

Consideration of Comments on Non-binding Poll of VRFs and VSLs associated with PRC-005-2 – Protection System Maintenance (Project 2007-17)

The Project 2007-17 Drafting Team thanks all commenters who submitted comments on the non-binding poll of VRFs and VSLs associated with the proposed revisions to PRC-005-2. The standard and associated VRFs and VSLs were posted for a 30-day public comment period from November 17, 2010 through December 17, 2010, with a 10-day ballot beginning on December 10, 2010 through December 21, 2010. The stakeholders were asked to provide feedback on the VRFs and VSLs. There were 28 sets of comments, including comments from more than 46 different people from approximately 26 companies representing 6 of the 10 Industry Segments as shown in the table on the following pages.

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

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Herb Schrayshuen, at 609-452-8060 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.¹

¹ The appeals process is in the Reliability Standards Development Procedures: <http://www.nerc.com/standards/newstandardsprocess.html>.

The Industry Segments are:

- 1 — Transmission Owners
- 2 — RTOs, ISOs
- 3 — Load-serving Entities
- 4 — Transmission-dependent Utilities
- 5 — Electric Generators
- 6 — Electricity Brokers, Aggregators, and Marketers
- 7 — Large Electricity End Users
- 8 — Small Electricity End Users
- 9 — Federal, State, Provincial Regulatory or other Government Entities
- 10 — Regional Reliability Organizations, Regional Entities

Segment	1
Organization	Ameren Services
Member	Kirit S. Shah
Comment	The Lower VSL for all Requirements should begin above 1% of the components. For example for R4: "Entity has failed to complete scheduled program on 1% to 5% of total Protection System components." PRC-005-2 unrealistically mandates perfection without providing technical justification. A basic premise of engineering is to allow for reasonable tolerances, even Six Sigma allows for defects. Requiring perfection may well harm reliability in that valuable resources will be distracted from other duties.
Response	Thank you for your comments. The NERC criteria for VSLs do not currently permit them to allow some level of non-performance without being in violation.
Segment	1,3,6
Organization	American Electric Power, AEP Marketing
Member	Paul B. Johnson, Raj Rana, Edward P. Cox
Comment	<ol style="list-style-type: none"> 1. The VSL table should be revised to remove the reference to the Standard Requirement 1.5 in the R1 "High" VSL. 2. All four levels of the VSL for R2 make reference to a "condition-based PSMP." However, nowhere in the standard is the term "condition-based" used in reference to defining ones PSMP. The VSL for R2 should be revised to remove reference to a condition-based PSMP; alternatively the Standard could be revised to include the term "condition-based" within the Standard Requirements and Table 1. 3. In multiple instances, Table 1 uses the phrase "No periodic maintenance specified" for the Maximum Maintenance Interval. Is this intended to imply that a component with the designated attributes is not required to have any periodic maintenance? If so, the wording should more clearly state "No periodic maintenance required" or perhaps "Maintain per manufacturers recommendations." Failure to clearly state the maintenance requirement for these components leaves room for interpretation on whether a Registered Entity has maintenance and testing program for devices where the Standard has not specified a periodic maintenance interval and the manufacturer states that no maintenance is required. 4. Three different types of maintenance programs (time-based, performance-based and condition-based) are referenced in the standard or VSLs, yet the time-based and condition-based programs are neither defined nor described. Certain terms defined within the definition section (such as Countable Event or Segment) only make sense knowing what

	those three programs entail. These programs should be described within the standard itself and not assume knowledge of material in the Supplementary Reference or FAQ.
Response	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this. 2. The SDT concluded that Requirement R2 is redundant with Requirement R1, Part 1.4, and has deleted Requirement R2 (together with the associated Measure and VSL). 3. If the indicated monitoring attributes are present, no “hands-on” periodic maintenance is required, as the monitoring of the component is providing a continuing indication of its functionality. 4. The term, “condition-based” has been removed from the draft standard. The other terms are used, but are clear in the context in which they are used.
Segment	1
Organization	Beaches Energy Services
Member	Joseph S. Stonecipher
Comment	The VRF of R1 should be Low since the attached tables are essentially the PSMP.
Response	Thank you for your comments. The SDT disagrees; the Tables establish the intervals and activities, and Requirement R1 addresses the establishment of an entity’s individual PSMP.
Segment	3
Organization	City of Green Cove Springs
Member	Gregg R Griffin

