NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2010-05.1 – Protection Systems: Phase 1 (Misoperations)

Requested Approvals

- PRC-004-3 – Protection System Misoperation Identification and Correction

Requested Retirements

- PRC-003-1 – Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection System
- PRC-004-~~2a~~2.1a – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

Prerequisite Approvals

- None

Revisions to Defined Terms in the NERC Glossary

The standard~~s~~ drafting team proposes ~~modifying~~ the following ~~approved~~new definition:

Composite Protection System:

The total complement of the Protection System(s) that function collectively to protect an Element, such as any primary, secondary, local backup, and communication-assisted relay systems. Backup protection provided by a remote Protection System is excluded.

The standard drafting team proposes the following revised definition:

Misoperation:

The failure of ~~an Element's composite~~a Composite Protection System to operate as intended. Any of the following is ~~considered~~ a Misoperation:

1. **Failure to Trip ~~–~~ During Fault ~~–~~** A failure of a Composite Protection System to operate for a Fault ~~within the zone~~ condition for which it is designed ~~to protect~~. The failure of a Protection System component is not a Misoperation as long as the ~~overall~~ performance of the Composite Protection System ~~for the Element it is designed to protect~~ is correct.
2. **Failure to Trip ~~–~~ Other Than Fault ~~–~~** A failure of a Composite Protection System to operate for a non-Fault condition for which ~~the Protection System was intended to operate~~it is

designed, such as a power swing, ~~under-voltage, over excitation~~undervoltage, overexcitation, or loss of excitation. The failure of a Protection System component is not a Misoperation as long as the ~~overall~~ performance of the Composite Protection System ~~for the Element it is designed to protect~~ is correct.

3. **Slow Trip ~~–~~ During Fault ~~–~~** A Composite Protection System operation that is slower than ~~intended~~required for a Fault ~~within the zone~~ condition for which it is designed ~~to protect~~. Delayed ~~Fault~~ clearing ~~associated with an installed high-speed protection scheme is not~~ of a Fault condition is a Misoperation if ~~the~~ high-speed performance ~~has not been~~was previously identified ~~to meet the~~ as being necessary to prevent voltage or dynamic ~~stability performance requirements of the TPL standards nor is it required to ensure coordination with~~instability, or resulted in the operation of any other Composite Protection System~~s~~.

4. **Slow Trip ~~–~~ Other Than Fault ~~–~~** A Composite Protection System operation that is slower than ~~intended~~required for a non-Fault condition for which it is designed, such as a power swing, ~~under-voltage, over excitation~~undervoltage, overexcitation, or loss of excitation ~~for which the Protection System was intended to operate~~. Delayed clearing of a non-Fault condition is a Misoperation if high-speed performance was previously identified as being necessary to prevent voltage or dynamic instability, or resulted in the operation of any other Composite Protection System.

5. **Unnecessary Trip ~~–~~ During Fault ~~– A –~~** An unnecessary Protection System operation for a Fault ~~for which the Protection System is not intended to operate~~condition on another Element.

6. **Unnecessary Trip ~~–~~ Other Than Fault ~~–~~** An unnecessary Protection System operation for a non-Fault condition for which it is not designed. A Protection System operation ~~for a non-Fault condition for which the Protection System is not intended to operate, and~~ that is ~~unrelated to~~caused by on-site maintenance, testing, inspection, construction or commissioning activities~~.~~

~~Background~~

~~PRC-004-3 Protection System Misoperation Identification and Correction~~ is ~~a revision of PRC-004-2a Analysis and Mitigation of Transmission and Generation Protection System Misoperations with the stated purpose: Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated. PRC-003-1 Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems required the Regions to establish procedures for analysis of Misoperations. In FERC Order No. 693, the Commission identified PRC-003-0 as a fill-in-the-blank standard. The Order stated that because the regional procedures had not been submitted, the Commission proposed not to approve or remand PRC-003-0. Because PRC-003-0 (now PRC-003-1) is not enforceable, there is not a mandatory requirement for Regional procedures to support the requirements of PRC-004-2a. This is~~ not a ~~potential~~

~~reliability gap; consequently, PRC-004-3 combines the reliability intent of the two legacy standards PRC-003-1 and PRC-004-2a~~Misoperation.

