

Uses of “Special Protection System” and “Remedial Action Scheme” in Reliability Standards

This document provides a summary of the occurrences of “Special Protection System” (“SPS”) and “Remedial Action Scheme” (“RAS”) in the existing NERC Reliability Standards to assist entities in assessing the impact of the proposed definition of “Remedial Action Scheme.” The existing Reliability Standards and certain NERC Glossary of Terms use the terms interchangeably.¹ Changes are proposed in this Project for each applicable standard and NERC Glossary term to align the use of the terminology in each instance. Where only the term SPS occurs, it was replaced with RAS. Where both terms, SPS and RAS, occur, the drafting team deleted the references to SPS. Where only the term RAS occurs, no change was made. In all cases, entities should apply the proposed definition of RAS to its own schemes, and determine any impact.

General Description of Definition Change

The revised definition of RAS will create one definition to replace both existing definitions in the NERC Glossary of Terms, for use throughout the NERC Reliability Standards. The revised definition of RAS addresses ambiguities within the existing definition and provides clarity to promote consistency in the application of the standards by the responsible entities and the auditing of the standards by compliance staff. The revised definition of RAS recasts the existing definition of SPS to:

- more precisely describe the objectives of the schemes;
- more precisely describe exclusions;
- state the relationship between Protection Systems and RAS; and
- clarify that centrally controlled undervoltage-based load shedding is included in the definition.

Uses of SPS and RAS in Existing Reliability Standards and NERC Glossary of Terms

The table below includes each occurrence of SPS and RAS found in the applicability sections, requirements, tables, and attachments of the existing NERC Reliability Standards (as of May 16, 2014). The table does not reflect any associated occurrences in other sections of the standard such as the measures, compliance information, and Violation Severity Levels. All occurrences have been reflected in the separate document *Revised Reliability Standards for the Revised Definition of “Remedial Action Scheme.”*

¹ NERC, *Reliability Standards for the Bulk Electric Systems of North America* (Updated May 16, 2014).

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| <p>CIP-002-3 CIP-002-3b</p> | <p>B. Requirements</p> <p>R1. Critical Asset Identification Method — The Responsible Entity shall identify and document a risk-based assessment methodology to use to identify its Critical Assets.</p> <p style="padding-left: 40px;">R1.1. The Responsible Entity shall maintain documentation describing its risk-based assessment methodology that includes procedures and evaluation criteria.</p> <p style="padding-left: 40px;">R1.2. The risk-based assessment shall consider the following assets:</p> <p style="padding-left: 80px;">R1.2.6. Special Protection Systems that support the reliable operation of the Bulk Electric System.</p> |
| <p>CIP-002-5.1</p> | <p>4. Applicability:</p> <p style="padding-left: 40px;">4.1.2. Distribution Provider that owns one or more of the following Facilities, systems, and equipment for the protection or restoration of the BES:</p> <p style="padding-left: 80px;">4.1.2.2. Each Special Protection System or Remedial Action Scheme where the Special Protection System or Remedial Action Scheme is subject to one or more requirements in a NERC or Regional Reliability Standard.</p> <hr/> <p>B. Requirements and Measures</p> <p>R1. Each Responsible Entity shall implement a process that considers each of the following assets for purposes of parts 1.1 through 1.3: [<i>Violation Risk Factor: High</i>][<i>Time Horizon: Operations Planning</i>]</p> <p style="padding-left: 40px;">v. Special Protection Systems that support the reliable operation of the Bulk Electric System;...</p> <hr/> <p>Attachment 1: Impact Rating Criteria</p> <p>2. Medium Impact Rating (M)</p> <p style="padding-left: 40px;">2.9. Each Special Protection System (SPS), Remedial Action Scheme (RAS), or automated switching System that operates BES Elements, that, if destroyed, degraded, misused or otherwise rendered unavailable, would cause one or more Interconnection Reliability Operating Limits (IROLs) violations for failure to operate as designed or cause a reduction in one or more IROLs if destroyed, degraded, misused, or otherwise rendered unavailable.</p> <hr/> <p>3. Low Impact Rating (L)</p> <p style="padding-left: 40px;">3.5. Special Protection Systems that support the reliable operation of the Bulk Electric System.</p> |

