

A. Introduction

1. **Title:** Transmission and Generation Protection System Maintenance and Testing
2. **Number:** PRC-005-1b
3. **Purpose:** To ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.
4. **Applicability**
 - 4.1. Transmission Owner.
 - 4.2. Generator Owner.
 - 4.3. Distribution Provider that owns a transmission Protection System.
5. **Effective Date*:** To be determined

B. Requirements

- R1.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall have a Protection System maintenance and testing program for Protection Systems that affect the reliability of the BES. The program shall include:
 - R1.1.** Maintenance and testing intervals and their basis.
 - R1.2.** Summary of maintenance and testing procedures.
- R2.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall provide documentation of its Protection System maintenance and testing program and the implementation of that program to its Regional Reliability Organization on request (within 30 calendar days). The documentation of the program implementation shall include:
 - R2.1.** Evidence Protection System devices were maintained and tested within the defined intervals.
 - R2.2.** Date each Protection System device was last tested/maintained.

C. Measures

- M1.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System that affects the reliability of the BES, shall have an associated Protection System maintenance and testing program as defined in Requirement 1.
- M2.** Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System that affects the reliability of the BES, shall have evidence it provided documentation of its associated Protection System maintenance and testing program and the implementation of its program as defined in Requirement 2.

D. Compliance

1. **Compliance Monitoring Process**
 - 1.1. **Compliance Monitoring Authority**

The British Columbia Utilities Commission

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1.2. Compliance Monitoring Period and Reset Time Frame

One calendar year.

1.3. Data Retention

The Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System, shall retain evidence of the implementation of its Protection System maintenance and testing program for three years.

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

1.4. Additional Compliance Information

The Transmission Owner and any Distribution Provider that owns a transmission Protection System and the Generator Owner that owns a generation Protection System, shall each 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. Levels of Non-Compliance

- 2.1. Level 1:** Documentation of the maintenance and testing program provided was incomplete as required in R1, but records indicate maintenance and testing did occur within the identified intervals for the portions of the program that were documented.
- 2.2. Level 2:** Documentation of the maintenance and testing program provided was complete as required in R1, but records indicate that maintenance and testing did not occur within the defined intervals.
- 2.3. Level 3:** Documentation of the maintenance and testing program provided was incomplete, and records indicate implementation of the documented portions of the maintenance and testing program did not occur within the identified intervals.
- 2.4. Level 4:** Documentation of the maintenance and testing program, or its implementation, was not provided.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	December 1, 2005	<ul style="list-style-type: none"> 1. Changed incorrect use of certain hyphens (-) to “en dash” (–) and “em dash (—).” 2. Added “periods” to items where appropriate. 3. Changed “Timeframe” to “Time Frame” in item D, 1.2. 	01/20/05

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1	February 7, 2006	Adopted by NERC Board of Trustees	
1a	November 5, 2009	Interpretation of R1, R1.1, and R1.2 adopted by the NERC Board of Trustees	Project 2009-10 Interpretation
1a	February 17, 2011	Interpretation regarding applicability of standard to protection of radially connected transformers adopted by the NERC Board of Trustees (adopted and filed as -1a instead of -1b)	Project 2009-17 Interpretation
1a	September 26, 2011	FERC Order issued approving interpretation regarding applicability of standard to protection of radially connected transformers (FERC's Order is effective as of September 26, 2011)	Project 2009-17 Interpretation
1b	February 3, 2012	FERC Order issued approving interpretation of R1, R1.1, and R1.2 (FERC's Order is effective as of March 14, 2012). Updated version from 1a to 1b.	Project 2009-10 Interpretation

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Appendix 1

Requirement Number and Text of Requirement
<p>R1. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall have a Protection System maintenance and testing program for Protection Systems that affect the reliability of the BES. The program shall include:</p> <p>R1.1. Maintenance and testing intervals and their basis.</p> <p>R1.2. Summary of maintenance and testing procedures.</p> <p>R2. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall provide documentation of its Protection System maintenance and testing program and the implementation of that program to its Regional Reliability Organization on request (within 30 calendar days). The documentation of the program implementation shall include:</p> <p>R2.1 Evidence Protection System devices were maintained and tested within the defined intervals.</p> <p>R2.2 Date each Protection System device was last tested/maintained.</p>
Question:
<p>Is protection for a radially-connected transformer protection system energized from the BES considered a transmission Protection System subject to this standard?</p>
Response:
<p>The request for interpretation of PRC-005-1 Requirements R1 and R2 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.</p> <p>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.</p>

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Appendix 2¹

Requirement Number and Text of Requirement
<p>R1. Each Transmission Owner and any Distribution Provider that owns a transmission Protection System and each Generator Owner that owns a generation Protection System shall have a Protection System maintenance and testing program for Protection Systems that affect the reliability of the BES. The program shall include:</p> <p>R1.1. Maintenance and testing intervals and their basis.</p> <p>R1.2. Summary of maintenance and testing procedures.</p>
Question #1
Does R1 require a maintenance and testing program for the battery chargers for the “station batteries” that are considered part of the Protection System?
Response to Question #1
While battery chargers are vital for ensuring “station batteries” are available to support Protection System functions, they are not identified within the definition of “Protection Systems.” Therefore, PRC-005-1 does not require maintenance and testing of battery chargers.
Question #2
Does R1 require a maintenance and testing program for auxiliary relays and sensing devices? If so, what types of auxiliary relays and sensing devices? (i.e. transformer sudden pressure relays)
Response to Question #2
The existing definition of “Protection System” does not include auxiliary relays; therefore, maintenance and testing of such devices is not explicitly required. Maintenance and testing of such devices is addressed to the degree that an entity’s maintenance and testing program for DC control circuits involves maintenance and testing of imbedded auxiliary relays. Maintenance and testing of devices that respond to quantities other than electrical quantities (for example, sudden pressure relays) are not included within Requirement R1.
Question #3
Does R1 require maintenance and testing of transmission line re-closing relays?
Response to Question #3
No. “Protective Relays” refer to devices that detect and take action for abnormal conditions. Automatic restoration of transmission lines is not a “protective” function.
Question #4
Does R1 require a maintenance and testing program for the DC circuitry that is just the circuitry with relays and devices that control actions on breakers, etc., or does R1 require a program for the entire circuit from the battery charger to the relays to circuit breakers and all associated

¹ According to the FERC Order issued approving a modified definition of Protection System (RD11-13-000), this interpretation will be superseded by the modified definition of Protection System when the modified definition becomes effective. The modified definition of Protection System becomes effective on April 1, 2013.

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wiring?
Response to Question #4
PRC-005-1 requires that entities 1) address DC control circuitry within their program, 2) have a basis for the way they address this item, and 3) execute the program. PRC-005-1 does not establish specific additional requirements relative to the scope and/or methods included within the program.
Question #5
For R1, what are examples of "associated communications systems" that are part of "Protection Systems" that require a maintenance and testing program?
Response to Question #5
<p>"Associated communication systems" refer to communication systems used to convey essential Protection System tripping logic, sometimes referred to as pilot relaying or teleprotection. Examples include the following:</p> <ul style="list-style-type: none">• communications equipment involved in power-line-carrier relaying• communications equipment involved in various types of permissive protection system applications• direct transfer-trip systems• digital communication systems (which would include the protection system communications• functions of standard IEC 618501 as well as various proprietary systems)