

## Unofficial Comment Form for 1<sup>st</sup> 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](#) to submit comments on the 1<sup>st</sup> draft of the PRC-005-2 standard for Protection System Maintenance and Testing. Comments must be submitted by **September 28, 2011**. If you have questions please contact Al McMeekin at [al.mcmeekin@nerc.net](mailto:al.mcmeekin@nerc.net) or by telephone at 803-530-1963.

[http://www.nerc.com/filez/standards/Protection\\_System\\_Maintenance\\_Project\\_2007-17.html](http://www.nerc.com/filez/standards/Protection_System_Maintenance_Project_2007-17.html)

### Background Information:

This project recently failed to receive two-thirds weighted stakeholder approval on recirculation ballot. The Standards Committee directed that the Standard Drafting Team post the SAR and standard for a 45-day comment period with an initial ballot conducted during the last 10 days. During the posting period, the Standard Drafting Team plans to conduct a Webinar to discuss recently-presented industry comments and how they are addressed in the draft standard.

The Protection System Maintenance and Testing Standard Drafting Team (PSMT SDT) has made several changes to the fifth posting of PRC-005-2 based on comments received from industry. The changes include:

- Revising the term, "Maintenance Correctable Issue" to "Unresolved Maintenance Issue".
- Revising the "3 calendar months" interval for various station dc supply and communications system maintenance activities to "4 calendar months".
- The maintenance activities and intervals for distributed UFLS and UVLS systems were extracted from Table 1-1 through 1-5 and placed into a new Table 3 to more clearly illustrate the requirements related to these systems, which are often implemented on the distribution system.
- Modifying the VSLs and VRFs to reflect the changes listed above.
- Revising the Supplemental Reference and FAQ document to reflect changes made to the draft standard and to address additional issues raised within comments.
- Revising the Implementation Plan.

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

For questions 1-5, please provide specific comments related to the individual question. Please reserve question 6 for general comments not related to questions 1-5.

1. Do you have any comments regarding the existing SAR for this project?

- Yes  
 No

Comments:

2. In response to comments, the term "Maintenance Correctable Issue" was revised to "Unresolved Maintenance Issue". Do you agree with this change? If you do not agree, please provide specific suggestions for improvement.

Yes

No

Comments: Requirement R3 includes the following: "and initiate resolution of any unresolved maintenance issues". The addition of unresolved maintenance issues to the standard is not included in the SAR and has the potential to cause confusion and misinterpretation. It is suggested that this phrase be removed.

3. In response to comments, the SDT revised the previous "3 calendar months" interval to "4 calendar months" for communications systems and station dc supply. Do you agree with this change? If you do not agree, please provide specific suggestions for improvement.

Yes

No

Comments: We agree 4 calendar months is better than 3 Calendar months. The 4 month activities should be removed from Tables 1-4(a,b,c,d). These requirements are blurring the distinction between a best practice and functionally verifying the component. IEEE already sets the industries best practices, if a reliability Standard includes best maintenance practices it is encroaching on IEEE's ability to keep the industry informed and optimized. The Standard Drafting Team should restrain itself to only making requirements that functionally verify components and initiate corrective action wherever possible. We recommend that this time frame be a maximum of 6 Calendar Months which will allow entities to establish their own time frame based on the seasonal changes that occur where the batteries are located.

4. The SDT extracted the maintenance activities and intervals for distributed UFLS and UVLS systems from Table 1-1 through 1-5 and placed them into a new Table 3 to more clearly illustrate the requirements related to these systems. Do you agree with this change? If you do not agree, please provide specific suggestions for improvement.

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.

Yes

No

Comments:

- a. **Page 9, "Is a Sudden Pressure Relay an auxiliary tripping relay?"**

- 1) During the webinar on Thursday, September 15<sup>th</sup> it was asked whether the trip path for a sudden pressure relay needed to be confirmed. Based on this question, we believe that the FAQ should be modified as follows:
  - i. **Is a Sudden Pressure Relay an auxiliary tripping relay?**