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| <p>CIP-003-5 CIP-004-5.1 CIP-005-5 CIP-006-5 CIP-007-5 CIP-008-5 CIP-009-5 CIP-010-1 CIP-011-1</p> | <p>(All standards)</p> <p>4. Applicability:</p> <p>4.1.2.2. Each Special Protection System or Remedial Action Scheme where the Special Protection System or Remedial Action Scheme is subject to one or more requirements in a NERC or Regional Reliability Standard.</p> <p>4.2.1.2. Each Special Protection System or Remedial Action Scheme where the Special Protection System or Remedial Action Scheme is subject to one or more requirements in a NERC or Regional Reliability Standard.</p> | | | |
| <p>EOP-004-2</p> | <p>Attachment 1: Reportable Events</p> <table border="1" data-bbox="363 768 1484 926"> <tr> <td data-bbox="363 768 807 926">BES Emergency resulting in automatic firm load shedding</td> <td data-bbox="807 768 912 926">DP, TOP</td> <td data-bbox="912 768 1484 926">Automatic firm load shedding ≥ 100 MW (via automatic undervoltage or underfrequency load shedding schemes, or SPS/RAS).</td> </tr> </table> | BES Emergency resulting in automatic firm load shedding | DP, TOP | Automatic firm load shedding ≥ 100 MW (via automatic undervoltage or underfrequency load shedding schemes, or SPS/RAS). |
| BES Emergency resulting in automatic firm load shedding | DP, TOP | Automatic firm load shedding ≥ 100 MW (via automatic undervoltage or underfrequency load shedding schemes, or SPS/RAS). | | |
| <p>FAC-010-2.1</p> | <p>B. Requirements</p> <p>R3. The Planning Authority’s methodology for determining SOLs, shall include, as a minimum, a description of the following, along with any reliability margins applied for each:</p> <p>R3.4. Allowed uses of Special Protection Systems or Remedial Action Plans.</p> <p>E. Regional Differences</p> <p>1.1. As governed by the requirements of R2.5 and R2.6, starting with all Facilities in service, shall require the evaluation of the following multiple Facility Contingencies when establishing SOLs:</p> <p>1.1.4 The failure of a circuit breaker associated with a Special Protection System to operate when required following: the loss of any element without a Fault; or a permanent phase to ground Fault, with Normal Clearing, on any transmission circuit, transformer or bus section.</p> | | | |
| <p>FAC-011-2</p> | <p>B. Requirements</p> <p>R3. The Reliability Coordinator’s methodology for determining SOLs, shall include, as a minimum, a description of the following, along with any reliability margins applied for each:</p> <p>R3.5. Allowed uses of Special Protection Systems or Remedial Action Plans.</p> <p>E. Regional Differences</p> <p>1.1. As governed by the requirements of R3.3, starting with all Facilities in service, shall require the evaluation of the following multiple Facility Contingencies when establishing SOLs:</p> <p>1.1.4 The failure of a circuit breaker associated with a Special Protection System to operate when required following: the loss of any element without a Fault; or a</p> | | | |

