

Internal Project Report

Project 2007-17

Protection System Maintenance and Testing

Issues -

Fill in the Blank Team

ISSUE: Okay if PRC-006 is fixed

"Okay if PRC-006 is fixed"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Applicability section of PRC-005-2 (4.2.2) establishes applicability to UFLS established in accordance with ERO requirements.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Applicability section of PRC-005-2 (4.2.2) establishes applicability to UFLS established in accordance with ERO requirements.

NERC Audit Observation Team

ISSUE: 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?

"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?"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Maintenance of Protection Systems on all BES equipment is included within this standard. See definition of Protection System.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Maintenance of Protection Systems 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.

ISSUE: 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?

"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?"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The VSLs for maintenance program implementations (Requirements R3 and R4) establish different VSLs depending on the degree to which the program is implemented.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The VSLs for maintenance program implementations (Requirements R3 and R4) have been phased such that an entity that misses only a few required activities will be at a lower VSL than entities that miss many such activities.

ISSUE: How do you verify compliance for 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/pts

"How do you verify compliance for 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/pts"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Specific activities for current and voltage transformers have been defined within Table 1-3.

Status: In Drafting Delivery: 11/7/2012

Solution Details: 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.

ISSUE: 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.

"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."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Specific verification activities are established in Table 1-4.

Status: In Drafting Delivery: 11/7/2012

Solution Details: 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

Phase III/IV Team

ISSUE: All generation protection systems whose misoperations impact the bulk electric system

"All generation protection systems whose misoperations impact the bulk electric system"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Specificity is provided in Applicability 4.2.5 addressing maintenance of Protection Systems for generator facilities.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Specificity is provided in Applicability 4.2.5 addressing maintenance of Protection Systems for generator facilities.

ISSUE: All protection systems on the bulk electric system.

"All protection systems on the bulk electric system."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The Applicability section of the standard defines the facilities to which the standard applies.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The Applicability section of the standard defines the facilities to which the standard applies.

ISSUE: Modify applicability to clarify that the requirements are applicable to the following:

"Modify applicability to clarify that the requirements are applicable to the following:"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The applicability section has been modified.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The applicability section has been modified.

ISSUE: Need to add language to ensure the Regional Requirements focus on the most impactful scenarios

"Need to add language to ensure the Regional Requirements focus on the most impactful scenarios"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The draft standard establishes minimum ERO-wide requirements; any Regional requirements would have to exceed the ERO requirements.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The draft standard establishes minimum ERO-wide requirements; any Regional requirements would have to exceed the ERO requirements.

ISSUE: PRC 003 to 005 only address generator (and transmission) protective systems, without defining this term.

"PRC 003 to 005 only address generator (and transmission) protective systems, without defining this term."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The applicability section addresses Protection Systems designed to provide protection for BES Element(s), and provides additional specificity regarding applicable generator Protection Systems.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The applicability section addresses Protection Systems designed to provide protection for BES Element(s), and provides additional specificity regarding applicable generator Protection Systems.

ISSUE: There is no performance requirement or measure of effectiveness of a maintenance program required by the standard

"There is no performance requirement or measure of effectiveness of a maintenance program required by the standard"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

For Time-Based (or Condition-Based) maintenance, minimum activities and maximum intervals are specified; for performance-based maintenance, performance (or effectiveness) goals are established.

Status: In Drafting Delivery: 11/7/2012

Solution Details: For Time-Based (or Condition-Based) maintenance, minimum activities and maximum intervals are specified; for performance-based maintenance, performance (or effectiveness) goals are established.

Version 0 Team

ISSUE: Consistent wording from standard to standard required

"Consistent wording from standard to standard required"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The SDT is combining the four legacy standards into one.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The SDT is combining the four legacy standards into one.

ISSUE: Define evidence

"Define evidence"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

ISSUE: Define evidence

"Define evidence"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

ISSUE: Define evidence

"Define evidence"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

ISSUE: Definition of evidence required

"Definition of evidence required"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Requirements R3 and R4 state that the programs must be implemented. Evidence that the program is implemented is included in the Measures M3 and M4.

ISSUE: Exemptions for those with shunt reactors

"Exemptions for those with shunt reactors"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

UV Relays on shunt reactors is not UVLS; these relays would be included as pertinent to relays ""applied on or to protect the BES"".

