction	Negative # Votes	Negative Fraction	Abstain # Votes	No Vote
1 - Segment 1.	106	1	57	0.713	23	0.288	11	15
2 - Segment 2.	10	0.8	5	0.5	3	0.3	0	2
3 - Segment 3.	83	1	51	0.85	9	0.15	13	10
4 - Segment 4.	24	1	13	0.813	3	0.188	4	4
5 - Segment 5.	75	1	38	0.792	10	0.208	13	14
6 - Segment 6.	51	1	32	0.865	5	0.135	9	5
7 - Segment 7.	0	0	0	0	0	0	0	0
8 - Segment 8.	8	0.6	5	0.5	1	0.1	0	2
9 - Segment 9.	0	0	0	0	0	0	0	0
10 - Segment 10.	6	0.6	4	0.4	2	0.2	0	0
Totals	**363**	**7**	**205**	**5.433**	**56**	**1.569**	**50**	**52**

Individual Ballot Pool Results

Segment	Organization	Member	Ballot	Comments
1		Vijay Sankar		
1	Ameren Services	Kirit Shah	Affirmative	
1	American Electric Power	Paul B. Johnson	Affirmative	
1	American Transmission Company, LLC	Andrew Z Pusztai	Affirmative	
1	Arizona Public Service Co.	Robert Smith	Affirmative	
1	Associated Electric Cooperative, Inc.	John Bussman	Affirmative	
1	Austin Energy	James Armke	Affirmative	

1	Avista Corp.	Scott J Kinney	Affirmative	
1	Balancing Authority of Northern California	Kevin Smith	Affirmative	
1	Baltimore Gas & Electric Company	Christopher J Scanlon	Affirmative	
1	BC Hydro and Power Authority	Patricia Robertson	Affirmative	
1	Beaches Energy Services	Joseph S Stonecipher		
1	Big Rivers Electric Corp.	Chris Bradley	Negative	
1	Black Hills Corp	Eric Egge		
1	Bonneville Power Administration	Donald S. Watkins	Affirmative	
1	Brazos Electric Power Cooperative, Inc.	Tony Kroskey		
1	Bryan Texas Utilities	John C Fontenot	Affirmative	
1	CenterPoint Energy Houston Electric, LLC	John Brockhan	Negative	
1	Central Electric Power Cooperative	Michael B Bax	Affirmative	
1	Central Maine Power Company	Joseph Turano Jr.	Negative	
1	City of Tacoma, Department of Public Utilities, Light Division, dba Tacoma Power	Chang G Choi	Affirmative	
1	Clark Public Utilities	Jack Stamper	Affirmative	
1	Colorado Springs Utilities	Paul Morland	Affirmative	
1	Consolidated Edison Co. of New York	Christopher L de Graffenried	Affirmative	
1	Corporate Risk Solutions, Inc.	Joseph Doetzl	Affirmative	
1	CPS Energy	Richard Castrejana	Affirmative	
1	Dairyland Power Coop.	Robert W. Roddy	Negative	
1	Dayton Power & Light Co.	Hertzel Shamash	Affirmative	
1	Deseret Power	James Tucker	Abstain	
1	Dominion Virginia Power	Michael S Crowley	Abstain	
1	Duke Energy Carolina	Douglas E. Hils	Affirmative	
1	East Kentucky Power Coop.	Amber Anderson	Negative	
1	Entergy Transmission	Oliver A Burke	Negative	
1	FirstEnergy Corp.	William J Smith	Affirmative	
1	Florida Keys Electric Cooperative Assoc.	Dennis Minton	Negative	
1	Florida Power & Light Co.	Mike O'Neil	Abstain	
1	FortisBC	Curtis Klashinsky		
1	Gainesville Regional Utilities	Richard Bachmeier	Negative	
1	Georgia Transmission Corporation	Jason Snodgrass	Affirmative	
1	Great River Energy	Gordon Pietsch	Affirmative	
1	Hoosier Energy Rural Electric Cooperative, Inc.	Bob Solomon		
1	Hydro One Networks, Inc.	Ajay Garg	Affirmative	
1	Idaho Power Company	Molly Devine	Affirmative	
1	International Transmission Company Holdings Corp	Michael Moltane	Negative	
1	JEA	Ted Hobson		
1	KAMO Electric Cooperative	Walter Kenyon	Affirmative	
1	Kansas City Power & Light Co.	Jennifer Flandermeyer	Negative	
1	Keys Energy Services	Stanley T Rzad	Affirmative	
1	Lakeland Electric	Larry E Watt	Negative	
1	Lee County Electric Cooperative	John W Delucca	Negative	
1	Lincoln Electric System	Doug Bantam	Affirmative	
1	Long Island Power Authority	Robert Ganley		
1	Lower Colorado River Authority	Martyn Turner	Abstain	
1	M & A Electric Power Cooperative	William Price	Affirmative	
1	Manitoba Hydro	Nazra S Gladu	Affirmative	
1	MEAG Power	Danny Dees	Abstain	
1	MidAmerican Energy Co.	Terry Harbour	Affirmative	
1	Minnkota Power Coop. Inc.	Daniel L Inman	Affirmative	
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey	Affirmative	
1	National Grid USA	Michael Jones	Affirmative	
1	Nebraska Public Power District	Cole C Brodine		
1	New Brunswick Power Transmission Corporation	Randy MacDonald	Affirmative	
1	New York Power Authority	Bruce Metruck	Abstain	
1	Northeast Missouri Electric Power Cooperative	Kevin White		
1	Northeast Utilities	David Boguslawski	Affirmative	
1	Northern Indiana Public Service Co.	Kevin M Largura	Affirmative	
1	NorthWestern Energy	John Canavan	Negative	
1	Ohio Valley Electric Corp.	Robert Mattey	Affirmative	
1	Oklahoma Gas and Electric Co.	Marvin E VanBebber	Abstain	
1	Omaha Public Power District	Doug Peterchuck	Affirmative	
1	Oncor Electric Delivery	Jen Fiegel	Negative	