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| | <p>permanent phase to ground Fault, with Normal Clearing, on any transmission circuit, transformer or bus section.</p> |
| <p>IRO-005-3.1a</p> | <p>B. Requirements:</p> <p>R1. Each Reliability Coordinator shall monitor its Reliability Coordinator Area parameters, including but not limited to the following:</p> <p style="padding-left: 40px;">R1.1. Current status of Bulk Electric System elements (transmission or generation including critical auxiliaries such as Automatic Voltage Regulators and Special Protection Systems) and system loading.</p> <p>R9. Whenever a Special Protection System that may have an inter-Balancing Authority, or inter-Transmission Operator impact (e.g., could potentially affect transmission flows resulting in a SOL or IROL violation) is armed, the Reliability Coordinators shall be aware of the impact of the operation of that Special Protection System on inter-area flows. The Transmission Operator shall immediately inform the Reliability Coordinator of the status of the Special Protection System including any degradation or potential failure to operate as expected.</p> |
| <p>IRO-014-1</p> | <p>B. Requirements</p> <p>R1. The Reliability Coordinator shall have Operating Procedures, Processes, or Plans in place for activities that require notification, exchange of information or coordination of actions with one or more other Reliability Coordinators to support Interconnection reliability. These Operating Procedures, Processes, or Plans shall address Scenarios that affect other Reliability Coordinator Areas as well as those developed in coordination with other Reliability Coordinators.</p> <p style="padding-left: 40px;">R1.1. These Operating Procedures, Processes, or Plans shall collectively address, as a minimum, the following:</p> <p style="padding-left: 80px;">R1.1.1. Communications and notifications, including the conditions [FN1] under which one Reliability Coordinator notifies other Reliability Coordinators; the process to follow in making those notifications; and the data and information to be exchanged with other Reliability Coordinators.</p> <p>[FN1]: Examples of conditions when one Reliability Coordinator may need to notify another Reliability Coordinator may include (but aren't limited to) sabotage events, Interconnection Reliability Operating Limit violations, voltage reductions, insufficient resources, arming of special protection systems, etc.</p> |
| <p>MOD-029-1a</p> | <p>B. Requirements</p> <p style="padding-left: 40px;">R1.1.8. Uses Special Protection System (SPS) models where currently existing or projected for implementation within the studied time horizon.</p> <p style="padding-left: 40px;">R2.2. Where it is impossible to actually simulate a reliability-limited flow in a direction counter to prevailing flows (on an alternating current Transmission line), set the TTC for the non-prevailing direction equal to the TTC in the prevailing direction. If the TTC in the prevailing flow direction is dependent on a Special Protection System (SPS), set the TTC for the non-prevailing flow direction equal to the greater of the maximum</p> |

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| | flow that can be simulated in the non-prevailing flow direction or the maximum TTC that can be achieved in the prevailing flow direction without use of a SPS . |
| MOD-030-02 | <p>B. Requirements</p> <p>R2.1.1.1. Use first Contingency criteria consistent with those first Contingency criteria used in planning of operations for the applicable time periods, including use of Special Protection Systems.</p> <p>R2.1.2.1. Use first Contingency criteria consistent with those first Contingency criteria used in planning of operations for the applicable time periods, including use of Special Protection Systems.</p> |
| NUC-001-2.1 | <p>B. Requirements</p> <p>R9. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall include, as a minimum, the following elements within the agreement(s) identified in R2:</p> <p>R9.3.7. Coordination of the NPIRs with transmission system Special Protection Systems and underfrequency and undervoltage load shedding programs.</p> |
| PRC-001-1.1 | <p>B. Requirements</p> <p>R6. Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected Transmission Operators and Balancing Authorities of each change in status.</p> |
| WECC Regional Standard PRC-004-WECC-1 | <p>A. Introduction</p> <p>1. Title: Protection System and Remedial Action Scheme Misoperation</p> <p>2. Number: PRC-004-WECC-1</p> <p>3. Purpose: Regional Reliability Standard to ensure all transmission and generation Protection System and Remedial Action Scheme (RAS) Misoperations on Transmission Paths and RAS defined in section 4 are analyzed and/or mitigated.</p> <p>4. Applicability</p> <p>4.1. Transmission Owners of selected WECC major transmission path facilities and RAS listed in tables titled “Major WECC Transfer Paths in the Bulk Electric System” provided at http://www.wecc.biz/Standards/Approved%20Standards/Supporting%20Tables/Table%20Major%20Paths%204-28-08.pdf and “Major WECC Remedial Action Schemes (RAS)” provided at http://www.wecc.biz/Standards/Approved%20Standards/Supporting%20Tables/Table%20Major%20RAS%204-28-08.pdf.</p> <p>4.2. Generator Owners that own RAS listed in the Table titled “Major WECC Remedial Action Schemes (RAS)” provided at http://www.wecc.biz/Standards/Approved%20Standards/Supporting%20Tables/Table%20Major%20RAS%204-28-08.pdf.</p> <p>4.3. Transmission Operators that operate major transmission path facilities and RAS listed in Tables titled “Major WECC Transfer Paths in the Bulk Electric System” provided at</p> |