Comment	
	<ol style="list-style-type: none"> 1. Small entities with only one or two BES substations may not have enough components to take advantage of the expanded maintenance intervals afforded by a performance-based maintenance program. Aggregating these components across different entities doesn't seem too logical considering the variations at the sub-component level (wire gauge, installation conditions, etc.) 2. Trip circuits are interconnected to perform various functions. Testing a trip path may involve disabling other features (i.e. breaker failure or reclosing) not directly a part of the test being performed. Temporary modifications made for testing introduce a chance to unknowingly leave functions disabled, contacts shorted, jumpers lifted, etc. after testing has been completed. Trip coils and cable runs from panels to breaker can be made to meet the requirements for monitored components. The only portions of the circuitry where this may not be the case is in the inter and intra-panel wiring. Because such portions of the circuitry have no moving parts and are located inside a control house, the exposure is negligible and should not be covered by the requirements. Entities will be at increased compliance risk as they struggle to properly document the testing of all parallel tripping paths. 3. Table 1-4 requires a comparison of measured battery internal ohmic value to battery baseline. Since battery manufacturers do not provide this value, it is unclear what the "baseline" values ought to be if an entity recently began performing this test (assuming it's several years after the commissioning of the battery.) Would it be acceptable for an entity to establish baseline values based on statistical analysis of multiple test results specific to a given battery manufacturer and design? 4. UFLS and UVLS maintenance and testing is greatly expanded, e.g., we interpreted PRC-008/011 as being only the UFLS/UVLS equipment. The new PRC-005 sweeps in other protection system components, e.g., communications (probably not applicable), voltage and current sensing devices (e.g., instrument transformers), Station DC supply, control circuitry. What's key about this is that these components are all part of distribution system protection, so, these activities would not be covered by other BES protection system maintenance and testing. I'm sure we are testing batteries and the like, but, we are probably not testing battery chargers and control circuitry, and, in many cases distribution circuits are such that it is very difficult, if not impossible, to test control circuitry to the trip coil of the breaker without causing an outage of the customers on that distribution circuit. There is no real reliability need for this either. Unlike Transmission and Generation Protection Systems which are needed to clear a fault and may only have one or two back-up systems, there are thousands and thousands of UFLS relays and if one fails to operate, it will not be noticeable to the event. It does make sense to test the relays themselves in part to ensure that the regional UFLS program is being met, but, to test the other protection system components is not worthwhile. Note that DC Supplies and most of the control

	<p>circuitry of distribution lines are "tested" frequently by distribution circuits clearing faults such as animals, vegetation blow-ins, lightning, etc., on distribution circuits, reducing the value of testing to just about null. However, this version is better than prior versions because it essentially requires the entity to determine it's own period of maintenance and testing for UFLS/UVLS for DC Supply and control circuitry.</p> <ol style="list-style-type: none"> 5. Applicability, 4.2.1, should reflect the Y&W and Tri-State interpretation (Project 2009-17) of "transmission Protection System" and should state: "Protection Systems applied on, or designed to provide protection for a BES Facility and that trips a BES Facility" 6. Applicability, 4.2. - does not reflect the interpretation of Project 20009-10 that excludes non-electrical protection (e.g., sudden pressure relays) and auxiliary relays. Because the definition of Protection System (recently approved) does not clearly exclude "non-electrical" protection, the Applicability section should. For instance,, a vibration monitor, steam pressure, etc. protection of generators, sudden pressure protection of transformers, etc. should not be included in the standard. An alternative is to change the definition of Protection System to make sure it only includes electrical the VRF of R1 should be Low since the attached tables are essentially the PSMP.
<p>Response</p>	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. Entities are not required to use performance-based maintenance programs. Requirement R3 and Attachment A are provided for the use of entities that can (and desire to) avail themselves of this approach. 2. The requirement relative to control circuitry does not explicitly require trip or functional testing of the entire path; it requires that entities verify all paths without specifying the method of doing so. Please see Section 15.5 of the Supplementary Reference Document for a detailed discussion. 3. Typical baseline values for various types of lead-acid batteries can be obtained from the test equipment manufacturer, the battery vendor, and perhaps other sources for batteries that are already in service. For new batteries, the initial battery baseline ohmic values should be measured upon installation and used for trending. 4. For UFLS and UVLS, the maintenance activities related to station dc supply and control circuitry are somewhat constrained relative to similar activities for Protection Systems in general. Regardless, without proper functioning of these component types, UFLS and UVLS will not respond as expected, and will therefore degrade BES system reliability, particularly during the stressed system conditions for which UFLS and UVLS are installed. Relative to control circuitry, Table 1-5 specifically excludes UFLS and UVLS from maintenance activities relate to the interrupting device trip coil. 5. This interpretation is not yet approved. When this interpretation is approved, the SDT will

	<p>incorporate it within PRC-005-2. However, the SDT has made changes to Applicability 4.2.1.</p> <p>6. The recently-balloted revision of the definition of Protection System, which has been approved by the NERC Board of Trustees and will soon be filed with FERC for approval, clearly includes only protective relays that respond to electrical quantities. As for auxiliary relays, the interpretation to which you refer states that they are not explicitly included, but are included to the degree that an entity's Protection System control circuitry addresses them (which has been identified as a reliability gap), and are being added to PRC-005-2 to resolve the gap.</p>
Segment	1, 5, 6
Organization	Consolidated Edison Co. of New York
Member	Christopher L de Graffenried, Wilket (Jack) Ng, Nickesha P Carrol
Comment	<p>VSL/VRF Ballot Comments: The Modified VSL's and VRF's –</p> <ol style="list-style-type: none"> 1. Because all the requirements deal with protective system maintenance and testing, violations could directly cause or contribute to bulk electric system instability, etc., the VRFs should all be "High". 2. The Time Horizons should all be "Operations Planning" because of the immediacy of a failure to meet the requirements. 3. For the R1 Lower VSL, include a second part to read: Failed to identify calibration tolerances or other equivalent parameters for one Protection System component type that establish acceptable parameters for the conclusion of maintenance activities. 4. For the R1 Moderate VSL, suggest similar wording as for the Lower VSL but specifying two Protection System component types. 5. For the R1 High VSL, suggest changing the wording of the 3rd part to be similar to the Lower VSL to match the requirement and to cater for more than two Protection System component types. 6. For the R3 Severe VSL, in part 3, replace "less" with fewer.
Response	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. Consideration of the VRFs, in association with the VRF Guidelines, yields the VRFs as established within the draft Standard. 2. The SDT has reviewed the time horizons, and believes that Requirement R1 is properly assigned a Long-Term Planning time horizon, as the activities to develop a program and to determine the monitoring attributes of components are performed within the related time period. The SDT concluded that Requirement R2 is redundant to Requirement R1 and has deleted Requirement R2 (together with the Measure and