1	Orlando Utilities Commission	Brad Chase		
1	Otter Tail Power Company	Daryl Hanson		
1	Pacific Gas and Electric Company	Bangalore Vijayraghavan	Negative	
1	PacifiCorp	Ryan Millard	Affirmative	
1	Platte River Power Authority	John C. Collins	Affirmative	
1	Portland General Electric Co.	John T Walker	Affirmative	
1	Potomac Electric Power Co.	David Thorne	Abstain	
1	PowerSouth Energy Cooperative	Larry D Avery	Affirmative	
1	PPL Electric Utilities Corp.	Brenda L Truhe	Affirmative	
1	Public Service Company of New Mexico	Laurie Williams	Affirmative	
1	Public Service Electric and Gas Co.	Kenneth D. Brown	Affirmative	
1	Public Utility District No. 2 of Grant County, Washington	Rod Noteboom		
1	Puget Sound Energy, Inc.	Denise M Lietz	Negative	
1	Rochester Gas and Electric Corp.	John C. Allen	Negative	
1	Sacramento Municipal Utility District	Tim Kelley	Affirmative	
1	Salt River Project	Robert Kondziolka	Negative	
1	Santee Cooper	Terry L Blackwell	Abstain	
1	Seattle City Light	Pawel Krupa	Negative	
1	Sho-Me Power Electric Cooperative	Denise Stevens	Affirmative	
1	Snohomish County PUD No. 1	Long T Duong	Negative	
1	South Carolina Electric & Gas Co.	Tom Hanzlik	Abstain	
1	Southern California Edison Company	Steven Mavis	Negative	
1	Southern Company Services, Inc.	Robert A. Schaffeld	Affirmative	
1	Southern Illinois Power Coop.	William Hutchison		
1	Southwest Transmission Cooperative, Inc.	John Shaver	Negative	
1	Sunflower Electric Power Corporation	Noman Lee Williams	Negative	
1	Tampa Electric Co.	Beth Young		
1	Tennessee Valley Authority	Howell D Scott	Affirmative	
1	Tri-State G & T Association, Inc.	Tracy Sliman	Affirmative	
1	Tucson Electric Power Co.	John Tolo	Affirmative	
1	Turlock Irrigation District	Esteban Martinez	Abstain	
1	United Illuminating Co.	Jonathan Appelbaum	Affirmative	
1	Westar Energy	Allen Klassen	Affirmative	
1	Western Area Power Administration	Brandy A Dunn	Affirmative	
1	Xcel Energy, Inc.	Gregory L Pieper	Affirmative	
2	BC Hydro	Venkataramakrishnan Vinnakota	Affirmative	
2	California ISO	Rich Vine	Negative	
2	Electric Reliability Council of Texas, Inc.	Cheryl Moseley	Affirmative	
2	Independent Electricity System Operator	Barbara Constantinescu	Affirmative	
2	ISO New England, Inc.	Kathleen Goodman	Negative	
2	Midwest ISO, Inc.	Marie Knox	Affirmative	
2	New Brunswick System Operator	Alden Briggs	Negative	
2	New York Independent System Operator	Gregory Campoli		
2	PJM Interconnection, L.L.C.	stephanie monzon		
2	Southwest Power Pool, Inc.	Charles H. Yeung	Affirmative	
3	AEP	Michael E Deloach	Affirmative	
3	Alabama Power Company	Robert S Moore	Affirmative	
3	Ameren Services	Mark Peters	Affirmative	
3	APS	Steven Norris	Affirmative	
3	Associated Electric Cooperative, Inc.	Chris W Bolick	Affirmative	
3	Atlantic City Electric Company	NICOLE BUCKMAN	Abstain	
3	Avista Corp.	Robert Lafferty		
3	BC Hydro and Power Authority	Pat G. Harrington	Affirmative	
3	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
3	Central Electric Power Cooperative	Adam M Weber	Affirmative	
3	City of Austin dba Austin Energy	Andrew Gallo	Affirmative	
3	City of Green Cove Springs	Gregg R Griffin	Negative	
3	City of Homestead	Orestes J Garcia		
3	City of Redding	Bill Hughes	Affirmative	
3	City of Tallahassee	Bill R Fowler	Abstain	
3	Cleco Corporation	Michelle A Corley		
3	Colorado Springs Utilities	Charles Morgan	Affirmative	
3	ComEd	John Bee	Affirmative	
3	Consolidated Edison Co. of New York	Peter T Yost	Affirmative	
3	Consumers Energy	Richard Blumenstock	Abstain	