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| | <p data-bbox="362 375 1466 548"> http://www.wecc.biz/Standards/Approved%20Standards/Supporting%20Tables/Table%20Major%20Paths%204-28-08.pdf and “Major WECC Remedial Action Schemes (RAS)” provided at http://www.wecc.biz/Standards/Approved%20Standards/Supporting%20Tables/Table%20Major%20RAS%204-28-08.pdf. </p> <p data-bbox="362 554 568 583">B. Requirements</p> <p data-bbox="362 602 1479 705"> The requirements below only apply to the major transmission paths facilities and RAS listed in the tables titled “Major WECC Transfer Paths in the Bulk Electric System” and “Major WECC Remedial Action Schemes (RAS).” </p> <p data-bbox="362 722 1422 825"> R.1. System Operators and System Protection personnel of the Transmission Owners and Generator Owners shall analyze all Protection System and RAS operations. <i>[Violation Risk Factor: Lower] [Time Horizon: Operations Assessment]</i> </p> <p data-bbox="456 842 1430 909"> R1.1. System Operators shall review all tripping of transmission elements and RAS operations to identify apparent Misoperations within 24 hours. </p> <p data-bbox="456 926 1463 1029"> R1.2. System Protection personnel shall analyze all operations of Protection Systems and RAS within 20 business days for correctness to characterize whether a Misoperation has occurred that may not have been identified by System Operators. </p> <p data-bbox="362 1045 1474 1325"> R.2. Transmission Owners and Generator Owners shall perform the following actions for each Misoperation of the Protection System or RAS. It is not intended that Requirements R2.1 through R2.4 apply to Protection System and/or RAS actions that appear to be entirely reasonable and correct at the time of occurrence and associated system performance is fully compliant with NERC Reliability Standards. If the Transmission Owner or Generator Owner later finds the Protection System or RAS operation to be incorrect through System Protection personnel analysis, the requirements of R2.1 through R2.4 become applicable at the time the Transmission Owner or Generator Owner identifies the Misoperation: </p> <p data-bbox="456 1341 1466 1587"> R2.1. If the Protection System or RAS has a Security-Based Misoperation and two or more Functionally Equivalent Protection Systems (FEPS) or Functionally Equivalent RAS (FERAS) remain in service to ensure Bulk Electric System (BES) reliability, the Transmission Owners or Generator Owners shall remove from service the Protection System or RAS that misoperated within 22 hours following identification of the Misoperation. Repair or replacement of the failed Protection System or RAS is at the Transmission Owners’ and Generator Owners’ discretion. </p> <p data-bbox="456 1604 1479 1707"> R2.2. If the Protection System or RAS has a Security-Based Misoperation and only one FEPS or FERAS remains in service to ensure BES reliability, the Transmission Owner or Generator Owner shall perform the following. </p> <p data-bbox="553 1724 1487 1862"> R2.2.1. Following identification of the Protection System or RAS Misoperation, Transmission Owners and Generator Owners shall remove from service within 22 hours for repair or modification the Protection System or RAS that misoperated. </p> |