	<p>VSL).</p> <ol style="list-style-type: none"> 3. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. The associated VSL has also been revised. 4. Requirement R1 ‘Moderate’ appears to be similar to Requirement R1 ‘Lower’ as you suggest. 5. The SDT believes that, if more than two Protection System component types are not addressed, the ‘Severe’ VSL is appropriate. 6. The SDT believes that your suggestion is similar to the existing text, and declines to modify the standard.
Segment	5
Organization	Constellation Power Source Generation, Inc.
Member	Amir Y Hammad
Comment	The VRFs and VSLs still do not take into account smaller generation facilities that do not have as many protection system components as other facilities. They are penalized much more heavily.
Response	Thank you for your comments. The percentage levels within Requirement R4 are consistent with many other NERC Standards, and are also consistent with the guidance within the NERC VSL Guidelines.
Segment	4
Organization	Consumers Energy
Member	David Frank Ronk
Comment	<ol style="list-style-type: none"> 1. Table 1-3 states, “are received by the protective relays”. Does this require that the inputs to each individual relay must be checked, or is it sufficient to verify that acceptable signals are received at the relay panel, etc? 2. Relative to Table 1-5, the activities will likely require that system components be removed from service to complete those activities. If the changes to the BES definition (per the FERC Order) causes system elements such as 138 kV connected distribution transformers to be considered as BES, these components can not be removed from service for maintenance without outaging customers. The standard must exempt these components from the activities of Table 1-5 if the activity would result in deenergizing customers. 3. For the component types addressed in Tables 1-3 and 1-5, the requirements may cause entities to identify components very differently than they are currently doing, and doing so may take several years to complete. The Implementation Plan for R1 and R4 is too aggressive in that it may not

	<p>permit entities to complete the identification of discrete components and the associated maintenance and implement their program as currently proposed. We propose that the Implementation Plan specifically address the components in Table 1-3 and 1-5 with a minimum of 3 calendar years for R1 and 12 calendar years after that for R4.</p> <p>4. As for the interval in Table 1-4 regarding the battery terminal connection resistance, we believe that an 18-month interval is excessively frequent for this activity, and suggest that it be moved to the 6-calendar-year interval.</p> <p>5. In Table 1-4, we currently re-torque all of the battery terminal connections every 4-years, rather than measuring the terminal connection resistance to determine if the connections are sound. Disregarding the interval, would this activity satisfy the “verify the battery terminal connection resistance” activity?</p>
Response	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. The SDT intends that the voltage and current signals properly reach each individual relay, but there may be several methods of accomplishing this activity. 2. This concern seems more properly to be one to be addressed during the activities to develop the new BES definition, rather than within PRC-005-2 3. The Implementation Plan for Requirement R1 has been modified from 6 months to 12 months. The Standard has also been modified (Requirement R1, Part 1.1) to not specifically require identification of all individual Protection System components. The Implementation Plan for Requirement R4 has been revised to add one year to all established dates. 4. IEEE 450, 1188, 1106 all recommend this activity at a 12-month interval. Please see Section 15.4.1 of the Supplementary Reference Document for a discussion of this activity. 5. Re-torquing the battery terminals would not meet this requirement.
Segment	5
Organization	Consumers Energy
Member	James B Lewis
Comment	The issues raised in our comments to the proposed Standard need to be addressed.
Response	Thank you for your comments. Please see our response to your comments which were submitted during the formal comment period.
Segment	1, 3, 5, 6

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Organization	Dominion
Member	John K Loftis, Michael F Gildea, Mike Garton, Louis S Slade
Comment	VSL R3. How do you measure a percentage of countable events over a period of time? How are you to determine what the total population to be considered? An entity should not be penalized if they are following their program, correcting issues, and documenting all actions, even if there is a high failure rate in an instance.
Response	Thank you for your comments. Attachment A, to which Requirement R3 refers, specifies that countable events are assessed on the basis of “for the greater of either the last 30 components maintained or all components maintained in the previous year.”
Segment	1, 3, 4, 5, 6
Organization	FirstEnergy Energy Delivery, FirstEnergy Solutions, Ohio Edison Company
Member	Robert Martinko, Kevin Querry, Kenneth Dresner, Mark S Travaglianti
Comment	Please see FirstEnergy's comments submitted separately through the comment period posting.
Response	Thank you for your comments. Please see our response to your comments which were submitted during the formal comment period.
Segment	4, 5
Organization	Florida Municipal Power Agency
Member	Frank Gaffney, David Schumann
Comment	<ol style="list-style-type: none"> 1. UFLS and UVLS maintenance and testing is greatly expanded, e.g., we interpreted PRC-008/011 as being only the UFLS/UVLS equipment. The new PRC-005 sweeps in other protection system components, e.g., communications (probably not applicable), voltage and current sensing devices (e.g., instrument transformers), Station DC supply, control circuitry. What's key about this is that these components are all part of distribution system protection, so, these activities would not be covered by other BES protection system maintenance and testing. I'm sure we are testing batteries and the like, but, we are probably not testing battery chargers and control circuitry, and, in many cases distribution circuits are such that it is very difficult, if not impossible, to test control circuitry to the trip coil of the breaker without causing an outage of the customers on that distribution circuit. There is no real reliability need for this either. Unlike Transmission and Generation Protection Systems which are needed to clear a fault and may only have one or two back-up systems, there are thousands and thousands of UFLS relays and if one fails to operate, it will not be noticeable to the event. It does make sense to test the relays themselves in part to ensure that the regional UFLS program is being met, but, to test the other protection system components is not worthwhile. Note that DC Supplies and most of the control