Status: In Drafting Delivery: 11/7/2012

Solution Details: UV Relays on shunt reactors is not UVLS; these relays would be included as pertinent to relays "applied on or to protect the BES".

ISSUE: Include breakers/switches in list

"Include breakers/switches in list"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Breakers/switches are specifically NOT included in the Protection System definition, and therefore NOT addressed in the draft standard.

Status: In Drafting Delivery: 11/7/2012

Solution Details: Breakers/switches are specifically NOT included in the Protection System definition, and therefore NOT addressed in the draft standard.

ISSUE: Need to retain two dates

"Need to retain two dates"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

The Standard requires that data be retained for the last two maintenance intervals or to the last audit, whichever is longer.

Status: In Drafting Delivery: 11/7/2012

Solution Details: The Standard requires that data be retained for the last two maintenance intervals or to the last audit, whichever is longer.

FERC Staff

ISSUE: Definition of Protection System Maintenance Program (PSMP)

"Draft PRC-005-2 R3 does not address what maintenance means in the context of the standard itself. The standard only requires documentation of protection system maintenance and testing program with supporting documentation that devices were maintained and tested within the intervals defined in the process document and the date that each device was last tested and/or maintained. The ambiguity that arose was with a program that defines scheduled maintenance and testing, as opposed to just stating maintenance in general, but not unscheduled, leaving a gap in the plan"

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Definition of PSMP addresses key concerns

Status: In Drafting Delivery: 11/7/2012

Solution Details: Protection System Maintenance Program (PSMP) is defined within PRC-005-2 as "An ongoing program by which Protection System components are kept in working order and proper operation of malfunctioning components is restored." Further details are included, and this term is intended to be placed into the NERC Glossary of Terms when approved. <#CR><#LF>These concerns are otherwise beyond the scope of this standard, as reflected by the directives of FERC Order 693.<#CR><#LF>

Directives -

Mandatory Reliability Standards for the Bulk-Power System (Order 693)

DIRECTIVE: S- Ref 10351 - Maintenance and testing of a protection system must be carried out within a maximum allowable time interval that is appropriate for the type of protection system and its impact on the reliability of the bulk power system. 1

Due 4/10/2012

Para 1475

"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."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, and Table 2 for time-based programs.

Status: In Drafting Delivery: 2012

Solution Details: 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.

DIRECTIVE: S- Ref 10352 - Consider FirstEnergys and ISO-NEs suggestions to combine PRC-005, PRC-008, PRC-011, and PRC-017 into a single standard.

Para 1475

"Consider FirstEnergys and ISO-NEs suggestions to combine PRC-005, PRC-008, PRC-011, and PRC-017 into a single standard."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

These suggestions were adopted. The SDT is combining the four legacy standards into one.

Status: In Drafting Delivery: 2012

Solution Details: These suggestions were adopted. The SDT is combining the four legacy standards into one.

DIRECTIVE: S- Ref 10355 - Maintenance and testing of a protection system must be carried out within a maximum allowable time interval that is appropriate for the type of protection system and its impact on the reliability of the bulk power system.

Due 4/10/2012

Para 1492

"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."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

Specific maximum allowable intervals are included in the draft standard within Tables 1-1 through 1-5, and Table 3 for time-based programs.

Status: In Drafting Delivery: 2012

Solution Details: 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.

DIRECTIVE: S- Ref 10358 - Maintenance and testing of a protection system must be carried out within a maximum allowable time interval that is appropriate for the type of protection system and its impact on the reliability of the bulk power system.

Due 4/10/2012

Para 1516

"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."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

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.

Status: In Drafting Delivery: 2012

Solution Details: 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.

DIRECTIVE: S- Ref 10362 - Maintenance and testing of a protection system must be carried out within a maximum allowable time interval that is appropriate for the type of protection system and its impact on the reliability of the bulk power system.

Para 1546

"Maintenance and testing of a protection system must be carried out within a maximum allowable time interval that is appropriate for the type of protection system and its impact on the reliability of the bulk power system."

Assigned: Project 2007-17 - Protection System Maintenance and Testing

Addressed

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.

Status: In Drafting Delivery: 2012

Solution Details: 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.