3	CPS Energy	Jose Escamilla	Affirmative	
3	Delmarva Power & Light Co.	Michael R. Mayer	Abstain	
3	Detroit Edison Company	Kent Kujala	Affirmative	
3	Dominion Resources, Inc.	Connie B Lowe	Abstain	
3	Duke Energy Carolina	Henry Ernst-Jr		
3	East Kentucky Power Coop.	Patrick Woods	Negative	
3	Entergy	Joel T Plessinger	Negative	
3	FirstEnergy Energy Delivery	Stephan Kern	Affirmative	
3	Florida Municipal Power Agency	Joe McKinney	Affirmative	
3	Florida Power Corporation	Lee Schuster	Affirmative	
3	Georgia Power Company	Danny Lindsey	Affirmative	
3	Great River Energy	Brian Glover	Affirmative	
3	Gulf Power Company	Paul C Caldwell	Affirmative	
3	Hydro One Networks, Inc.	David Kiguel	Affirmative	
3	JEA	Garry Baker	Affirmative	
3	KAMO Electric Cooperative	Theodore J Hilmes	Affirmative	
3	Kansas City Power & Light Co.	Charles Locke	Affirmative	
3	Kissimmee Utility Authority	Gregory D Woessner		
3	Lakeland Electric	Mace D Hunter		
3	Lincoln Electric System	Jason Fortik	Affirmative	
3	Los Angeles Department of Water & Power	Daniel D Kurowski	Abstain	
3	Louisville Gas and Electric Co.	Charles A. Freibert	Affirmative	
3	M & A Electric Power Cooperative	Stephen D Pogue	Affirmative	
3	Manitoba Hydro	Greg C. Parent	Affirmative	
3	MidAmerican Energy Co.	Thomas C. Mielnik	Affirmative	
3	Mississippi Power	Jeff Franklin	Affirmative	
3	Modesto Irrigation District	Jack W Savage	Abstain	
3	Municipal Electric Authority of Georgia	Steven M. Jackson	Negative	
3	Muscatine Power & Water	John S Bos	Affirmative	
3	Nebraska Public Power District	Tony Eddleman	Abstain	
3	New York Power Authority	David R Rivera	Abstain	
3	Niagara Mohawk (National Grid Company)	Michael Schiavone	Affirmative	
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann	Affirmative	
3	Northern Indiana Public Service Co.	William SeDoris	Affirmative	
3	NW Electric Power Cooperative, Inc.	David McDowell	Affirmative	
3	Oklahoma Gas and Electric Co.	Gary Clear		
3	Orange and Rockland Utilities, Inc.	David Burke	Affirmative	
3	Orlando Utilities Commission	Ballard K Mutters	Abstain	
3	Owensboro Municipal Utilities	Thomas T Lyons	Affirmative	
3	Pacific Gas and Electric Company	John H Hagen	Negative	
3	PacifiCorp	Dan Zollner	Affirmative	
3	Platte River Power Authority	Terry L Baker	Affirmative	
3	PNM Resources	Michael Mertz	Affirmative	
3	Portland General Electric Co.	Thomas G Ward	Abstain	
3	Potomac Electric Power Co.	Mark Yerger	Abstain	
3	Public Service Electric and Gas Co.	Jeffrey Mueller	Affirmative	
3	Puget Sound Energy, Inc.	Erin Apperson	Negative	
3	Sacramento Municipal Utility District	James Leigh-Kendall	Affirmative	
3	Salt River Project	John T. Underhill	Negative	
3	Santee Cooper	James M Poston	Abstain	
3	Seattle City Light	Dana Wheelock	Negative	
3	Seminole Electric Cooperative, Inc.	James R Frauen		
3	Sho-Me Power Electric Cooperative	Jeff L Neas	Affirmative	
3	Snohomish County PUD No. 1	Mark Oens	Negative	
3	South Carolina Electric & Gas Co.	Hubert C Young		
3	Tacoma Public Utilities	Travis Metcalfe	Affirmative	
3	Tampa Electric Co.	Ronald L. Donahey	Affirmative	
3	Tennessee Valley Authority	Ian S Grant	Affirmative	
3	Tri-County Electric Cooperative, Inc.	Mike Swearingen	Affirmative	
3	Tri-State G & T Association, Inc.	Janelle Marriott	Affirmative	
3	Turlock Irrigation District	James Ramos		
3	Westar Energy	Bo Jones	Affirmative	
3	Xcel Energy, Inc.	Michael Ibold	Affirmative	
4	American Municipal Power	Kevin Koloini		
4	Blue Ridge Power Agency	Duane S Dahlquist	Affirmative	
4	City of Austin dba Austin Energy	Reza Ebrahimian	Affirmative	
4	City of New Smyrna Beach Utilities	Tim Beyrle	Affirmative	