General Considerations

~~PRC-004-WECC-1 – This regional standard is related to reporting of Misoperations for a limited set of WECC Paths and Remedial Action Schemes. In those cases where PRC-004-WECC-1 overlaps with the Continent-wide standard, entities are expected to comply with the more stringent standard.~~

The implementation period allows adequate time for applicable entities to develop or modify its procedures and processes for reviewing Protection System operations. The obligation for reporting Misoperations has been removed from PRC-004 and is being developed under the NERC Rules of Procedure, Section 1600 – Request for Data or Information. The development and implementation of a Corrective Action Plan remains within the scope of PRC-004; therefore, little additional time and resources should be needed to account for the increased detail in the required performance identified in the proposed PRC-004-3 Reliability Standard.

Applicability

This standard applies to the following functional entities:

- Transmission Owner
- Generator Owner
- Distribution Provider

This standard applies to the following Facilities:

- Protection Systems for BES Elements.
- Underfrequency Load Shedding (UFLS) that trips a BES Element
- Special Protection Systems (SPS), Remedial Action Schemes (RAS), and Undervoltage Load Shedding (UVLS) are excluded

- Non-protective functions that may be imbeddedare embedded within a Protection System are excluded. Protective functions intended to operate as a control function during switching are excluded.
- Underfrequency load shedding (UFLS) that is intended to trip one or more BES Elements.

Effective Dates of New or Revised Standards and Definitions

First day ofExcept in the Western Interconnection, the standard and definitions shall become effective on the first day of the first calendar quarter that is twelve months beyondafter the date that PRC-004-3the standard is approved by an applicable regulatory authorities, or in those jurisdictionsgovernmental authority or as otherwise provided for in a jurisdiction where regulatory approval by an applicable governmental authority is required for a standard to go into effect. Except in the Western Interconnection, where approval by an applicable governmental authority is not required, the standard becomesand definitions shall become effective on the first day of the first calendar quarter that is twelve months beyondafter the date thisthe standard is approvedadopted by the NERC Board of Trustees, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authoritiesprovided for in that jurisdiction.

The proposed definition of Misoperation In the Western Interconnection, the standard and definitions shall become effective on the same date as PRC-004-3. Entities shall use this definition when implementing any portions of Requirements R1, R2 R3 and R4 that use this defined term.

Implementation Plan for Requirements R1, R2, R3 and R4

Entities shall be 100% compliant for any new Protection System Operation on the first day of the first calendar quarter twelvethat is twenty-four months followingafter the date that the standard is approved by an applicable regulatory approvals,governmental authority or as otherwise provided for in those jurisdictionsa jurisdiction where no regulatory approval by an applicable governmental authority is required, for a standard to go into effect. In the Western Interconnection, where approval by an applicable governmental authority is not required, the standard and definitions shall become effective on the first day of the first calendar quarter twelvethat is twenty-four months followingafter the date the standard is adopted by the NERC Board of Trustees adoption. Protection System operations that occur before the compliance date shall comply with the previous version of the Standardor as otherwise provided for in that jurisdiction.

Implementation Plan for PRC-004-3, All Requirements

Each Transmission Owner, Generator Owner, and Distribution Provider applicable to this standard shall be 100% compliant upon the effective date of the standard.

The extended implementation for the Western Interconnection is provided to allow an opportunity to make the necessary changes to the PRC-004-WECC-1 Regional Reliability Standard. An overlap in performance between the regional and proposed continent-wide standard was identified during the development of the proposed PRC-004-3 Reliability Standard.

Implementation Plan for definitions

The revised definition of Misoperation and the new definition of Composite Protection System shall be implemented concurrently with the standard upon the effective dates noted above. Note that the Western Interconnection has an extended implementation.

Retirement of Existing Standards

~~The~~ Except in the Western Interconnection, the existing standards PRC-003-1 and PRC-004-~~2a~~2.1a shall be retired at midnight of the day immediately prior to the effective date of PRC-004-3. In the Western Interconnection, the existing standards PRC-003-1 and PRC-004-2.1a shall be retired at midnight of the day immediately prior to the effective date of PRC-004-3 for the Western Interconnection.