Unofficial Comment Form
Project 2007-06 System Protection Coordination
PRC-027-1 (Draft 6)

DO NOT use this form for submitting comments. Use the electronic form to submit comments on draft 6 of PRC-027-1 – Coordination of Protection Systems for Performance During Faults. The electronic form must be submitted by 8:00 p.m. Eastern, Friday, September 11, 2015.

Documents and information about this project are available on the project page. If you have questions, contact Standards Developer, Al McMeekin, (via email) or at (404) 446-9675.

Background Information
Project 2007-06 System Protection Coordination originated in 2007 to address directives from FERC Order 693 and other issues identified by the System Protection and Control Task Force pertaining to PRC-001. The System Protection Coordination Standard Drafting Team (SPCSDT) developed Reliability Standard PRC-027-1 with the stated purpose: “To maintain the coordination of Protection Systems installed to detect and isolate Faults on Bulk Electric System (BES) Elements, such that those Protection Systems operate in the intended sequence during Faults.” PRC-027-1 clarifies the coordination aspects and incorporates the reliability objectives of Requirements R3 and R4 from PRC-001-1.1(ii).

In conjunction with Project 2007-06.2 Phase 2 of System Protection Coordination, NERC is proposing the complete retirement of PRC-001-1.1(ii). In Phase 2, Requirement R1 is being incorporated into the proposed Reliability Standard TOP-009-1. Requirements R2, R5, and R6 are proposed for retirement as the reliability objectives of those requirements are addressed by other TOP/IRO standards pending regulatory approval. The Mapping Document on that project page explains how the reliability objectives of Requirements R1, R2, R5, and R6 are addressed. The remaining two Requirements R3 and R4 of PRC-001-1.1(ii) are addressed by PRC-027-1 as shown in the Project 2007-06 System Protection Coordination Mapping Document. The complete retirement of PRC-001-1.1(ii) is contingent upon the approval of Reliability Standards PRC-027-1 and TOP-009-1 (as proposed by Project 2007-06.2 Phase 2 of System Protection Coordination). NERC is proposing the retirement of PRC-001-1.1(ii) in the implementation plans associated with both projects. See the Phase 2 project page for more details. Collaboratively, these two projects are proposing the retirement of PRC-001-1.1(ii).

Draft 5 of PRC-027-1 was posted for formal comment and ballot from April 1 – May 15, 2015. The standard received affirmative votes totaling 39.63 percent. The drafting team appreciated the feedback industry stakeholders provided and incorporated many of the suggested revisions into draft 6 of the standard. In accordance with section 4.13: Additional Ballots of the Standards Process Manual, the drafting team is not providing written responses to the comments with this posting because significant revisions to the standard were made and an Additional Ballot will be conducted. Based on stakeholder comments, the drafting team modified the proposed standard as follows:
**Defined term**

*Protection System Coordination Study*

An analysis to determine whether Protection Systems operate in the intended sequence during Faults.

**Purpose**

Changed from: “To maintain the coordination of Protection Systems installed for the purpose of detecting Faults on BES Elements and isolating those faulted Elements, such that the Protection Systems operate in the intended sequence during Faults” to “To maintain the coordination of Protection Systems installed to detect and isolate Faults on Bulk Electric System (BES) Elements, such that those Protection Systems operate in the intended sequence during Faults.”

**Applicability**

Changed the Facilities language to be consistent with the revised “Purpose” of the standard. It now reads: “Protection Systems installed to detect and isolate Faults on BES Elements.”

**Requirements**

*Requirement R1*

Revised the language in the core requirement to: “Each Transmission Owner, Generator Owner, and Distribution Provider shall establish a process for developing new and revised Protection System settings for BES Elements, such that the Protection Systems operate in the intended sequence during Faults.”

**Part 1.1**

Revised the language from: “A method to review and update the information required to develop new or revised Protection System settings.” to “A review and update of short-circuit models for the BES Elements under study.”

**Part 1.2**

Deleted “A review of Protection System settings affected by System changes.”

**Part 1.3**

Removed from Requirement R1. Revised and incorporated into new Requirement R2.