	Commission			
4	City of Redding	Nicholas Zettel	Affirmative	
4	City Utilities of Springfield, Missouri	John Allen	Affirmative	
4	Constellation Energy Control & Dispatch, L.L.C.	Margaret Powell	Affirmative	
4	Consumers Energy	David Frank Ronk	Abstain	
4	Detroit Edison Company	Daniel Herring		
4	Flathead Electric Cooperative	Russ Schneider	Affirmative	
4	Florida Municipal Power Agency	Frank Gaffney	Affirmative	
4	Fort Pierce Utilities Authority	Cairo Vanegas	Negative	
4	Georgia System Operations Corporation	Guy Andrews	Affirmative	
4	Integrys Energy Group, Inc.	Christopher Plante	Abstain	
4	Modesto Irrigation District	Spencer Tacke	Abstain	
4	Ohio Edison Company	Douglas Hohlbaugh	Affirmative	
4	Public Utility District No. 1 of Snohomish County	John D Martinsen	Negative	
4	Sacramento Municipal Utility District	Mike Ramirez	Affirmative	
4	Seattle City Light	Hao Li	Negative	
4	Seminole Electric Cooperative, Inc.	Steven R Wallace	Affirmative	
4	South Mississippi Electric Power Association	Steven McElhaney		
4	Tacoma Public Utilities	Keith Morisette	Affirmative	
4	Turlock Irrigation District	Steven C Hill		
4	Wisconsin Energy Corp.	Anthony Jankowski	Abstain	
5	AEP Service Corp.	Brock Ondayko	Affirmative	
5	Amerenue	Sam Dwyer	Affirmative	
5	Arizona Public Service Co.	Scott Takinen	Affirmative	
5	Associated Electric Cooperative, Inc.	Matthew Pacobit		
5	Avista Corp.	Edward F. Groce	Affirmative	
5	BC Hydro and Power Authority	Clement Ma	Affirmative	
5	Boise-Kuna Irrigation District/dba Lucky peak power plant project	Mike D Kukla	Negative	
5	Bonneville Power Administration	Francis J. Halpin	Affirmative	
5	Brazos Electric Power Cooperative, Inc.	Shari Heino	Affirmative	
5	BrightSource Energy, Inc.	Chifong Thomas	Negative	
5	City and County of San Francisco	Daniel Mason	Abstain	
5	City of Austin dba Austin Energy	Jeanie Doty	Affirmative	
5	City of Redding	Paul A. Cummings	Affirmative	
5	City of Tallahassee	Karen Webb	Abstain	
5	City Water, Light & Power of Springfield	Steve Rose		
5	Cleco Power	Stephanie Huffman		
5	Colorado Springs Utilities	Jennifer Eckels	Affirmative	
5	Consolidated Edison Co. of New York	Wilket (Jack) Ng	Affirmative	
5	Consumers Energy Company	David C Greyerbiehl	Abstain	
5	Dairyland Power Coop.	Tommy Drea		
5	Detroit Edison Company	Alexander Eizans	Affirmative	
5	Dominion Resources, Inc.	Mike Garton	Abstain	
5	Duke Energy	Dale Q Goodwine	Affirmative	
5	East Kentucky Power Coop.	Stephen Ricker	Negative	
5	Electric Power Supply Association	John R Cashin		
5	Energy Services, Inc.	Tracey Stubbs	Negative	
5	Exelon Nuclear	Mark F Draper	Affirmative	
5	FirstEnergy Solutions	Kenneth Dresner		
5	Florida Municipal Power Agency	David Schumann	Affirmative	
5	Gainesville Regional Utilities	Karen C Alford		
5	Great River Energy	Preston L Walsh	Affirmative	
5	JEA	John J Babik	Affirmative	
5	Kansas City Power & Light Co.	Brett Holland	Affirmative	
5	Kissimmee Utility Authority	Mike Blough		
5	Lakeland Electric	James M Howard		
5	Lincoln Electric System	Dennis Florom	Affirmative	
5	Los Angeles Department of Water & Power	Kenneth Silver		
5	Manitoba Hydro	S N Fernando	Affirmative	
5	Massachusetts Municipal Wholesale Electric Company	David Gordon	Abstain	
5	MEAG Power	Steven Grego	Negative	
5	MidAmerican Energy Co.	Neil D Hammer	Affirmative	
5	Muscatine Power & Water	Mike Avesing	Affirmative	
5	Nebraska Public Power District	Don Schmit	Abstain	