| Standard No. | Existing Standard Language |
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| | <p>R2.2.2. The Transmission Owner or Generator Owner shall repair or replace any Protection System or RAS that misoperated with a FEPS or FERAS within 20 business days of the date of removal. The Transmission Owner or Generator Owner shall remove the Element from service or disable the RAS if repair or replacement is not completed within 20 business days.</p> <p>R2.3. If the Protection System or RAS has a Security-Based or Dependability-Based Misoperation and a FEPS and FERAS is not in service to ensure BES reliability, Transmission Owners or Generator Owners shall repair and place back in service within 22 hours the Protection System or RAS that misoperated. If this cannot be done, then Transmission Owners and Generator Owners shall perform the following.</p> <p>R2.3.1. When a FEPS is not available, the Transmission Owners shall remove the associated Element from service.</p> <p>R2.3.2. When FERAS is not available, then</p> <p>2.3.2.1. The Generator Owners shall adjust generation to a reliable operating level, or</p> <p>2.3.2.2. Transmission Operators shall adjust the SOL and operate the facilities within established limits.</p> <p>R2.4. If the Protection System or RAS has a Dependability-Based Misoperation but has one or more FEPS or FERAS that operated correctly, the associated Element or transmission path may remain in service without removing from service the Protection System or RAS that failed, provided one of the following is performed.</p> <p>R2.4.1. Transmission Owners or Generator Owners shall repair or replace any Protection System or RAS that misoperated with FEPS and FERAS within 20 business days of the date of the Misoperation identification, or</p> <p>R2.4.2. Transmission Owners or Generator Owners shall remove from service the associated Element or RAS. [<i>Violation Risk Factor: Lower</i>] [<i>Time Horizon: Operations Assessment</i>]</p> <p>R.3. Transmission Owners and Generation Owners shall submit Misoperation incident reports to WECC within 10 business days for the following.</p> <p>R3.1. Identification of a Misoperation of a Protection System and/or RAS,</p> <p>R3.2. Completion of repairs or the replacement of Protection System and/or RAS that misoperated.</p> |
| PRC-005-2 | <p>4. Applicability:</p> <p>4.2.4 Protection Systems installed as a Special Protection System (SPS) for BES reliability.</p> |
| PRC-005-2 Table 1-4(a) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS systems, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-2 Table 1-4(b) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS systems, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |

| Standard No. | Existing Standard Language |
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| PRC-005-2 Table 1-4(c) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS system, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-2 Table 1-4(d) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS system, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-2 Table 1-4(e) header and Component Attributes | <p>Component Type - Protection System Station dc Supply for non-BES Interrupting Devices for SPS, non-distributed UFLS, and nondistributed UVLS systems</p> <p>Component Attributes: Any Protection System dc supply used for tripping only non-BES interrupting devices as part of a SPS, non-distributed UFLS, or non-distributed UVLS system and not having monitoring attributes of Table 1-4(f).</p> |
| PRC-005-2 Table 1-5 header and Component Attributes and Maintenance Activities | <p>Component Type - Control Circuitry Associated With Protective Functions</p> <p>Note: Table requirements apply to all Control Circuitry Components of Protection Systems, and SPSs except as noted.</p> <p>Component Attributes: Unmonitored control circuitry associated with SPS.</p> <p>Maintenance Activities: Verify all paths of the control circuits essential for proper operation of the SPS.</p> <p>Component Attributes: Control circuitry associated with protective functions and/or SPS whose integrity is monitored and alarmed (See Table 2).</p> |
| PRC-005-3 | <p>4. Applicability:</p> <p>4.2.4 Protection Systems installed as a Special Protection System (SPS) for BES reliability.</p> <p>4.2.6.3 Automatic Reclosing applied as an integral part of an SPS specified in Section 4.2.4.</p> |
| PRC-005-3 Table 1-4(a) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS systems, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-3 Table 1-4(b) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS systems, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-3 Table 1-4(c) header | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS system, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-3 Table 1-4(d) | Protection System Station dc supply used only for non-BES interrupting devices for SPS , non-distributed UFLS system, or non-distributed UVLS systems is excluded (see Table 1-4(e)). |
| PRC-005-3 Table 1-4(e) | <p>Component Type - Protection System Station dc Supply for non-BES Interrupting Devices for SPS, non-distributed UFLS, and non-distributed UVLS systems.</p> <p>Component Attributes: Any Protection System dc supply used for tripping only non-BES interrupting devices as part of a SPS, non-distributed UFLS, or non-distributed UVLS system and not having monitoring attributes of Table 1-4(f).</p> |
| PRC-005-3 Table 1-5 header and Component Attributes and | <p>Note: Table requirements apply to all Control Circuitry Components of Protection Systems, and SPSs except as noted.</p> <p>Component Attributes: Unmonitored control circuitry associated with SPS (See Table 4-2(b) for SPS which include Automatic Reclosing.)</p> |