**Part 1.4**

Removed the descriptor “quality” and the phrase “prior to implementation.” Part 1.4 is the new Part 1.2 and reads as follows: “A review of the developed Protection System settings.”

**Part 1.5**

The language of Part 1.5 was revised for clarity and is the new Part 1.3.
Requirement R2
Revised the language from the previous Requirement R1, Part 1.3 and made it new Requirement R2. Removed the term “existing entity-designated” and the associated footnote. New Requirement R2 now references “Attachment A” which lists Protection System functions that are applicable to the standard, if the entity uses available Fault current levels to develop Protection System settings. These are the only functions that require study to determine that coordination is maintained for those Protection System functions for each BES Element.

The language in Requirement R2, Option 2 was clarified to explain that the six-year interval is inclusive of the Fault current comparisons and any resulting Protection System Coordination Study(ies). Option 2 now includes a footnote pertaining to the development of an initial Fault current baseline as well as updating or creating baselines after the effective date of the standard. The footnote states: “The initial Fault current baseline(s) shall be established by the effective date of this Reliability Standard and updated each time a Protection System Coordination Study is performed. If an initial baseline was not established by the effective date of this Reliability Standard because of the previous use of an alternate option or the installation of a new Element, the entity may establish the baseline by performing a Protection System Coordination Study.”

Requirement R3
The previous Requirement R2 is now Requirement R3.

Measures
Revisions commensurate with changes made to the requirements.

VSLs
Revisions commensurate with changes made to the requirements.

Description
Draft 6 of PRC-027-1 consists of three proposed requirements.

Requirement R1 mandates that entities establish a process for developing new and revised Protection System settings for BES Elements to operate in the intended sequence during Faults, and stipulates certain attributes that must be included in the process. Because Protection System designs and philosophies of entities vary, entities are provided latitude in developing their coordination processes.

Requirement R2 mandates that entities periodically perform Protection System Coordination Studies and/or compare existing Fault current values to established Fault current baselines for Protection Systems applied on BES Elements that are identified as being affected by changes in Fault current. The applicable Protection System functions are identified in Attachment A. These periodic reviews increase the likelihood that incremental changes to the BES that impact coordination are revealed. Requirement R2 provides responsible entities (Distribution Providers, Generator Owners, and Transmission Owners) with options to assess the state of their Protection System coordination.
Requirement R3 mandates that entities utilize its process established in accordance with Requirement R1. Implementing each of the elements of the process facilitates a consistent approach in the development of accurate Protection System settings, by minimizing the introduction of errors, thereby maximizing the likelihood of maintaining a coordinated Protection System.

The Project 2007-06 System Protection Coordination Standard Drafting Team (SPCSDT) is posting draft 6 of Reliability Standard PRC-027-1 “Protection System Coordination for Performance During Faults” for comment from July 29, 2015 to September 11, 2015.

Questions

1. The term “entity-designated” and its associated footnote were removed and replaced by “Attachment A.” Attachment A lists the Protection System functions applicable in the standard. Do you agree that Attachment A includes the Protection System functions that must be reviewed to maintain Protection System coordination when Fault current levels change? If not, please provide the basis for your disagreement and any proposed revisions.

☐ Yes
☐ No

Comments: We agree with the classification of specific Protection System components that require coordination. In addition, this will aid the compliance enforcement process. However, clarification is requested with regard to applicability of distance protection element. Does the standard apply to distance elements used solely for non-communication aided protection schemes (for example transfer trip, carrier systems) or for all distance element applications?

2. Do you agree with the proposed Implementation Plan? If not, please provide the basis for your disagreement and your proposed revisions.

☐ Yes
☐ No

Comments: As it stands now, entities will not have adequate time, within 12 months, to develop a process, establish Fault current baselines, and establish a tracking tool for Fault current baseline changes and/or periodic review. We recommend that the Implementation Plan be extended to 24 months.

We recommend the implementation plan include a statement clarifying the start date of the 6 year cycle that is described in Requirement R2. Is it the date the standard is effective, or the date the protection system was last reviewed prior to the effective date?
3. If you have any other comments that you haven’t already provided in response to the above questions, please provide them here.