5	New York Power Authority	Wayne Sipperly	Abstain	
5	NextEra Energy	Allen D Schriver	Abstain	
5	Northern Indiana Public Service Co.	William O. Thompson	Affirmative	
5	Oklahoma Gas and Electric Co.	Kim Morphis		
5	Omaha Public Power District	Mahmood Z. Safi	Affirmative	
5	Orlando Utilities Commission	Richard K Kinas		
5	PacifiCorp	Bonnie Marino-Blair	Affirmative	
5	Platte River Power Authority	Roland Thiel	Affirmative	
5	Portland General Electric Co.	Matt E. Jastram	Affirmative	
5	PPL Generation LLC	Annette M Bannon	Affirmative	
5	PSEG Fossil LLC	Tim Kucey	Affirmative	
5	Public Utility District No. 1 of Lewis County	Steven Grega	Abstain	
5	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		
5	Puget Sound Energy, Inc.	Lynda Kupfer	Negative	
5	Sacramento Municipal Utility District	Susan Gill-Zobitz		
5	Salt River Project	William Alkema	Negative	
5	Santee Cooper	Lewis P Pierce	Abstain	
5	Seattle City Light	Michael J. Haynes	Negative	
5	Seminole Electric Cooperative, Inc.	Brenda K. Atkins	Affirmative	
5	Snohomish County PUD No. 1	Sam Nietfeld	Negative	
5	South Carolina Electric & Gas Co.	Edward Magic	Abstain	
5	Southern California Edison Company	Denise Yaffe	Negative	
5	Southern Company Generation	William D Shultz	Affirmative	
5	Tacoma Power	Chris Mattson	Affirmative	
5	Tampa Electric Co.	RJames Rocha	Affirmative	
5	Tenaska, Inc.	Scott M. Helyer	Abstain	
5	Tennessee Valley Authority	David Thompson	Affirmative	
5	Tri-State G & T Association, Inc.	Mark Stein	Affirmative	
5	Turlock Irrigation District	Marty Rojas	Abstain	
5	U.S. Army Corps of Engineers	Melissa Kurtz	Affirmative	
5	Westar Energy	Bryan Taggart	Affirmative	
5	Xcel Energy, Inc.	Liam Noailles	Affirmative	
6	AEP Marketing	Edward P. Cox	Affirmative	
6	Ameren Energy Marketing Co.	Jennifer Richardson	Affirmative	
6	APS	Randy A. Young	Affirmative	
6	Associated Electric Cooperative, Inc.	Brian Ackermann	Affirmative	
6	Bonneville Power Administration	Brenda S. Anderson	Affirmative	
6	City of Austin dba Austin Energy	Lisa L Martin	Affirmative	
6	City of Redding	Marvin Briggs	Affirmative	
6	Cleco Power LLC	Robert Hirchak		
6	Consolidated Edison Co. of New York	Nickesha P Carrol	Affirmative	
6	Constellation Energy Commodities Group	David J Carlson	Affirmative	
6	Dominion Resources, Inc.	Louis S. Slade	Abstain	
6	Duke Energy	Greg Cecil	Affirmative	
6	Entergy Services, Inc.	Terri F Benoit	Negative	
6	FirstEnergy Solutions	Kevin Querry	Affirmative	
6	Florida Municipal Power Agency	Richard L. Montgomery	Affirmative	
6	Florida Municipal Power Pool	Thomas Washburn	Affirmative	
6	Florida Power & Light Co.	Silvia P. Mitchell	Abstain	
6	Imperial Irrigation District	Cathy Bretz	Abstain	
6	Kansas City Power & Light Co.	Jessica L Klinghoffer	Affirmative	
6	Lakeland Electric	Paul Shipps	Abstain	
6	Lincoln Electric System	Eric Ruskamp	Affirmative	
6	Los Angeles Department of Water & Power	Brad Packer	Abstain	
6	Manitoba Hydro	Daniel Prowse	Affirmative	
6	MidAmerican Energy Co.	Dennis Kimm	Affirmative	
6	Modesto Irrigation District	James McFall	Abstain	
6	Muscatine Power & Water	John Stolley	Affirmative	
6	New York Power Authority	Saul Rojas	Abstain	
6	Northern Indiana Public Service Co.	Joseph O'Brien	Affirmative	
6	Omaha Public Power District	David Ried		
6	Orlando Utilities Commission	Claston Augustus Sunanon		
6	PacifiCorp	Kelly Cumiskey	Affirmative	
6	Platte River Power Authority	Carol Ballantine	Affirmative	
6	Portland General Electric Co.	Ty Bettis	Affirmative	
6	PPL EnergyPlus LLC	Elizabeth Davis	Affirmative	