	<p>circuitry of distribution lines are "tested" frequently by distribution circuits clearing faults such as animals, vegetation blow-ins, lightning, etc., on distribution circuits, reducing the value of testing to just about null. However, this version is better than prior versions because it essentially requires the entity to determine it's own period of maintenance and testing for UFLS/UVLS for DC Supply and control circuitry.</p> <ol style="list-style-type: none"> 2. Applicability, 4.2.1, should reflect the Y&W and Tri-State interpretation (Project 2009-17) of "transmission Protection System" and should state: "Protection Systems applied on, or designed to provide protection for a BES Facility and that trips a BES Facility" 3. Applicability, 4.2. - does not reflect the interpretation of Project 20009-10 that excludes non-electrical protection (e.g., sudden pressure relays) and auxiliary relays. Because the definition of Protection System (recently approved) does not clearly exclude "non-electrical" protection, the Applicability section should. For instance,, a vibration monitor, steam pressure, etc. protection of generators, sudden pressure protection of transformers, etc. should not be included in the standard. An alternative is to change the definition of Protection System to make sure it only includes electrical the VRF of R1 should be Low since the attached tables are essentially the PSMP.
<p style="text-align: right;">Response</p>	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. For UFLS and UVLS, the maintenance activities related to station dc supply and control circuitry are somewhat constrained relative to similar activities for Protection Systems in general. Regardless, without proper functioning of these component types, UFLS and UVLS will not respond as expected, and will therefore degrade BES system reliability, particularly during the stressed system conditions for which UFLS and UVLS are installed. Relative to control circuitry, Table 1-5 specifically excludes UFLS and UVLS from maintenance activities relate to the interrupting device trip coil. 2. This interpretation is not yet approved. When this interpretation is approved, the SDT will incorporate it within PRC-005-2. However, the SDT has made changes to Applicability 4.2.1. 3. The recently-balloted revision of the definition of Protection System, which has been approved by the NERC Board of Trustees and will soon be filed with FERC for approval, clearly includes only protective relays that respond to electrical quantities. As for auxiliary relays, the interpretation to which you refer states that they are not explicitly included, but are included to the degree that an entity's Protection System control circuitry addresses them(which has been identified as a reliability gap), and are being added to PRC-005-2 to resolve the gap.
<p>Segment</p>	<p>6</p>

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Organization	Florida Municipal Power Pool
Member	Thomas E Washburn
Comment	the VRF of R1 should be Low since the attached tables are essentially the PSMP.
Response	Thank you for your comments. The SDT disagrees; the Tables establish the intervals and activities, and Requirement R1 addresses the establishment of an entity's individual PSMP.
Segment	4
Organization	Fort Pierce Utilities Authority
Member	Thomas W. Richards
Comment	The VRF of R1 should be Low since the attached tables are essentially the PSMP.
Response	Thank you for your comments. The SDT disagrees; the Tables establish the intervals and activities, and Requirement R1 addresses the establishment of an entity's individual PSMP.
Segment	1, 3
Organization	Hydro One Networks, Inc.
Member	Ajay Garg, Michael D. Penstone
Comment	Hydro One is casting a negative vote with the following comments: 1. R1 Lower - Include a second part as follows: "Failed to identify calibration tolerances or other equivalent parameters for one Protection System component type that establish acceptable parameters for the conclusion of maintenance activities. " 2. R1 Moderate - Similar wording as for the Lower VSL but catering for two Protection System component types. R1 High - Change the wording of the 3rd part to be similar to the Lower VSL to match the requirement and to cater for more than two Protection System component types.
Response	Thank you for your comments. 1. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this. 2. Requirement R1 'Moderate' appears to be similar to Requirement R1 'Lower' as you suggest. The SDT believes that, if more than two Protection System component types are not addressed, the 'Severe' VSL is appropriate.
Segment	5
Organization	Indeck Energy Services, Inc.

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Member	Rex A Roehl
Comment	The Violation Risk Factors should not be the same for all registered entities because the risk in a violation by a 20 MW wind farm connected at 115 kV is de minimis compared to that same violation at a 2,000 MW transmission substation or generator. The basic structure of this revision to PRC-005 is totally defective. Combining 4 standards that each have something to do with relays into one omnibus standard was wrongheaded. The Violation Severity Levels need to match the violation and four arbitrary categories cannot do so for the myriad of components, systems and varying numbers of them for one registered entity that are covered by this draft standard.
Response	Thank you for your comments. The VRFs are not dependent on size, and must be assigned on a requirement-by-requirement basis.
Segment	2
Organization	Independent Electricity System Operator
Member	Kim Warren
Comment	<ol style="list-style-type: none"> 1. R1 Lower - We suggest including a second part as follows: "Failed to identify calibration tolerances or other equivalent parameters for one Protection System component type that establish acceptable parameters for the conclusion of maintenance activities. " 2. R1 Moderate - We suggest similar to the Lower VSL but catering for two Protection System component types. R1 High - We suggest changing the wording of the 3rd part to match the requirement and to cater for more than two Protection System component types. 3. Editorial Comment to Severe VSL for R3: In part 3, replace "less" with "fewer".
Response	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this. 2. Requirement R1 'Moderate' appears to be similar to Requirement R1 'Lower' as you suggest. The SDT believes that, if more than two Protection System component types are not addressed, the 'Severe' VSL is appropriate. 3. The SDT has elected not to change the VSL for Requirement R3 as suggested.
Segment	1
Organization	Lake Worth Utilities
Member	Walt Gill