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| <p>Maintenance Activities</p> | <p>Maintenance Activities: Verify all paths of the control circuits essential for proper operation of the SPS</p> <p>Component Attributes: Control circuitry associated with protective functions and/or SPS whose integrity is monitored and alarmed (See Table 2).</p> |
| <p>PRC-005-3 Table 4-2(a) header and Component Attributes</p> | <p>Component Type - Control Circuitry Associated with Reclosing Relays that are NOT an Integral Part of an SPS</p> <p>Component Attributes: Unmonitored Control circuitry associated with Automatic Reclosing that is not an integral part of an SPS</p> <p>Component Attributes: Control circuitry associated with Automatic Reclosing that is not part of an SPS and is monitored and alarmed for conditions that would result in a premature closing command. (See Table 2)</p> |
| <p>PRC-005-3 Table 4-2(b) header and Component Attributes and Maintenance Activities</p> | <p>Component Type - Control Circuitry Associated with Reclosing Relays that ARE an Integral Part of an SPS</p> <p>Component Attributes: Close coils or actuators of circuit breakers or similar devices that are used in conjunction with Automatic Reclosing as part of an SPS (regardless of any monitoring of the control circuitry).</p> <p>Component Attributes: Unmonitored close control circuitry associated with Automatic Reclosing used as an integral part of an SPS.</p> <p>Maintenance Activities: Verify all paths of the control circuits associated with Automatic Reclosing that are essential for proper operation of the SPS.</p> <p>Component Attributes: Control circuitry associated with Automatic Reclosing that is an integral part of an SPS whose integrity is monitored and alarmed. (See Table 2)</p> |
| <p>PRC-006-1</p> | <p>B. Requirements</p> <p>R. 2.2. Any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System, and</p> <p>E.B. Regional Variance for the Western Electricity Coordinating Council</p> <p>E.B.2.2. Any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System.</p> |
| <p>PRC-012-0</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Review Procedure</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.</p> |

| Standard No. | Existing Standard Language |
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| | <p>B. Requirements</p> <p>R1. Each Regional Reliability Organization with a Transmission Owner, Generator Owner, or Distribution Providers that uses or is planning to use an SPS shall have a documented Regional Reliability Organization SPS review procedure to ensure that SPSs comply with Regional criteria and NERC Reliability Standards. The Regional SPS review procedure shall include:</p> <ul style="list-style-type: none"> R1.1. Description of the process for submitting a proposed SPS for Regional Reliability Organization review. R1.2. Requirements to provide data that describes design, operation, and modeling of an SPS. R1.3. Requirements to demonstrate that the SPS shall be designed so that a single SPS component failure, when the SPS was intended to operate, does not prevent the interconnected transmission system from meeting the performance requirements defined in Reliability Standards TPL-001-0, TPL-002-0, and TPL-003-0. R1.4. Requirements to demonstrate that the inadvertent operation of an SPS shall meet the same performance requirement (TPL-001-0, TPL-002-0, and TPL-003-0) as that required of the contingency for which it was designed, and not exceed TPL-003-0. R1.5. Requirements to demonstrate the proposed SPS will coordinate with other protection and control systems and applicable Regional Reliability Organization Emergency procedures. R1.7. Requirements for analysis and documentation of corrective action plans for all SPS misoperations. <p>R2. The Regional Reliability Organization shall provide affected Regional Reliability Organizations and NERC with documentation of its SPS review procedure on request (within 30 calendar days).</p> |