6	PSEG Energy Resources & Trade LLC	Peter Dolan	Affirmative	
6	Sacramento Municipal Utility District	Diane Enderby	Affirmative	
6	Salt River Project	Steven J Hulet	Negative	
6	Santee Cooper	Michael Brown	Abstain	
6	Seattle City Light	Dennis Sismaet	Negative	
6	Seminole Electric Cooperative, Inc.	Trudy S. Novak	Affirmative	
6	Snohomish County PUD No. 1	Kenn Backholm	Negative	
6	Southern California Edison Company	Lujuanna Medina	Negative	
6	Southern Company Generation and Energy Marketing	John J. Ciza	Affirmative	
6	Tacoma Public Utilities	Michael C Hill	Affirmative	
6	Tampa Electric Co.	Benjamin F Smith II		
6	Tenaska Power Services Co.	John D Varnell		
6	Tennessee Valley Authority	Marjorie S. Parsons	Affirmative	
6	Turlock Irrigation District	Amy Petersen	Abstain	
6	Westar Energy	Grant L Wilkerson	Affirmative	
6	Western Area Power Administration - UGP Marketing	Peter H Kinney	Affirmative	
6	Xcel Energy, Inc.	David F Lemmons	Affirmative	
8		Edward C Stein		
8		Roger C Zaklukiewicz	Affirmative	
8	JDRJC Associates	Jim Cyrulewski	Affirmative	
8	Massachusetts Attorney General	Frederick R Plett	Affirmative	
8	Power Energy Group LLC	Peggy Abbadini		
8	Utility Services, Inc.	Brian Evans-Mongeon	Negative	
8	Utility System Effeciencies, Inc. (USE)	Robert L Dintelman	Affirmative	
8	Volkmann Consulting, Inc.	Terry Volkmann	Affirmative	
10	Midwest Reliability Organization	William S Smith	Affirmative	
10	New York State Reliability Council	Alan Adamson	Negative	
10	Northeast Power Coordinating Council	Guy V. Zito	Negative	
10	ReliabilityFirst Corporation	Anthony E Jablonski	Affirmative	
10	Southwest Power Pool RE	Emily Pennel	Affirmative	
10	Texas Reliability Entity, Inc.	Donald G Jones	Affirmative	

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Account Log-In/Register

Exhibit I

Interpretation Drafting Team Roster for Project 2012-INT-02

Project 2012-INT-02 Interpretation Drafting Team Biographies	
Member	**Bio**
Douglas Hohlbaugh, P.E., Manager, Reliability Standards Development FirstEnergy Corp. 76 South Main Street Akron, Ohio 44308 hohlbaughdg@firstenergycorp.com	Mr. Hohlbaugh is Manager, Reliability Standards Development at FirstEnergy Corp. (FE). He has over 23 years of electric utility experience since joining the company's wholly-owned affiliate, Ohio Edison Company, in January 1990. He is responsible for providing oversight and ensuring timely adherence of newly proposed and/or revised reliability standards governing the bulk electric power system. Mr. Hohlbaugh previously held various engineering related positions, and has approximately eight years of transmission planning experience. He is currently the vice chair of the NERC Assess Future Transmission Needs Standards Drafting Team, which is re-writing the existing NERC Reliability Standards, TPL-001 through TPL-006. Mr. Hohlbaugh chaired the Project 2012-INT-02 Interpretation of TPL-003-0a and TPL-004-0 for the NERC System Protection and Control Subcommittee. Mr. Hohlbaugh holds a Bachelor of Science in Electrical Engineering degree from the University of Akron. He is also a registered Professional Engineer in the State of Ohio.
Ronald W. Mazur, P.E., Manager, System Planning Department Manitoba Hydro 820 Taylor Avenue P.O. Box 7950 Station Main Winnipeg, Manitoba R3C 0J1 rwmazur@hydro.mb.ca	Mr. Mazur has 39 years of electric power industry experience. He initially worked for Atomic Energy of Canada Limited and then joined Manitoba Hydro in 1974, where he has worked in station design, system operations and system planning. He currently manages the System Planning Department of Manitoba Hydro. Mr. Mazur has expertise in the application series and static var compensation, ac power system expansion planning and HVdc transmission planning. He is responsible for the development and maintenance of the Manitoba Hydro transmission system planning criteria and ensuring compliance to the NERC Reliability Standards related to the planning functions. Mr. Mazur is a Canadian Representative on the NERC Planning Committee, and the chair of Midwest Reliability Organization Planning Committee. He is currently a member of the NERC Assess Future Transmission Needs Standards Drafting Team which is re-writing the existing NERC Reliability Standards, TPL-001 through TPL-006. Mr. Mazur obtained his Bachelor of Science in Electrical Engineering degree in 1971, and his Masters of Science in Electrical Engineering degree in 1989, both from the University of Manitoba. He has been a registered Professional Engineer with the Association of Professional Engineers and Geoscientists of Manitoba since 1974.