Comments: The parenthetical phrase in sub-Part 4.1.3 of the Applicability is not necessary and should be deleted. FPA 215 already ready limits the applicability of all reliability standards to the Bulk Power System and believe that NERC has revised the BES definition so that it should, either through application of bright line criteria or through the NERC or FERC exception process, encompass only those Elements and Facilities that are subject to FPA 215.

It should also be noted that, in this version the word “its” is deleted from Requirement 1 but that the Rationale for Requirement R1 uses the word “their” while Measure 1 uses the word “its”. We suggest changes be made so that all contain consistent verbiage. We believe that an entity can only be responsible for Protection System(s) it owns and would prefer this be explicitly indicated in the requirement(s).

As defined in the NERC Glossary, the Reliability Coordinator is the entity that is the highest level of authority who is responsible for the reliable operation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and Real-time operations. The Reliability Coordinator has the purview above and beyond that of a Transmission Operator that is broad enough to enable the calculation of Interconnection Reliability Operating Limits. Because new relay settings or revisions to relay settings can impact IROL calculations, the Reliability Coordinator must be aware of any new relay settings or revised relay settings in advance of their implementation.

For these reasons the standard needs to require that each Transmission Owner, Generator Owner and Distribution Provider notify the Reliability Coordinator that it is developing new or revised relay settings. The revision should also allow for the Reliability Coordinator to provide comments on the new or revised relay settings. To capture this, we suggest the following revision to R1:

**R1.** Each Transmission Owner, Generator Owner, and Distribution Provider shall establish a process for developing new and revised Protection System settings for BES Elements, such that the Protection Systems operate in the intended sequence during Faults. The process shall include: [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]

1.1. A review and update of short-circuit models for the BES Elements under study.

1.2. A review of the developed Protection System settings.

1.3. Provide new or revised Protection System settings to the Reliability Coordinator.

1.3.1 Respond to the Reliability Coordinator’s comments regarding the proposed new or revised Protection System settings by resolving any coordination issue(s) or affirming that no coordination issue(s) were identified.
1.4. For Protection System settings applied on BES Elements that electrically join Facilities owned by separate functional entities (Transmission Owners, Generator Owners, and Distribution Providers), provisions to:

1.4.1. Provide the proposed Protection System settings to the owner(s) of the electrically-joined Facilities.

Also, to clarify and reinforce the nature of the broader protection coordination concern, suggest the following modification to the Purpose:

“To maintain the coordination of Protection Systems installed to detect and isolate Faults on Bulk Electric System (BES) Elements, such that those Protection Systems operate in the intended sequence during Faults without causing an inadvertent adverse impact anywhere on the BES.”

We suggest that the drafting team review PRC-027-1 R1 Part 1.1 and MOD-032-1, R1 for a potential overlap, and if necessary provide clarification in the supplemental material.

R2, Option 2 has two actions associated with it, both of which have to be completed in one timeframe. The two actions are the Fault current comparison against the baseline and the performance of a Protection System Coordination Study if the fault current comparison exceeds 15% or greater deviation. It is recommended that under this option, if an entity identifies a 15% or greater deviation in Fault current value at a bus, the entity is given a set amount of time per element to complete a protection coordination study on all applicable elements at that bus.

In many cases, smaller entities that are interconnected to larger TOs do not develop their own Protection System settings. These settings are provided to them by the interconnecting TO and mandated to be implemented through Interconnection agreements. R1 should be revised to recognize these instances, including the Rationale for Requirement R1 words related to a “single protective relaying group performing the work for multiple functional entities,” as a single group may be responsible for the process for multiple owners of BES Elements. The note should also be included in the Requirement and Measure as internal documentation will be used to determine the coordination aspects of Part 1.3.

Requirement R3 needs a “trigger” to initiate the process described therein. Suggest revising Requirement R3 to read:

R3. Each Transmission Owner, Generator Owner, and Distribution Provider that determines a need for new or revised Protection System settings shall utilize its process established in Requirement R1 to develop new and revised Protection System settings for BES Elements.
To avoid confusion between modeling and protection short circuit modeling, suggest adding the word “protection” to make the term used in the standard “protection short circuit”.