

Unofficial Comment Form for 2nd Draft of the Standard for Protection System Maintenance and Testing Project 2007-17

Please **DO NOT** use this form. Please use the [electronic comment form](#) at the link below to submit comments on the 2nd draft of the PRC-005-2 standard for Protection System Maintenance and Testing. Comments must be submitted by **July 16, 2010**. If you have questions please contact Al McMeekin at al.mcmeekin@nerc.net or by telephone at 803-530-1963.

http://www.nerc.com/filez/standards/Protection_System_Maintenance_Project_2007-17.html

Background Information:

The Protection System Maintenance and Testing Standard Drafting Team (PSMT SDT) has made substantial changes to the second posting of PRC-005-2 base on comments received from the industry. The changes included:

- Re-naming the standard from “Protection System Maintenance and Testing” to “Protection System Maintenance”
- Revisions to the standard and tables regarding the maintenance activities and associated maintenance intervals
- Revisions to the tables regarding condition-based and performance based maintenance programs
- Revisions to the Supplemental Reference and the FAQ documents

In addition, Violation Risk Factors (VRFs), Time Horizons, Measures, and Compliance elements including Violation Security Levels (VSLs) have been supplied with this version of the draft standard. The rationale for the team's assignments pertaining to the VRFs and VSLs are posted in a separate document.

The PSMT SDT would like to receive industry comments on this standard.

1. The SDT has made significant changes to the minimum maintenance activities and maximum allowable intervals within Tables 1a, 1b, and 1c, particularly related to station dc supply and dc control circuits. Do you agree with these changes? If not, please provide specific suggestions for improvement.

Yes

No

Comments: The NSRS feels additional changes are needed. The functional testing requirement should be altered or removed as it increases the amount of hands-on involvement and the opportunity for human error related outages to occur, thereby introducing a greater risk to decrease system reliability. As noted on p. 8 in the supplementary reference document, “Experience has shown that keeping human hands away from equipment known to be working correctly enhances reliability.” By removing circuits from service on the proposed timelines for functional testing, the chance for human error is greater than a mis-operation from faulty wiring.

Alternatively, entities may choose to schedule more planned outages to conduct their functional testing in order to limit the risk of unplanned outages resulting from human error. Under this scenario, more elements will be scheduled out of service on a regular basis, thereby reducing transmission system availability and weakening the system making it

more challenging to withstand each subsequent contingency (N-1). Thus testing an in-tact system is more desirable than taking it out of service for testing.

While the SDT has included language in the draft standard to use fault analysis to complete maintenance obligations, in practicality, this option does not offer any relief to taking outages to perform functional tests. Nearly all BES circuit breakers are equipped with dual trip coils. Identifying which trip coil operated for a fault only covers the one trip coil. Functional tests would still be needed on the other. The likelihood of having multiple trips on a given line in the course of several years is very low. Given it can take a year to schedule some outages; planning maintenance with random faults is unpractical and will create unacceptable risk to compliance violations.

A better approach is to use the basis in schedule A, but extend this to cover the entire protection schemes. The document should establish target goals for mis-operation rates (dependability and security). This would allow the utilities to develop cost effective programs to increase reliability. The utilities would have incentives to replace poorly performing communications systems; they would be able to quantify the value of upgrading relay systems.

2. The SDT has included VRFs and Time Horizons with this posting. Do you agree with the assignments that have been made? If not, please provide specific suggestions for improvement.

Yes

No

Comments: The NSRS disagrees with the VRFs as specified in the standard. R1 VRF would more likely be classified as "medium" and R2 through R4 should be classified as a "High" VRF.

3. The SDT has included Measures and Data Retention with this posting. Do you agree with the assignments that have been made? If not, please provide specific suggestions for improvement.

Yes

No

Comments: The NERC standard assigns a retention period for the two most recent performances of maintenance activity which implies two intervals of documentation being maintained. The NSRS does not agree that requiring all data for two full cycles is warranted. The volume and length of data retention is unreasonable. The NSRS recommends that the entity retain the last test date with the associated data, plus the prior cycle test date only without retaining the test data.

ATC agrees with assignment of the measures.

4. The SDT has included VSLs with this posting. Do you agree with the assignments that have been made? If not, please provide specific suggestions for change.

Yes

No

Comments:

5. The SDT has revised the "Supplementary Reference" document which is supplied to provide supporting discussion for the Requirements within the standard. Do you agree with the changes? If not, please provide specific suggestions for change.