No. IEEE C37.2-2008 assigns the device number 94 to auxiliary tripping relays. Sudden pressure relays are assigned device number 63. Sudden pressure relays are excluded from the Standard because it does not utilize voltage and/or current measurements to determine anomalies.  
**Since the sudden pressure relay is not included, it also follows that trip path testing for this relay type is also excluded.**
  - b. On page 26 of the Supplementary Reference document, it states, "If your PSMP (plan) requires more activities than you must perform and document to this higher standard." This penalizes utilities from including best practices in their PSMP, and encourages utilities to implement the standard maintenance practice instead of a higher maintenance practice. Why would a utility accept the additional risk of a NERC penalty or sanction when they can stay in compliance by accepting the minimum requirements of the standard? By stating this, the PSMP will include only those required items at the minimum frequency to avoid a compliance violation. For the reliability of the BES, recommend the wording be changed to, "If your PSMP (plan) requires more activities than required by PRC-005-2, you will be held accountable only to the minimum requirements in the standard. NERC encourages utilities to implement best practices to improve the reliability of the BES, so utilities will not be penalized for exceeding the standards." In FERC Order 693, section 278 FERC states: While we appreciate that many entities may perform at a higher level than that required by the Reliability Standards, and commend them for doing so, the Commission is focused on what is required under the Reliability Standards, we do not require that they exceed the Reliability Standards".
  - c. **Page 78, last paragraph:** If the same type of ohmic testing is done (impedance, conductance or resistance), may a different manufacturer's test equipment be used for this testing?
  - d. **Page 79, second paragraph of "Why verify voltage?":**
    - 1) "The verification of the dc supply voltage is simply an observation of battery voltage to prove that the charger has not been lost or is not malfunctioning."
      - i. Is it the intent of the PSMT SDT that this measurement is taken at the battery terminals, or will a reading taken from the battery charger panel meter meet this requirement?
    - 2) "The maintenance activity of verifying the float voltage of the battery charger is not to prove that a charger is lost or producing high voltages on the station dc supply, but rather to prove that the charger is properly floating the battery within the proper voltage limits."
      - i. Is it the intent of the PSMT SDT that this measurement is taken at the battery terminals, or will a reading taken from the battery charger panel meter meet this requirement?
  - e. Except as noted above, the changes to the "Supplementary Reference" document appear to be acceptable, but the following are suggested as changes to enhance clarity.
    - 1) On page 9 of the Supplementary Reference and FAQ draft the following statement is included: "Relays that respond to non-electrical inputs or impulses (such as, but not limited to, vibration, pressure, seismic, thermal or gas accumulation) are not included." On page 67, the third sentence of Section 15.3 states: "It includes [referring to control circuitry] the wiring from every trip output to every trip coil." Later in that section the following is

included: "...from a protective relay that are necessary for the correct operation of the protective functions." While this later statement may be interpreted to exclude circuitry associated with relays that do not respond to non-electrical inputs or impulses it would be better to make this more explicit. It would seem illogical to require testing of circuitry that is not needed for the protective functions covered by the standard. It is suggested that a sentence like the following be added to the first paragraph of Section 15.3: "Control circuitry associated with relays that respond to non-electrical inputs or impulses is not covered by this standard and need not be tested."

- 2) On page 31 of the Supplementary Reference it indicates that a procedure that includes intervals less than the standard could result in a noncompliance finding even if the maximum intervals in the standard are complied with. This is contrary to previous Commission rulings on what is mandatory and enforceable (i.e. only the standard itself Ref. Order 733 p105). This FAQ response should be changed to reflect those rulings.

6. 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:

- a. Section 4.2.5.4 includes station service transformers for generator facilities. As currently written, the section includes all the protection systems for station service transformers for generators that are a part of the BES. It states, "Protection Systems for generator-connected station service transformers for generators that are part of the BES." Generating facilities may have transfer schemes on the auxiliary transformer to transfer equipment to a reserve transformer instead of tripping the unit. These protection systems should not be included in the Facilities for PRC-005-2, since the BES is not affected. Recommend changing Section 4.2.5.4 to read, "Protection Systems that trip the generator for generator-connected station service transformers for generators that are a part of the BES."
- b. Data Retention, Section 1.3 (concerning R2 and R3) requires an entity to retain the two most recent performances of each distinct maintenance activity. This is an unreasonable requirement and does not enhance reliability. Recommend the data retention be changed to require only the most recent (past) test record. An example exists where an entity recently registered and tested all their relays prior to registering. They have one set of documentation and not two. PRC-005-2 allows testing intervals of up to 12 calendar years. If we are required to have the two most recent tests, we could conceivably have to retain a relay test record for 24 years. Recommend retention to be the most current record or all records since the last audit.
- c. Table 1-5 requires a maintenance activity to, "Verify that each trip coil is able to operate the circuit breaker, interrupting device, or mitigating device." Recommend this be changed to, "Verify that ~~each~~a trip coil is able to operate the circuit breaker, interrupting device, or mitigating device." Or alternately, change the wording to, "Electrically operate each interrupting device every 6 years." While requiring each trip coil to operate the breaker sounds good in theory, practically it creates issues in the field and may create more problems than it solves. The trip coils are located in the panel at the breaker and aren't configured to test independently. Isolating one trip coil from the other may include "lifting a wire" that may not get landed properly when the test is complete. Then, how do you prove for a compliance audit that both trip coils were independently tested to trip the breaker? Using an actual event only tests one coil and we may not know which coil tripped the device. To be compliant, it isn't practical to be able to track a real-time fault clearing operation as suggested on page 67 of the Supplementary Reference document. First, we don't know which