Comment	
	<ol style="list-style-type: none"> 1. UFLS and UVLS maintenance and testing is greatly expanded, e.g., we interpreted PRC-008/011 as being only the UFLS/UVLS equipment. The new PRC-005 sweeps in other protection system components, e.g., communications (probably not applicable), voltage and current sensing devices (e.g., instrument transformers), Station DC supply, control circuitry. What's key about this is that these components are all part of distribution system protection, so, these activities would not be covered by other BES protection system maintenance and testing. I'm sure we are testing batteries and the like, but, we are probably not testing battery chargers and control circuitry, and, in many cases distribution circuits are such that it is very difficult, if not impossible, to test control circuitry to the trip coil of the breaker without causing an outage of the customers on that distribution circuit. There is no real reliability need for this either. Unlike Transmission and Generation Protection Systems which are needed to clear a fault and may only have one or two back-up systems, there are thousands and thousands of UFLS relays and if one fails to operate, it will not be noticeable to the event. It does make sense to test the relays themselves in part to ensure that the regional UFLS program is being met, but, to test the other protection system components is not worthwhile. Note that DC Supplies and most of the control circuitry of distribution lines are "tested" frequently by distribution circuits clearing faults such as animals, vegetation blow-ins, lightning, etc., on distribution circuits, reducing the value of testing to just about null. However, this version is better than prior versions because it essentially requires the entity to determine its own period of maintenance and testing for UFLS/UVLS for DC Supply and control circuitry. 2. Applicability, 4.2.1, should reflect the Y&W and Tri-State interpretation (Project 2009-17) of "transmission Protection System" and should state: "Protection Systems applied on, or designed to provide protection for a BES Facility and that trips a BES Facility" 3. Applicability, 4.2. - does not reflect the interpretation of Project 20009-10 that excludes non-electrical protection (e.g., sudden pressure relays) and auxiliary relays. Because the definition of Protection System (recently approved) does not clearly exclude "non-electrical" protection, the Applicability section should. For instance,, a vibration monitor, steam pressure, etc. protection of generators, sudden pressure protection of transformers, etc. should not be included in the standard. An alternative is to change the definition of Protection System to make sure it only includes electrical 4. the VRF of R1 should be Low since the attached tables are essentially the PSMP. 5. Table 1-4 requires a comparison of measured battery internal ohmic value to battery baseline. Since battery manufacturers do not provide this value, it is unclear what the "baseline" values ought to be if an entity recently began performing this test (assuming it's several years after the commissioning of the battery.) Would it be acceptable for an entity to establish baseline values based on statistical analysis of multiple test results specific to a

	<p>given battery manufacturer and design?</p> <ol style="list-style-type: none"> 6. Small entities with only one or two BES substations may not have enough components to take advantage of the expanded maintenance intervals afforded by a performance-based maintenance program. Aggregating these components across different entities doesn't seem too logical considering the variations at the sub-component level (wire gauge, installation conditions, etc.) 7. Trip circuits are interconnected to perform various functions. Testing a trip path may involve disabling other features (i.e. breaker failure or reclosing) not directly a part of the test being performed. Temporary modifications made for testing introduce a chance to unknowingly leave functions disabled, contacts shorted, jumpers lifted, etc. after testing has been completed. Trip coils and cable runs from panels to breaker can be made to meet the requirements for monitored components. The only portions of the circuitry where this may not be the case is in the inter and intra-panel wiring. Because such portions of the circuitry have no moving parts and are located inside a control house, the exposure is negligible and should not be covered by the requirements. Entities will be at increased compliance risk as they struggle to properly document the testing of all parallel tripping paths.
<p>Response</p>	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. For UFLS and UVLS, the maintenance activities related to station dc supply and control circuitry are somewhat constrained relative to similar activities for Protection Systems in general. Regardless, without proper functioning of these component types, UFLS and UVLS will not respond as expected, and will therefore degrade BES system reliability, particularly during the stressed system conditions for which UFLS and UVLS are installed. Relative to control circuitry, Table 1-5 specifically excludes UFLS and UVLS from maintenance activities relate to the interrupting device trip coil. 2. This interpretation is not yet approved. When this interpretation is approved, the SDT will incorporate it within PRC-005-2. However, the SDT has made changes to Applicability 4.2.1. 3. The recently-balloted revision of the definition of Protection System, which has been approved by the NERC Board of Trustees and will soon be filed with FERC for approval, clearly includes only protective relays that respond to electrical quantities. As for auxiliary relays, the interpretation to which you refer states that they are not explicitly included, but are included to the degree that an entity's Protection System control circuitry addresses them(which has been identified as a reliability gap), and are being added to PRC-005-2 to resolve the gap. 4. The SDT disagrees; the Tables establish the intervals and activities and Requirement R1 addresses the establishment of an entity's individual PSMP.

