

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

Standard Development Timeline

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

Development Steps Completed

1. SAR posted for comment November 20 – December 19, 2013.
2. The Standards Committee authorized this posting on July 1, 2014.

Description of Current Draft

This version of PRC-004 contains applicability revisions to the Standard intended to clarify application of the Requirements to Bulk Electric System (BES) dispersed power producing resources. A subsequent version of PRC-004, i.e., PRC-004-3, also is under active standard development. Depending on the timing of regulatory approval, this interim version, which has been labeled PRC-004-2.1a(X) for balloting purposes, may be filed for regulatory approval. Project 2014-01 does not have in its scope any technical content changes beyond revising the applicability to ensure consistent application of the Requirements of PRC-004 to dispersed power producing resources.

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with Initial Ballot	July – August 2014
45-day Additional Formal Comment Period with Additional Ballot (if necessary)	September – October 2014
Final ballot	November 2014
BOT adoption	February 2015

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

When this standard has received ballot approval, the text boxes within the Applicability section of the Standard will be moved to the Application Guidelines Section of the Standard.

A. Introduction

1. **Title:** Analysis and Mitigation of Transmission and Generation Protection System Misoperations
2. **Number:** PRC-004-2.1a(X)
3. **Purpose:** Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.
4. **Applicability**
 - 4.1. Transmission Owner.
 - 4.2. Distribution Provider that owns a transmission Protection System.
 - 4.3. Generator Owner.
5. **(Proposed) Effective Date:** In those jurisdictions where regulatory approval is required, all requirements become effective upon approval. In those jurisdictions where no regulatory approval is required, all requirements become effective upon Board of Trustees' adoption.

The only revisions made to this version of PRC-004 are revisions to Requirements R2 and R3 to clarify applicability of the Requirements of the standard at generator Facilities. These applicability revisions are intended to clarify and provide for consistent application of the Requirements to BES generator Facilities included in the BES through Inclusion I4 – Dispersed Power Producing Resources.

This version is labeled PRC-004-2.1a(X) for balloting purposes. The 'X' indicates that a version number will be applied at a later time, because multiple versions of PRC-004 are in development. The 'X' designation reflects the fact that applicability changes need to apply to versions of the standard that are approved (PRC-004-2.1a) and in development in Project 2010-05.1. Depending on the timing of approvals of other versions, NERC may file this interim version to provide regulatory certainty for entities as the revised BES definition is implemented.

Rationale for Applicability: Misoperations occurring on the Protection Systems of individual generation resources identified under Inclusion I4 of the BES definition do not have a material impact on BES reliability when considered individually; however, the aggregate capability of these resources may impact BES reliability if a number of Protection Systems on the individual power producing resources incorrectly operated or failed to operate as designed during a system event. To recognize the potential for the Protection Systems of individual power producing resources to affect the reliability of the Bulk-Power System, Requirement R2 and Requirement R3 reflect the threshold consistent with the revised BES definition. See paragraph 20 of FERC Order Approving Revised Definition in Docket No. RD14-2-000. The intent of Requirement R2 and Requirement R3 is to exclude from the standard requirements these Protection Systems for “common-mode failure” type scenarios affecting less than or equal to 75 MVA aggregated nameplate generating capability at these dispersed generating facilities

B. Requirements

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

- R1.** The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity’s procedures.
- R2.** The Generator Owner shall analyze its generator and generator interconnection Facility Protection System Misoperations, and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity’s procedures.
- For Misoperations occurring on the protection systems of individual dispersed power producing resources identified under Inclusion I4 of the BES definition where the Misoperations affected an aggregate nameplate rating of less than or equal to 75 MVA of BES facilities, this requirement does not apply.
- R3.** The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Entity, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Entity’s procedures.
- For Misoperations occurring on the protection systems of individual dispersed power producing resources identified under Inclusion I4 of the BES definition where the Misoperations affected an aggregate nameplate rating of less than or equal to 75 MVA of BES facilities, this requirement does not apply.

C. Measures

- M1.** The Transmission Owner, and any Distribution Provider that owns a transmission Protection System shall each have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Entity’s procedures.
- M2.** The Generator Owner shall have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Entity’s procedures.
- M3.** Each Transmission Owner, and any Distribution Provider that owns a transmission Protection System, and each Generator Owner shall have evidence it provided documentation of its Protection System Misoperations, analyses and Corrective Action Plans according to the Regional Entity’s procedures.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Compliance Monitoring and Enforcement Processes:

Compliance Audits
Self-Certifications

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

The Transmission Owner, and Distribution Provider that own a transmission Protection System and the Generator Owner that owns a generation or generator interconnection Facility Protection System shall each retain data on its Protection System Misoperations and each accompanying Corrective Action Plan until the Corrective Action Plan has been executed or for 12 months, whichever is later.

The Compliance Monitor shall retain any audit data for three years.

1.5. Additional Compliance Information

The Transmission Owner, and any Distribution Provider that owns a transmission Protection System and the Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Violation Severity Levels (no changes)

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	December 1, 2005	1. Changed incorrect use of certain hyphens (-) to “en dash” (–) and “em dash (—).” 2. Added “periods” to items where appropriate. Changed “Timeframe” to “Time Frame” in item D, 1.2.	01/20/06
2		Modified to address Order No. 693 Directives contained in paragraph 1469.	Revised
2	August 5, 2010	Adopted by NERC Board of Trustees	
1a	February 17, 2011	Added Appendix 1 - Interpretation regarding applicability of standard to protection of radially connected transformers	Project 2009-17 interpretation
1a	February 17, 2011	Adopted by the Board of Trustees	

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

1a	September 26, 2011	FERC Order issued approving the interpretation of R1 and R3 (FERC’s Order is effective as of September 26, 2011)	
2a	September 26, 2011	Appended FERC-approved interpretation of R1 and R3 to version 2	
2.1a		Errata change: Edited R2 to add “...and generator interconnection Facility...”	Revision under Project 2010-07
2.1a	February 9, 2012	Errata change adopted by the Board of Trustees	
2.1a	September 19, 2013	FERC Order issued approving PRC-004-2.1a (approval becomes effective November 25, 2013).	
TBD (balloted as 2.1a(X))	TBD	Standard revised in Project 2014-01	Applicability revised to clarify application of Requirements to BES dispersed power producing resources

Appendix 1¹

Requirement Number and Text of Requirement
<p>R1. The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization’s procedures developed for Reliability Standard PRC-003 Requirement 1.</p> <p>R3. The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Reliability Organization, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Reliability Organization’s procedures developed for PRC-003 R1.</p>
Question:
Is protection for a radially-connected transformer protection system energized from the BES considered a transmission Protection System subject to this standard?
Response:

¹ When the request for interpretation was made, it was for a previous version of the standard. Although the interpretation references a previous version of the standard, because it is still applicable in this case, it is appended to this version of the standard.

Standard PRC-004-2.1a(X) – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

The request for interpretation of PRC-004-1 Requirements R1 and R3 focuses on the applicability of the term “transmission Protection System.” The NERC Glossary of Terms Used in Reliability Standards contains a definition of “Protection System” but does not contain a definition of transmission Protection System. In these two standards, use of the phrase transmission Protection System indicates that the requirements using this phrase are applicable to any Protection System that is installed for the purpose of detecting faults on transmission elements (lines, buses, transformers, etc.) identified as being included in the Bulk Electric System (BES) and trips an interrupting device that interrupts current supplied directly from the BES.

A Protection System for a radially connected transformer energized from the BES would be considered a transmission Protection System and subject to these standards only if the protection trips an interrupting device that interrupts current supplied directly from the BES and the transformer is a BES element.