Project 2012-INT-02 Interpretation Drafting Team Biographies	
Member	**Bio**
Bill Middaugh, P.E., System Protection Manager Tri-State Generation and Transmission Association, Inc. 1100 W. 116th Avenue Westminster, Colorado 80234 bmiddaugh@tristategt.org	Mr. Middaugh has approximately 31 years experience in the electric power industry with the last 23 years at Tri-State Generation and Transmission Association, Inc. His major experience is in power system protection and transmission system planning. He is currently the System Protection Manager in his group. In addition to system protection, he is responsible for power quality investigations, NERC Reliability Standard monitoring, and coordination with other entities. He is currently the vice chair of the NERC System Protection Coordination Standard Drafting Team working on Project 2007-06 and a member of the NERC Protection Systems Misoperations Standard Drafting Team working on Project 2010-5.1. Mr. Middaugh chaired two Western Electricity Coordinating Council (WECC) standard drafting teams regarding; the PRC-004-WECC-1 regional reliability standard and the PRC-003-WECC-CRT-1 regional criterion. He is a member of the WECC Relay Work Group, which he chaired for about five years. He is a member of Institute of Electrical and Electronics Engineers and is a registered Professional Engineer in the State of Colorado. Mr. Middaugh received his Bachelor of Science in Electrical Engineering degree from the University of Colorado at Boulder.
John Odom Vice President of Planning and Operations Florida Reliability Coordinating Council, Inc. 3000 Bayport Drive Suite 600 Tampa, Florida 33607 jodom@frcc.com	Mr. Odom is Vice President of Planning and Operations at the Florida Reliability Coordinating Council (FRCC). Mr. Odom joined FRCC in May, 2005 after 26 years at Progress Energy Corporation. He is responsible for oversight of all member services activities, including the FRCC standing committees, and FRCC Reliability Coordinator and Planning Coordinator functions. Additionally, he oversees the Regional Entity functions of reliability assessment, situational awareness, training and certification of system operators, and event analysis. From 2001 to 2007, Mr. Odom was the FRCC Representative on the NERC Reliability Assessment Subcommittee. He is currently the chair of the NERC Assess Future Transmission Needs Standards Drafting Team which is re-writing the existing NERC Reliability Standards, TPL-001 through TPL-006.
Robert (Bob) W. Pierce, P.E., Consulting Engineer Duke Energy 526 S. Church Street EC10Q Charlotte, North Carolina 28202 Bob.pierce@duke-energy.com	Mr. Pierce is a consulting engineer at Duke Energy where he specializes in Bulk Power System planning, NERC Reliability Standards, and Federal Energy Regulatory Commission regulations. He has 15 years of transmission planning experience and a total of 33 years of electric power system experience. Over the last decade, Mr. Pierce has served in various positions on several inter-utility groups. Currently, he is a member of the NERC Assess Future Transmission Needs Standard Drafting Team and was chair of the NERC Project 2010-10 FERC Order 729 team responsible for FAC-013-2. Mr. Peirce also chaired the North Carolina Transmission Planning Collaborative Planning Working Group and the effort to develop SERC's Facility Connection Requirements supplement to ensure compliance with the NERC Reliability

