

## Table of Issues and Directives Project 2007-17 Protection System Maintenance and Testing

Table of Issues and Directives Associated with PRC-005-2

| Source         | Directive Language<br>(including pg #)   | Disposition   | Section and/or<br>Requirement(s)  |
|----------------|--|---|---|
| FERC Order 693 | 1475. In addition, for the reasons discussed in the NOPR, the Commission directs the ERO to develop a modification to PRC-005-1 through the Reliability Standards development process that includes a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System. | Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, and Table 2 for time-based programs. Also adding a requirement allowing performance-based maintenance intervals. | Requirement R3, Requirement R4, Tables 1-1 through 1-5, and Table 2, Attachment A |
| FERC Order 693 | 1475. We further direct the ERO to consider FirstEnergy's and ISO-NE's suggestion to combine PRC-005-1, PRC-008-0, PRC-011-0 and PRC-017-0 into a single Reliability Standard through the Reliability Standards development process.   | These suggestions were adopted. The SDT is combining the four legacy standards into one.  | NA  |

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| Source         | Directive Language (including pg #)   | Disposition  | Section and/or Requirement(s)  |
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| FERC Order 693 | 1492. In addition, the Commission directs the ERO to develop a modification to PRC-008-0 through the Reliability Standards development process that includes a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System.   | Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, and Table 3 for time-based programs. Also adding a requirement allowing performance-based maintenance intervals.          | Applicability 4.2.2, Requirement R3, Requirement R4, Tables 1-1 through 1-5, and Table3.           |
| FERC Order 693 | 1516. The Commission believes that the proposal is presently part of the process. The Commission approves Reliability Standard PRC-011-0 as mandatory and enforceable. In addition, the Commission directs the ERO to submit a modification to PRC-011-0 through the Reliability Standards development process that includes a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate to the type of the protection system and its impact on the reliability of the Bulk-Power System. | Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, Table 2, and Table 3 for time-based programs. Also adding a requirement allowing performance-based maintenance intervals. | Applicability 4.2.3, Requirement R3, Requirement R4, Tables 1-1 through 1-5, Table 2, and Table 3. |

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| Source         | Directive Language (including pg #)   | Disposition   | Section and/or Requirement(s)  |
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| FERC Order 693 | 1546. The Commission approves Reliability Standard PRC-017-0 as mandatory and enforceable. In addition, the Commission directs the ERO to develop a modification to PRC-017-0 through the Reliability Standards development process that includes: (1) a requirement that maintenance and testing of a protection system must be carried out within a maximum allowable interval that is appropriate for the type of the protection system... | Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, and Table 2 for time-based programs. Also adding a requirement allowing performance-based maintenance intervals. | Applicability 4.2.4, Requirement R3, Requirement R4, Tables 1-1 through 1-5, and Table 2 |
| FERC Order 693 | 1546. In addition, the Commission directs the ERO to develop a modification to PRC-017-0 through the Reliability Standards development process, that includes: ...(2) a requirement that documentation identified in Requirement R2 shall be routinely provided to the ERO or Regional Entity.  | Transferred within Issues Database to Project 2010-05 that will address PRC-012-0 and other SPS standards. The directive is referencing documentation of the actual SPSs – primarily their design and implementation.   | NA   |
| Version 0 Team | Not a stand-alone standard  | The SDT is combining the four legacy standards into one.  | NA   |

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|-------------------|--|---|---|
| Version 0<br>Team | Include breakers/switches in list                        | Breakers/switches are specifically NOT included in the Protection System definition, and therefore are NOT addressed in the draft standard. | NA  |
| Version 0<br>Team | Define evidence  | Requirement R3 states that the program must be implemented. Evidence that the program is implemented is included in the Measure M3.         | M1, M2, M3, M4,<br>and M5 all contain<br>examples of evidence |
| Version 0<br>Team | Definition of evidence required                          | Requirement R3 states that the program must be implemented. Evidence that the program is implemented is included in the Measure M3.         | M1, M2, M3, M4,<br>and M5 all contain<br>examples of evidence |
| Version 0<br>Team | Consistent wording from standard to standard<br>required | The SDT is combining the four legacy standards into one.  | NA  |