| Standard No. | Existing Standard Language |
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| <p>PRC-013-0</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Database.</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPSs) are properly designed, meet performance requirements, and are coordinated with other protection systems.</p> <p>B. Requirements</p> <p>R1. The Regional Reliability Organization that has a Transmission Owner, Generator Owner, or Distribution Provider with an SPS installed shall maintain an SPS database. The database shall include the following types of information:</p> <ul style="list-style-type: none"> R1.1. Design Objectives — Contingencies and system conditions for which the SPS was designed, R1.2. Operation — The actions taken by the SPS in response to Disturbance conditions, and R1.3. Modeling — Information on detection logic or relay settings that control operation of the SPS. |
| <p>PRC-014-0</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Assessment</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.</p> <p>B. Requirements</p> <p>R1. The Regional Reliability Organization shall assess the operation, coordination, and effectiveness of all SPSs installed in its Region at least once every five years for compliance with NERC Reliability Standards and Regional criteria</p> <p>R2. The Regional Reliability Organization shall provide either a summary report or a detailed report of its assessment of the operation, coordination, and effectiveness of all SPSs installed in its Region to affected Regional Reliability Organizations or NERC on request (within 30 calendar days).</p> <p>R3. The documentation of the Regional Reliability Organization’s SPS assessment shall include the following elements:</p> <ul style="list-style-type: none"> R3.3. Identification of SPSs that were found not to comply with NERC standards and Regional Reliability Organization criteria. R3.4. Discussion of any coordination problems found between a SPS and other protection and control systems. R3.5. Provide corrective action plans for non-compliant SPSs. |

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| <p>PRC-015-0</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Data and Documentation</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.</p> <p>4. Applicability:</p> <p>4.1. Transmission Owner that owns an SPS</p> <p>4.2. Generator Owner that owns an SPS</p> <p>4.3. Distribution Provider that owns an SPS</p> <p>B. Requirements</p> <p>R1. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall maintain a list of and provide data for existing and proposed SPSs as specified in Reliability Standard PRC-013-0_R1.</p> <p>R2. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall have evidence it reviewed new or functionally modified SPSs in accordance with the Regional Reliability Organization’s procedures as defined in Reliability Standard PRC-012-0_R1 prior to being placed in service.</p> <p>R3. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall provide documentation of SPS data and the results of Studies that show compliance of new or functionally modified SPSs with NERC Reliability Standards and Regional Reliability Organization criteria to affected Regional Reliability Organizations and NERC on request (within 30 calendar days).</p> |

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| <p>PRC-016-0.1</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Misoperations</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.</p> <p>4. Applicability:</p> <p>4.1. Transmission Owner that owns an SPS</p> <p>4.2. Generator Owner that owns an SPS</p> <p>4.3. Distribution Provider that owns an SPS</p> <p>B. Requirements</p> <p>R1. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall analyze its SPS operations and maintain a record of all misoperations in accordance with the Regional SPS review procedure specified in Reliability Standard PRC-012-0_R1.</p> <p>R2. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall take corrective actions to avoid future misoperations.</p> <p>R3. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall provide documentation of the misoperation analyses and the corrective action plans to its Regional Reliability Organization and NERC on request (within 90 calendar days).</p> |

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| <p>PRC-017-0</p> | <p>A. Introduction</p> <p>1. Title: Special Protection System Maintenance and Testing</p> <p>3. Purpose: To ensure that all Special Protection Systems (SPS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.</p> <p>4. Applicability:</p> <p>4.1. Transmission Owner that owns an SPS</p> <p>4.2. Generator Owner that owns an SPS</p> <p>4.3. Distribution Provider that owns an SPS</p> <p>B. Requirements</p> <p>R1. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall have a system maintenance and testing program(s) in place. The program(s) shall include:</p> <p style="padding-left: 40px;">R1.1. SPS identification shall include but is not limited to:</p> <p>R2. The Transmission Owner, Generator Owner, and Distribution Provider that owns an SPS shall provide documentation of the program and its implementation to the appropriate Regional Reliability Organizations and NERC on request (within 30 calendar days).</p> |
| <p>PRC-020-1</p> | <p>B. Requirements</p> <p>R1.6. Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems.</p> |
| <p>PRC-021-1</p> | <p>B. Requirements</p> <p>R1.5. Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems.</p> |
| <p>PRC-023-2 Attachment A</p> | <p>2. The following protection systems are excluded from requirements of this standard:</p> <p style="padding-left: 40px;">2.5. Relay elements used only for Special Protection Systems applied and approved in accordance with NERC Reliability Standards PRC-012 through PRC-017.</p> |
| <p>PRC-023-3 Attachment A</p> | <p>2. The following protection systems are excluded from requirements of this standard:</p> <p style="padding-left: 40px;">2.5. Relay elements used only for Special Protection Systems applied and approved in accordance with NERC Reliability Standards PRC-012 through PRC-017.</p> |
| <p>PRC-024-1</p> | <p>B. Requirements</p> <p>R2. Each Generator Owner that has generator voltage protective relaying activated to trip its applicable generating unit(s) shall set its protective relaying such that the generator voltage protective relaying does not trip the applicable generating unit(s) as a result of a voltage excursion (at the point of interconnection²) caused by an event on the transmission system</p> |