trip coil operated, then we have a "one off" device in the substation that must be tracked separately with a different testing cycle from the other devices in the substation. The standard should focus on ensuring the control circuitry is intact and trips the breaker without injecting additional, unneeded risk to the BES.

- d. General comment under Table 1-5: We do extensive testing of the control circuit during commissioning and after a modification to the circuit. Testing of the control circuitry on a periodic basis is not needed. The wear and tear on the equipment from functional testing and the potential risk of the testing itself may create more issues than the benefits received from doing the tests. The functional test injects significant opportunities for human performance errors during the test (technician trips the wrong device, differential relay opens all protective devices for a bus instead of a breaker, technician bumps another relay, screw driver falls into another device, etc.) and latent errors after the test (i.e., if a wire was lifted during the test, was it landed back in proper location, was the relay tripping function activated after the test was completed or was the relay left in test mode, etc.). Request the drafting team provide a basis for requiring the functional test. Are there documented instances where the control circuitry caused a significant event on the BES? Many utilities, monitor circuit breakers for operations. If a breaker hasn't operated for a defined period of time, we set up a maintenance activity to operate the breaker (possibly to include a timing test to ensure the breaker clears in the proper amount of cycles) – this ensures the operating linkages aren't bound and the breaker will operate. Misoperations are already monitored and reported through PRC-004. Does recent misoperation data or TADS data indicate that control circuitry/trip coils are a problem within the protection and control system? The current version of PRC-005 doesn't require functional tests. What is the basis for requiring additional compliance documentation (additional functional testing)? A possible alternative: only perform testing following modifications or major maintenance (like breaker change outs or panel modifications).
- e. Change the text of "Standard PRC-005-2 – Protection System Maintenance" Table 1-5 on page 19, Row 3, Column 2 to: "**6 12** calendar years".
  - 1) The maximum maintenance interval for "Electromechanical lockout and/or tripping devices which are directly in a trip path from the protective relay to the interrupting device trip coil" should be consistent with the "Unmonitored control circuit" interval which is 12 calendar years.
  - 2) In order to test the lockout relays, it may be necessary to take a bus outage (due to lack of redundancy and associated stability issues with delayed clearing). Increasing the frequency of bus outages (with associated lines or transformers) will also increase the amount of time that the BES is in a less intact system configuration. Increasing the time the BES is in a less intact system configuration also increases the probability of a low frequency, high impact event occurring. Therefore, the Maximum Maintenance Interval should be 12 years for lockout relays.
- f. In the background section of the implementation plan in item two it states "...it is unrealistic for those entities to be immediately in compliance with the new intervals." A recent compliance application notice (CAN-0012) indicated that auditors are requiring entities to include proof of compliance to maintenance intervals by providing the most recent and prior maintenance dates. Please provide clarity on CAN-0012 is applicable to PRC-005-2?
- g. The purpose statement of the standard seems to be inconsistent with the applicability section. To correct this it is suggested that the words "affecting the reliability" be removed from the purpose statement.

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- h. For consistency with the changes from 3 months to 4 months in the tables of the standard it is suggested that the second item in Table 1-4(b) be changed from 6 calendar months to 7 calendar months.
- i. In the tables for dc Supply the term "unit-to-unit" is used along with "intercell" when referring to measurement of connection resistance. From the applicable IEEE standards (e.g. IEEE 450) the standard terminology seems to be "intercell". It is recommended that the "unit-to-unit" term be removed to avoid confusion regarding what is to be verified.
- j. The NSRF would like to extend our thanks to the drafting team. The 96 page Supplementary Reference document allows us to discuss these issues before the standard is approved, instead of as a potential violation later. Excellent job!