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| Version 0 Team | Exemptions for those with shunt reactors | UV Relays on shunt reactors is not UVLS; these relays would be included as pertinent to relays "applied on or to protect the BES".  | NA  |
| Version 0 Team | Define evidence                          | Requirement R3 states that the program must be implemented. Evidence that the program is implemented is included in the Measure M3. | M1, M2, M3, M4, and M5 all contain examples of evidence |
| Version 0 Team | Need to retain two dates                 | The Standard requires that data be retained for the last two maintenance intervals or to the last audit, whichever is longer.       | See data retention clause                               |
| Version 0 Team | Define evidence                          | Requirement R3 states that the program must be implemented. Evidence that the program is implemented is included in the Measure M3. | M1, M2, M3, M4, and M5 all contain examples of evidence |

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| NERC Audit Observation Team | How do you verify compliance for cts/pts? How do you audit these within a scheduled maintenance program? As part of the procedure, most have accepted visual inspection. Some entities state that testing of the relays verify functionality of the ct/pt. | Verification activities in Table 1-3 establish the activities required for the voltage and current sensing inputs to protective relays and associated circuitry from the voltage and current sensing devices. | Specific activities for current and voltage transformers have been defined within Table 1-3   |
| NERC Audit Observation Team | How do you verify DC control power? All regions require functional testing of the breaker. This should include functional relay & station battery checks, including breaker tripping, not just a visual inspection.  | Specific verification activities are established in Table 1-4.  | Specific activities for maintenance of dc control circuitry have been defined within Table 1-4. These activities include periodic verification of proper functioning of the dc control circuitry. |
| NERC Audit Observation Team | Determine what on schedule means. Is an entity who maintained/tested 95% of their relays at the same level of non-compliance as an entity who maintained/tested 10% of their relays?   | The VSL for maintenance program implementation (Requirement R3) establishes different VSLs depending on the degree to which the program is implemented.   | The VSLs for Requirement R3, Requirement R4 have been “phased” such that an entity that   |

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|                             |  |  | “misses” only a few required activities will be at a lower VSL than entities that “miss” many such activities. |
| NERC Audit Observation Team | As applicable, each TO, DP and GOP shall have a protection system maintenance and testing program for protection systems that affect the reliability of the BES. Does this include major equipment like circuit breakers and transformers? | Maintenance of <b>Protection Systems</b> on all BES equipment is included within this standard. Circuit breakers and power transformers are not included in the definition of Protection System; instrument transformers are included within the definition. | See definition of Protection System.   |
| Fill in the Blank Team      | Okay if PRC-006 is fixed   | Applicability section of PRC-005-2 (4.2.2) establishes applicability to UFLS established in accordance with ERO requirements.  | Applicability 4.2.2, Requirement R3, Requirement R4, Tables 1-1 through 1-5, and Table 3                       |

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| Phase III/IV Team | All protection systems on the bulk electric system.  | The Applicability section of the standard defines the facilities to which the standard applies.  | Applicability                 |
| Phase III/IV Team | PRC 003 to 005 only address generator (and transmission) protective systems, without defining this term. | The applicability section addresses Protection Systems designed to provide protection for BES Element(s), and provides additional specificity regarding applicable generator Protection Systems. | Applicability                 |
| Phase III/IV Team | Need to add language to ensure the Regional Requirements focus on the most impactful scenarios           | The draft standard establishes minimum ERO-wide requirements; any Regional requirements would have to exceed the ERO requirements.   | NA                            |
| Phase III/IV Team | Modify applicability to clarify that the requirements are applicable to the following:                   | The applicability section has been modified.   | Applicability                 |



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| Phase III/IV<br>Team | All generation protection systems whose misoperations impact the bulk electric system                             | Specificity is provided in Applicability 4.2.5 addressing maintenance of Protection Systems for generator facilities.   | Applicability: 4.2.5             |
| Phase III/IV<br>Team | There is no performance requirement or measure of effectiveness of a maintenance program required by the standard | For Time-Based (or Condition-Based) maintenance, minimum activities and maximum intervals are specified; for performance-based maintenance, performance (or effectiveness) goals are established. | R2 and Attachment A              |