	<p>5. Typical baseline values for various types of lead-acid batteries can be obtained from the test equipment manufacturer, the battery vendor, and perhaps other sources for batteries that are already in service. For new batteries, the initial battery baseline ohmic values should be measured upon installation and used for trending.</p> <p>6. Entities are not required to use performance-based maintenance programs. Requirement R3 and Attachment A are provided for the use of entities that can (and desire to) avail themselves of this approach.</p> <p>7. The requirement relative to control circuitry does not explicitly require trip or functional testing of the entire path; it requires that entities verify all paths without specifying the method of doing so. Please see Section 15.5 of the Supplementary Reference Document for a detailed discussion.</p>
Segment	1
Organization	Lakeland Electric
Member	Larry E Watt
Comment	<p>The major reasons are that:</p> <ol style="list-style-type: none"> 1. UFLS and UVLS maintenance and testing is greatly expanded, e.g., we interpreted PRC-008/011 as being only the UFLS/UVLS equipment. The new PRC-005 sweeps in other protection system components, e.g., communications (probably not applicable), voltage and current sensing devices (e.g., instrument transformers), Station DC supply, control circuitry. What's key about this is that these components are all part of distribution system protection, so, these activities would not be covered by other BES protection system maintenance and testing. I'm sure we are testing batteries and the like, but, we are probably not testing battery chargers and control circuitry, and, in many cases distribution circuits are such that it is very difficult, if not impossible, to test control circuitry to the trip coil of the breaker without causing an outage of the customers on that distribution circuit. There is no real reliability need for this either. Unlike Transmission and Generation Protection Systems which are needed to clear a fault and may only have one or two back-up systems, there are thousands and thousands of UFLS relays and if one fails to operate, it will not be noticeable to the event. It does make sense to test the relays themselves in part to ensure that the regional UFLS program is being met, but, to test the other protection system components is not worthwhile. Note that DC Supplies and most of the control circuitry of distribution lines are "tested" frequently by distribution circuits clearing faults such as animals, vegetation blow-ins, lightning, etc., on distribution circuits, reducing the value of testing to just about null. However, this version is better than prior versions because it essentially requires the entity to determine its own period of maintenance and testing for UFLS/UVLS for DC Supply and control circuitry.

	<ol style="list-style-type: none"> 2. Applicability, 4.2.1, should reflect the Y&W and Tri-State interpretation (Project 2009-17) of "transmission Protection System" and should state: "Protection Systems applied on, or designed to provide protection for a BES Facility and that trips a BES Facility" 3. Applicability, 4.2. - does not reflect the interpretation of Project 20009-10 that excludes non-electrical protection (e.g., sudden pressure relays) and auxiliary relays. Because the definition of Protection System (recently approved) does not clearly exclude "non-electrical" protection, the Applicability section should. For instance,, a vibration monitor, steam pressure, etc. protection of generators, sudden pressure protection of transformers, etc. should not be included in the standard. An alternative is to change the definition of Protection System to make sure it only includes electrical 4. the VRF of R1 should be Low since the attached tables are essentially the PSMP.
<p style="text-align: right;">Response</p>	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. For UFLS and UVLS, the maintenance activities related to station dc supply and control circuitry are somewhat constrained relative to similar activities for Protection Systems in general. Regardless, without proper functioning of these component types, UFLS and UVLS will not respond as expected, and will therefore degrade BES system reliability, particularly during the stressed system conditions for which UFLS and UVLS are installed. Relative to control circuitry, Table 1-5 specifically excludes UFLS and UVLS from maintenance activities relate to the interrupting device trip coil. 2. This interpretation is not yet approved. When this interpretation is approved, the SDT will incorporate it within PRC-005-2. However, the SDT has made changes to Applicability 4.2.1. 3. The recently-balloted revision of the definition of Protection System, which has been approved by the NERC Board of Trustees and will soon be filed with FERC for approval, clearly includes only protective relays that respond to electrical quantities. As for auxiliary relays, the interpretation to which you refer states that they are not explicitly included, but are included to the degree that an entity's Protection System control circuitry addresses them(which has been identified as a reliability gap), and are being added to PRC-005-2 to resolve the gap. 4. The SDT disagrees; the Tables establish the intervals and activities and Requirement R1 addresses the establishment of an entity's individual PSMP.
<p style="text-align: right;">Segment</p>	6
<p style="text-align: right;">Organization</p>	Lakeland Electric
<p style="text-align: right;">Member</p>	Paul Shipps

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Comment	Small entities with only one or two BES substations may not have enough components to take advantage of the expanded maintenance intervals afforded by a performance-based maintenance program. Aggregating these components across different entities doesn't seem too logical considering the variations at the sub-component level (wire gauge, installation conditions, etc.)
Response	Thank you for your comments. Entities are not required to use performance-based maintenance programs. Requirement R3 and Attachment A are provided for the use of entities that can (and desire to) avail themselves of this approach.
Segment	5,6
Organization	Luminant Energy, Luminant Generation Company LLC
Member	Brad Jones, Mike Laney
Comment	Luminant commends the PRC-005-2 Standard Drafting Team for its quality efforts in producing this version of the Standard however; Luminant must cast a negative ballot vote for the present version of the VRFs and VSLs for this Standard. The negative vote against is solely based on the addition of the VSL associated with Requirement R1 Part 1.5.
Response	Thank you for your comments. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this.
Segment	1,3,6
Organization	Manitoba Hydro
Member	Joe D Petaski, Greg C. Parent, Daniel Prowse
Comment	-The high VSL for R1 "Failed to include all maintenance activities relevant for the identified monitoring attributes specified in Tables 1-1 through 1-5" may be interpreted in different ways and should be further clarified.
Response	Thank you for your comments. The SDT modified the VSL for clarity.
Segment	2
Organization	Midwest ISO, Inc.
Member	Jason L Marshall