| Standard No. | Existing Standard Language |
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| | <p>external to the generating plant that remains within the “no trip zone” of PRC-024 Attachment 2. If the Transmission Planner allows less stringent voltage relay settings than those required to meet PRC-024 Attachment 2, then the Generator Owner shall set its protective relaying within the voltage recovery characteristics of a location-specific Transmission Planner’s study. Requirement R2 is subject to the following exceptions:</p> <ul style="list-style-type: none"> • Generating unit(s) may trip in accordance with a Special Protection System (SPS) or Remedial Action Scheme (RAS). |
| <p>PRC-025-1 Attachment 1</p> | <p>Relay Settings:</p> <p>Exclusions: The following protection systems are excluded from the requirements of this standard:</p> <p style="padding-left: 40px;">5. Protective relay elements used only for Special Protection Systems that are subject to one or more requirements in a NERC or Regional Reliability Standard.</p> |
| <p>TOP-005-2a Attachment 1</p> | <p>Electric System Reliability Data</p> <p>This Attachment lists the types of data that Balancing Authorities, and Transmission Operators are expected to share with other Balancing Authorities and Transmission Operators.</p> <p style="padding-left: 40px;">2.6. New or degraded Special Protection Systems.</p> |
| <p>TPL-001-0.1 Category D</p> | <p>Table 1. Transmission System Standards - Normal and Emergency Conditions</p> <p style="padding-left: 40px;">12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</p> <p style="padding-left: 40px;">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</p> |
| <p>TPL-001-4</p> | <p>B. Requirements</p> <p style="padding-left: 40px;">2.7.1. List System deficiencies and the associated actions needed to achieve required System performance. Examples of such actions include:</p> <ul style="list-style-type: none"> • Installation, modification, or removal of Protection Systems or Special Protection Systems <p style="padding-left: 40px;">4.1.1. For planning event P1: No generating unit shall pull out of synchronism. A generator being disconnected from the System by fault clearing action or by a Special Protection System is not considered pulling out of synchronism.</p> |
| <p>TPL-002-0b Category D</p> | <p>Table I. Transmission System Standards — Normal and Emergency Conditions</p> <p style="padding-left: 40px;">12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</p> <p style="padding-left: 40px;">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</p> |

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| <p>TPL-003-0b Category D</p> | <p>Table I. Transmission System Standards — Normal and Emergency Conditions</p> <p>12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</p> <p>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</p> |
| <p>TPL-004-0a Category D</p> | <p>Table I. Transmission System Standards — Normal and Emergency Conditions</p> <p>12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</p> <p>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</p> |
| <p>WECC Regional Glossary Term:</p> | <p>Definition: Dependability-Based Misoperation</p> <p>Is the absence of a Protection System or RAS operation when intended. Dependability is a component of reliability and is the measure of a device’s certainty to operate when required.</p> |
| <p>WECC Regional Glossary Term:</p> | <p>Definition: Functionally Equivalent RAS (FERAS)</p> <p>A Remedial Action Scheme ("RAS") that provides the same performance as follows:</p> <ul style="list-style-type: none"> • Each RAS can detect the same conditions and provide mitigation to comply with all Reliability Standards. • Each RAS may have different components and operating characteristics |
| <p>WECC Regional Glossary Term:</p> | <p>Definition: Security-Based Misoperation</p> <p>A Misoperation caused by the incorrect operation of a Protection System or RAS. Security is a component of reliability and is the measure of a device’s certainty not to operate falsely.</p> |