

## Meeting Notes

### Project 2010-13.3 – Relay Loadability: Stable Power Swings Standard Drafting Team

March 24, 2014  
10:00 a.m.-11:00 a.m. Eastern

Conference Call

#### Administrative

##### 1. Introductions and chair remarks

The meeting was brought to order by Mr. Middaugh, chair, at 10:02 a.m. Eastern Monday, March 24, 2014. He thanked everyone for joining. Mr. Barfield took roll of members and observers. Those in attendance were:

Name	Company	Member/ Observer
Bill Middaugh, P.E.	Tri-State Generation & Transmission Association, Inc.	Chair
Kevin W. Jones, P.E.	Xcel Energy, Inc.	Vice Chair
David Barber, P.E.	FirstEnergy	Member
Slobodan Pajic	General Electric Energy	Member
John Schmall	Electric Reliability Council of Texas (ERCOT)	Member
Matthew H. Tackett, P.E.	Midcontinent Independent System Operator (MISO)	Member
Syed Ahmad	Federal Energy Regulatory Commission (FERC)	Observer
Ken Hubona	Federal Energy Regulatory Commission (FERC)	Observer
Scott Barfield-McGinnis (Standard Developer)	North American Electric Reliability Corporation (NERC)	Observer
Ramzi Chahine	Hydro Québec	Observer
Eric Loiselle	Hydro Québec	Observer
Si Truc Phan	Hydro Québec	Observer
David Youngblood	Consultant (Luminant Energy)	Observer

## 2. Determination of quorum

The rule for NERC Standard Drafting Team (SDT or team) states that a quorum requires two-thirds of the voting members of the SDT. Quorum was achieved as six of the nine members were present.

## 3. NERC Antitrust Compliance Guidelines and Public Announcements

NERC Antitrust Compliance Guidelines and public disclaimer were reviewed by Mr. Barfield. There were no questions. Mr. Barfield also referred everyone to the two new NERC policies and demonstrated where to find them on the NERC website. The policies are related to use of the email listserv and standard drafting team meeting conduct.

## 4. Review team roster

Mr. Barfield noted that the roster is posted on the NERC project page and has not been changed.

## 5. Review meeting agenda and objectives

Mr. Barfield reviewed the meeting agenda and objectives.

## Agenda

### 1. Continue with Standard Development

Mr. Barfield started off with a brief recap of the previous conference call which was held March 18. For reference, the proposed requirement text has been inserted at the bottom of these meeting notes. The team ended on Requirement R1, bullet 5. This bullet is incomplete and the team may want to revisit following discussion on other requirements. Mr. Tatro pointed out that the first 4 bullets were substantively the same as the SPCS Report<sup>1</sup> and that bullet five was different. Currently, the team is set to work on Requirement R2 (reviewing the identified Elements) and R3 (notifying the asset owners). Mr. Middaugh asked about working on the Measures. Mr. Barfield recommended deferring them until the requirements are not changing so much. Mr. Tatro raised concern that Requirement R2 was deviating from the SPCS intentions. He noted the SPCS made an effort to try and keep the criteria as straight forward as possible. With Requirement R2, it appears that the team is having the Planning Coordinator (PC) and Transmission Planner (TP) perform additional studies to further reduce the set of Elements (i.e., identified in R1) that would be subject to the standard. The SPCS intent as communicated by Mr. Tatro was a concern is not the direction the PC/TP would take in selecting the contingencies to model. Therefore, selecting the Elements (i.e., R1) would be sufficient. Requirement R1, criterion five is meant to capture any other identified power swings.

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<sup>1</sup> NERC System Protection and Control Subcommittee, Protection System Response to Power Swings, August 2013 [http://www.nerc.com/comm/PC/System%20Protection%20and%20Control%20Subcommittee%20SPCS%2020/SPCS%20Power%20Swing%20Report\\_Final\\_20131015.pdf](http://www.nerc.com/comm/PC/System%20Protection%20and%20Control%20Subcommittee%20SPCS%2020/SPCS%20Power%20Swing%20Report_Final_20131015.pdf)

Mr. Schmall did not see Requirement R2 as paring down the list of Elements identified in Requirement R1, but did see a lack of clarity in what the PC and TP are to simulate to create a power swing. Mr. Middaugh asked if the team needed to go into detail about the type of disturbances of the transmission planning standard (i.e., TPL-001-4). Mr. Youngblood wondered if Requirement R2 should use the criteria from TPL-001-4 to check Elements for power swings and then the planning engineer would get with the protection engineers. Mr. Schmall theorized that the planners would select certain contingencies, but without clarity, it would be difficult to measure or enforce. Mr. Barber did not really see a way to take multiple contingencies and reducing the list to the worst one or few power swings. Mr. Tatro mentioned that his experience was stepping through a model to find when the swing went unstable power swing. From there, base the setting on the last known stable power swing. Mr. Jones thought the discussion was leaning toward being less open and flexible for the planners to choose how to analyze the Elements and suggested utilizing the Application Guidelines to provide the necessary guidance.