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Comment	<ol style="list-style-type: none"> 1. We disagree with the VRFs for R3, R4, and R5. R3, R4, and R5 are administrative requirements and duplicate to requirements in FAC-008 and FAC-009 that already require communication of facility ratings including those limited by relays. Thus, it should be Lower. 2. We disagree with the High VRF for Requirement R6 because the criteria in attachment will identify circuits that are not critical. If the criteria is modified per our comments on the standard and in the ballot, then we would agree with a High VRF. 3. Requirement R7 should be deleted as it represents double jeopardy. Thus, we do not agree with any VRF for it.
Response	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. It appears that this comment was intended to be offered on some other project, and does not appear relevant to PRC-005-2. 2. It appears that this comment was intended to be offered on some other project, and does not appear relevant to PRC-005-2. 3. It appears that this comment was intended to be offered on some other project, and does not appear relevant to PRC-005-2.
Segment	1
Organization	Nebraska Public Power District
Member	Richard L. Koch
Comment	<p>VRF's: The definition of a Medium Risk Requirement included on page 8 of the SAR states: "A requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system."</p> <ol style="list-style-type: none"> 1. The PSMP does not "directly" affect the electrical state or the capability of the bulk electric system. A failure of a Protection System component is required to "directly" affect the BES. Therefore, the PSMP has only an "indirect" affect on the electrical state or the capability of the BES. Requirements R1 through R3 and their subparts are administrative in nature in that they are comprised entirely of documentation. Therefore, I recommend changing the Violation Risk Factor of Requirements R1, R2, and R3 to Lower to be consistent with the Violation Risk Factors defined in the SAR. <p>VSL's:</p> <ol style="list-style-type: none"> 2. R2: Tables 1-1 through 1-5 refers to time-based maintenance programs. I recommend changing "condition-based" to "time-based" in all four severity levels. 3. SAR Attachment B - Reliability Standard Review Guidelines states that violation severity levels should be based on the following equivalent scores: Lower: More than 95% but less than 100% compliant Moderate: More than 85% but less than or equal to 95% compliant High: More than 70% but less than equal to 85% compliant Severe: 70% or less compliant I recommend revising the percentages of the violation severity levels to be consistent with

	<p>the SAR.</p> <p>4. R3: The performance-based maintenance program identified in PRC-005 Attachment A provides the requirements to establish the technical justification for the initial use of a performance-based PSMP and the requirements to maintain the technical justification for the ongoing use of a performance-based PSMP. However, it appears the VSLs for Requirement R3 only addresses the ongoing use of the technical justification. I recommend revising the VSLs for R3 to include the initial use of the technical justification.</p> <p>a. Item 2) of R3 Severe VSL is a duplicate of Item 2) of R3 Lower VSL. This item is administrative in nature therefore I recommend deleting Item 2) from R3 Severe VSL.</p> <p>b. The first and third bullets of item 4) of R3 Severe VSL are administrative in nature and should be moved to the Lower VSL</p> <p>c. R4: SAR Attachment B - Reliability Standard Review Guidelines states that violation severity levels should be based on the following equivalent scores: Lower: More than 95% but less than 100% compliant Moderate: More than 85% but less than or equal to 95% compliant High: More than 70% but less than equal to 85% compliant Severe: 70% or less compliant I recommend revising the percentages of the violation severity levels to be consistent with the SAR.</p>
<p>Response</p>	<p>Thank you for your comments.</p> <p>1. Requirements R1, R2, and R3 are not administrative; they are foundational. Without the fundamental development of a PSMP, an entity is unlikely to actually implement a PSMP that satisfies the reliability needs of the BES.</p> <p>2. The SDT concluded that Requirement R2 is redundant with Requirement R1, Part 1.4, and has deleted Requirement R2 (together with the associated Measure and VSL).</p> <p>3. The guidelines within the SAR have been superseded by subsequent revisions to the VSL Guidelines. The VSLs in the draft standard adhere to the latest VSL Guidelines and to the June 19, 2008 FERC order on VSLs in Docket No RR08-04-000.</p> <p>4. Part a – The VSL for Requirement R3 has been modified in consideration of your comments.</p> <p>Part b – These requirements are not administrative; they are foundational. Without compliance with these requirements, an entity does not have an effective performance-based PSMP, and may be detrimentally affecting reliability.</p> <p>Part c – The latest VSL Guidelines also provide examples of VSLs similar to those in the draft standard.</p>
<p>Segment</p>	<p>1</p>