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Yes

No

Comments:

6. The SDT has revised the “Frequently-Asked Questions” (FAQ) document which is supplied to address anticipated questions relative to the standard. Do you agree with these changes? If not, please provide specific suggestions for change.

Yes

No

Comments: The FAQs are helpful, however, with the revised standard as written, The NSRS has issues with the answers provided. Please refer to Question #7 for areas of concern.

7. If you have any other comments on this Standard that you have not already provided in response to the prior questions, please provide them here.

Comments:

The NSRS does not support the existing 2nd Draft of PRC-005-2 Standard because it is our opinion that:

- There is a high probability that system reliability will be reduced with this revised standard.
- The utility industry is in the business of keeping the lights on, but these requirements will force the industry to take customers out of service in order to fulfill these requirements. A possible solution is to increase the test intervals, set performance targets, test set on a basis of past performance, etc.
- The number of unplanned outages due to human error will increase considerably.
- The requirement of a complete functional trip test will reduce the level of reliability and all levels of the BES to include distribution systems.
- Availability of the BES will be reduced due to an increased need to schedule planned outages for test purposes (to avoid unplanned outages due to human error).
- To implement this standard, an entity will need to hire additional skilled resources that are not readily available. (May require adjustments to the implementation timeline.)
- The cost of implementing the revised standard will approximately double our existing cost to perform this work.

Requests that relevant reliability performance data (*based on actual data and/or lessons learned from past operating incidents*, Criteria for Approving Reliability Standards per FERC Order 672) be provided to justify the additional cost and reliability risks associated with functional testing.

Under a Performance-Based Program, what happens if the population of components drops below 60 (as all will eventually)? Is there an implementation period to default to TBM? Please clarify.

In R1, the statement “or are designed to provide protection for the BES” re-opens the argument about transformer protection or breaker failure protection for transformer high-side breakers tripping BES breakers being included in the transmission protection systems. Also, for Table 1b “Verify that each breaker trip coil, each auxiliary relay, and each lockout

relay is electrically operated within this time interval" should be changed from a 6 year interval to a 12 year interval similar to the relay input and outputs. Experience has shown that these both have very similar reliability.

The standard as currently drafted raises concern as it relates to the identification of all Protection System components, particularly those with associated communications equipment. In the case of leased lines, a utility would be expected to maintain equipment they do not own. Recommend revising the standard to consider maintenance activities on a communications channel basis in which intermediate device functioning can be verified by sending a signal from one relay to another.

Clarification should be given as to the reason for stating control circuitry separately, such as in "Control and trip circuits". As currently stated, this implies that close circuit DC paths are now subject to a protection system maintenance program when reclosing and closing of breakers have never before been considered part of a Protection System.

Statements 3 (For microprocessor relays, check the relay inputs and outputs that are essential to

proper functioning of the Protection System.)and 6(Verify correct operation of output actions that are used for tripping. in Table 1b for Protective Relays essentially address the same issue. Please clarify if these are addressing the same issue or not. If the purpose is to describe the functionality of the protection system, that should be covered under another section in the table, such as DC circuitry.

How one identifies a voltage and current sensing input is not well defined. In most cases, this should already be identified with the relay. Also, the scope of detail required is ambiguous. Would individual cables, terminal blocks, etc. need to be identified as would be implied by "associated circuitry"? Please clarify. The NSRS recommends that individual cables, terminal blocks, etc are not included in this program.

Recommend removing "proper functioning of" from the maintenance activities for voltage and current sensing inputs in Table 1b. A utility is not verifying the functionality of the signal(s), they are verifying the signals themselves. Any functioning of the signals, which is related to ensuring proper relay interpretation, would be covered under the protective relay section.

In general, has thought been put into the possibility of degrading reliability by implementing such a rigorous maintenance program? To implement such a program, the number of scheduled outages would greatly increase resulting in scheduling conflicts that will increase, as well as degrading system conditions by taking lines, transformers, etc. out of service. Because of past design practices many of the requirements for maintenance will only be able to be performed by lifting wires to isolated trip paths. Potential error is introduced anytime a wire is lifted, especially numerous wires, by means of ensuring they are put back in the correct place. Redundancy is one thing that has been implemented in great detail throughout the history of protection systems to ensure that they work as intended. Diligent commissioning may need to be given its due credit.