Project 2012-INT-02 Interpretation Drafting Team Biographies	
Member	**Bio**
	Standards. Mr. Pierce is a member of the Southeastern Electric Reliability Corporation (SERC) Long Term Study Group and has served several terms as the SERC Representative to the Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group. During his career in transmission planning, Mr. Pierce provided input and technical expertise on issues related to generator site selection and interconnection, transmission service and associated regulations, market power, and transmission planning requirements. Prior to joining transmission planning, Mr. Pierce provided engineering support for maintenance and operation at Duke's McGuire Nuclear Station. Mr. Pierce holds a Bachelor of Science in Nuclear Engineering degree from Pennsylvania State University and a Master of Science in Electrical Engineering degree from the University of North Carolina at Charlotte. He is a registered Professional Engineer in the State of North Carolina.
Patrick Sorrells, P.E., Supervisor of System Protection and Control Sacramento Municipal Utility District 6001 S. Street Sacramento, California 95817 psorrel@smud.org	Mr. Sorrells has 19 years of electric power industry experience. He is currently the Supervisor of System Protection and Control at the Sacramento Municipal Utility District (SMUD) where his group is responsible for the company's transmission and generation protection systems. Prior to working at SMUD, he spent 11 years with CenterPoint Energy in Houston in various capacities as a relay engineer working on distribution and transmission protection systems and as a reliability engineer providing technical support to field crews including addressing technical complaints from customers. Mr. Sorrells is currently a member of the NERC Protection Systems Misoperations Standard Drafting Team working on Project 2010-5.1. Mr. Sorrells holds a Bachelor of Science in Electrical Engineering degree from the University of Texas at Austin and a Masters in Business Administration degree from the University of Houston. He is also a registered Professional Engineer in the State of Texas.
John A. Zipp, P.E., Senior Staff Engineer ITC Holdings 27175 Energy Way Novi, Michigan 48377 jzipp@itctransco.com	Mr. Zipp has over 30 years of transmission system protection experience. He has 27 years of experience at Consumers Energy in the area of system protection. He spent 20 of those years as the supervisor of the transmission system protection group directing protection system design, setting, and managing the protective system maintenance program. He was System Control Supervisor for 4 years, directing the south control room in Jackson, Michigan. He is presently a Senior Staff Engineer at ITC Holdings directing the Relay Engineering department since 2007. He is an Institute of Electrical and Electronics Engineers (IEEE) Senior Member and was a member of the IEEE Power System Relaying Technical Committee for 17 years serving many working groups which included chairing the Line Protection Committee. He

Project 2012-INT-02 Interpretation Drafting Team Biographies	
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Scott Barfield-McGinnis, P.E., Standards Developer North American Electric Reliability Corporation 3353 Peachtree Road, NE Suite 600 – North Tower Atlanta, Georgia 30326 scott.barfield@nerc.net	Mr. Barfield-McGinnis is a Standards Developer in NERC's Reliability Standards Development group. He supports NERC's continual mission of managing and improving standard development, revisions, interpretations, and other reliability standards related projects through the valued participation of industry technical subject matter experts. Before joining NERC, he was the Bulk Electric System Compliance Manager at Georgia System Operations Corporation. Other positions held throughout his 27-year career in power include system engineer, planner, and engineering manager with oversight in energy control systems, planning and forecasting, as well as, asset management. Mr. Barfield-McGinnis is a member of the Institute of Electrical and Electronics Engineers (IEEE), past Board Member of the IEEE Central Georgia Section, and continues to provide technical presentations at IEEE functions. Mr. Barfield-McGinnis holds a Bachelor of Science in Electrical Engineering Technology degree from the Southern Polytechnic State University and a Master of Business Administration degree from Mercer University, and is also a registered Professional Engineer in the State of Georgia.
Philip J. Tatro, P.E., Senior Performance and Analysis Engineer North American Electric Reliability Corporation 3353 Peachtree Road NE Suite 600 – North Tower Atlanta, Georgia 30326 phil.tatro@nerc.net	Mr. Tatro is a Senior Performance and Analysis Engineer in NERC's Reliability Initiatives and System Analysis group and has 26 years of industry experience. He is the NERC staff coordinator for the System Protection Control Subcommittee and provides technical expertise to several standard development projects, event analyses, and reliability initiatives. Prior to joining NERC he worked for 23 years at New England Electric System and National Grid. His experience there included assignments in Protection and Control Engineering, the Québec-New England 2,000 MW HVdc interconnection, development of independent transmission projects, and Transmission Planning. During this time he was a member of several NERC, Northeast Power Coordinating Council (NPCC) and New England Power Pool committees, task forces, and standard drafting teams. Mr. Tatro chaired the NPCC SS-38 Working Group on Inter-Area Dynamic Analysis and the NERC Major System Disturbance Task Force responsible for dynamic simulation of the August 14, 2003 blackout. Mr. Tatro received his Bachelor of Science and Master of Engineering degrees from Rensselaer Polytechnic Institute in Troy, New York in 1985 and 1986 respectively. He is a registered Professional Engineer in the Commonwealth of Massachusetts. He is a member of the Institute of Electrical and Electronics Engineers (IEEE) Power & Energy Society and is an active participant in the IEEE

Project 2012-INT-02 Interpretation Drafting Team Biographies	
Member	**Bio**
	Power System Relaying Committee.