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Organization	Oncor Electric Delivery
Member	Michael T. Quinn
Comment	Oncor cast a negative ballot vote for the present version of the VRFs and VSLs for this Standard. The negative vote against is solely based on the addition of the VSL associated with Requirement R1 Part 1.5.
Response	Thank you for your comments. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this.
Segment	6
Organization	Seattle City Light
Member	Dennis Sismaet
Comment	<p>The proposed Standard PRC-005-2 is an improvement over the previous draft in that it provides more consistency in maintenance and testing duration internals. Notwithstanding, two issues are of concern to Seattle City Light such that it is compelled to vote no:</p> <ol style="list-style-type: none"> 1) the establishment of bookends for standard verification and 2) the implementation timelines for entities with systems where electro-mechanical relays still compose a significant number of components in their protection systems. <p>1. Bookends: Proposed Standard PRC-005-2 specifies long inspection and maintenance intervals, up to 12 years, which correspondingly exacerbates the so-called “bookend” issue. To demonstrate that interval-based requirements have been met, two dates are needed - bookends. Evidencing an initial date can be problematic for cases where the initial date would occur prior to the effective date of a standard. NERC has provided no guidance on this issue, and the Regions approach it differently. Some, such as Texas Regional Entity, require initial dates beginning on or after the effective date of a Standard. Compliance with intervals is assessed only once two dates are available that occur on or after a standard took effect. Other regions, such as Western Electricity Coordinating Council (WECC), require that entities evidence an initial date prior to the effective date of a standard. For WECC, compliance with intervals is assessed as soon as a standard takes effect. Such variation makes application of standards involving bookends uncertain, arbitrary, capricious, and in the case of WECC, possibly illegal. Proposed Standard PRC-005-2 will be another such standard. Indeed this Standard will involve by far the largest number of bookends of any NERC standard - many thousands for a typical entity. Furthermore, the long inspection and maintenance intervals</p>

	<p>introduced in the draft will require entities in WECC, for instance, to evidence initial bookend dates prior to the date original PRC-005-1 took effect. For the 12-year intervals for CTs and VTs in proposed Standard PRC-005-2, many initial dates will occur prior to the 2005 Federal Power Act that authorized Mandatory Reliability Standards and even reach back before the 2003 blackout that catalyzed the effort to pass the Federal Power Act. As a result, many entities in WECC maybe at risk of being found in violation of proposed Standard PRC-005-2 immediately upon its implementation. Seattle City Light requests that NERC address the bookends issue, either within proposed Standard PRC-005-2 or in a separate, concurrent document.</p> <p>2. Legacy Systems: Many entities still have legacy protection systems that rely upon electro-mechanical relays. Effective testing approaches differ between electro-mechanical and digital relay systems. Thus, although the proposed standard rightly looks to the future of digital relays by specifying testing and maintenance focused on protection systems as a whole, the proposed implementation timelines create a level of hardship for those utilities with legacy systems. In example, auxiliary relay and trip coil testing may be essential to prove the correct operation of complex, multi-function digital protection systems. However, for legacy systems with single-function electro-mechanical components, the considerable documentation and operational testing needed to implement and track such testing is not necessarily proportional to the relative risk posed by the equipment to the bulk electric system. Performance testing of electro-mechanical systems, particularly regarding control circuits, will require extensive disconnection and reconnection of portions of the circuits. Such activities will likely cause far more problems on restoration-to-service than they will locate and correct. As such, to assist entities in their implementation efforts, we believe provision of alternatives are necessary, such as additional implementation time through phasing and/or through technical feasibility exceptions.</p>
<p>Response</p>	<p>Thank you for your comments.</p> <ol style="list-style-type: none"> 1. This issue has been addressed by NERC in Compliance Application Notice CAN-008 “PRC-005 R2 Pre-June 18 Evidence”. 2. Please see Sections 8 and 15.3 of the Supplementary Reference Document for a discussion on this topic. FERC Order 693 directs that NERC establish requirements for the maintenance of the Protection System and control circuitry is a portion thereof. Therefore, requirements for the maintenance of the control circuitry are necessary and the SDT has developed those requirements in a fashion that affords entities with the opportunity to best meet those requirements.
<p>Segment</p>	<p>1,3, 3, 3</p>
<p>Organization</p>	<p>Southern Company Services, Inc., Alabama Power, Georgia Power, Mississippi Power</p>
<p>Member</p>	<p>Horace Stephen Williamson, Richard J. Mandes, Anthony L Wilson, Don Horsley</p>

Consideration of Comments on Non-Binding Poll of VRFs and VSLs for PRC-005-2 — Project 2007-17

Comment	We disagree with the inclusion of the VSLs, VRFs, and time Horizons associated with the new Requirements 1.5 and 4.2
Response	Thank you for your comments. The SDT has determined that the fundamental concerns of Requirement R1, Part 1.5 and the associated changes are addressed within the PSMP definition, and that Requirement R1, Part 1.5 is not necessary; therefore, it has been removed. Requirement R4 has also been re-drafted to address various related concerns noted within comments. The associated VSL has also been revised. Please see Supplementary Reference Document, Section 8 for a discussion of this.
Segment	5
Organization	U.S. Bureau of Reclamation
Member	Martin Bauer P.E.
Comment	The VSL levels are not consistent with the true impact on reliability. Severe levels are assigned for failing to document rather than failing to maintain components. Documentation requirements that are not met should not be assigned a Severe level. The concept of penalizing an entity for failed components without regard to why they failed is unreasonable. The severely levels should be based on avoidable failures or failures that could have been detected if the entity had performed maintenance.
Response	Thank you for your comments. VSLs depict the level to which an entity has failed to comply with the standard; VRFs reflect the risk to the BES. Escalations within the VSLs specifically address more egregious (severe) violations of the standard in accordance with the NERC VSL Guidelines.