Mr. Youngblood noting PRC-023-2 that only certain sub 200 kV lines are subject to that standard. He wondered how that approach would be applicable to this standard (PRC-026-1). Mr. Schmall believed the problem is determining the most challenging power swing on the Element. Mr. Tackett questioned that if the planning assessments showing everything okay then no further action is needed. If the assessment found another element that had problems with a power swing, then you would provide the protection engineer with the impedance plots, etc. He sees Requirement R2 as necessary for the planner to simulate the Elements in Requirement R1 so that the protection engineer would know how to set the relay. Mr. Tatro stressed that PRC-023-2 goes beyond planning analysis and is designed to set lines for a variety of conditions that would not necessarily have been modeled. He believes the intent of the proposed standard is to have the most secure relay setting for a stable power swing and the most dependable setting for an unstable power swing. He further emphasized that the SPCS Report recognized the difficulties with determining the worst case power swing and because of these difficulties proposed the criteria for selecting the Element which should be considered in the standard. The last bullet in Requirement R1 is to allow additional Elements to be included, if known.

Mr. Schmall still believes that for those cases that get included, more clarity is needed to guide the planner in how to assess a particular Element for the most challenging power swing. Mr. Tatro agreed firm criteria is needed, such as stepping through a simulation until unstable and selecting this last stable case. Mr. Tatro took an action item to consider the language in the last bullet. He was agreeable with Requirement R2 if the intent is to do further analysis to support the protection setting. Mr. Tatro had the drafting team confirm that their intent is not to use Requirement R2 to pare the list resulting from Requirement R1. Mr. Middaugh and Mr. Tackett agreed that Requirement R2 was not intended to reduce the number of Elements on the list from Requirement R1.

The team continued with working on Requirement R3. Mr. Middaugh noted that any changes to R2 would impact R3. Mr. Jones noted he sees Requirement R3 as the part where the planner will develop the power swing characteristic relative to the protection settings. Mr. Tackett and Mr. Schmall believed the same. Mr. Youngblood questioned if “subject to

the power swing” (i.e., R2) means those relays that are challenged by power swings. Mr. Middaugh agreed and suggested varying edits Requirement R2. Mr. Tackett believed the approach should be for the planner to take the Elements identified in Requirement R1 and develop the necessary information for the protection engineers. Mr. Schmall, Mr. Tatro, Mr. Middaugh, and others agreed to the approach. Mr. Middaugh recapped that R1 would be for identifying the Elements, R2 for developing the impedance characteristics, etc., and R3 would be for communicating the information to the asset owners. Mr. Schmall agreed to look at revising the language in the Requirement R2 and R3 or what is placed in the Application Guidelines.

The team continued to Requirement R4 which applies to the asset owners. Mr. Jones noted that the bullets were solid and provided minor edits. Mr. Tackett suggested adding “modification” to the third bullet because replacement is not always necessary. Mr. Tatro liked the last bullet and offered to refine the text off-line. Mr. Youngblood questioned if the apparent impedance characteristic would identify the relay location. Mr. Tatro affirmed it would. The first bullet was modified to address a concern that other protection systems might be challenged by adding a parenthetical to “Protection System(s).” This requirement concluded the meeting.

## **2. Review of the schedule**

Mr. Barfield reviewed the schedule reminding team members of the in-person meeting, posting, Standard Committee’s approval of the initial posting, and the tentative placeholder dates of the second and third weeks of June for an in-person meeting.

## **3. Action items or assignments**

Mr. Schmall – Revise Requirement R2 and R3 and distribute proposed changes as early as possible to give team members time to consider the revisions prior to the next meeting.

Mr. Tatro – Consider the language in bullet five of Requirement R1.

## **4. Next steps**

Review Mr. Schmall’s revisions during the next call.

## **5. Future meeting(s)**

Conference call Wednesday, March 26, 2014 | 1:00 p.m. Eastern

Conference call Friday, March 28, 28, 2014 | 1:00 p.m.-2:00 p.m. Eastern

In-person meeting the week of March 31 beginning at 1:00 p.m. Eastern

## **6. Adjourn**

The meeting adjourned at 11:07 p.m. ET on March 24, 2014.

## A. Introduction

1. **Title:** Relay Performance During Stable Power Swings
2. **Number:** PRC-026-1
3. **Purpose:** To ensure that relays do not operate for non-Fault conditions during Stable Power Swings.
4. **Applicability:**
  - 4.1. **Functional Entities:**
    - 4.1.1 Planning Coordinator
    - 4.1.2 Transmission Planner
    - 4.1.3 Transmission Owner that applies protective relays at the terminals of the Elements listed in Section 4.2, Facilities.
    - 4.1.4 Generator Owner that applies protective relays at the terminals of the Elements listed in Section 4.2, Facilities.
  - 4.2 **Facilities:**

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The following Bulk Electric System (BES) Elements:

    - 4.2.1 Transmission lines.
    - 4.2.2 Generating units.
    - 4.2.3 Transformers.
    - 4.2.4 Series reactors.

## B. Requirements

- R1.** Each Planning Coordinator and Transmission Planner shall evaluate its portion of the Bulk Electric System (BES), once each calendar year, to identify Generation and Transmission Elements that meet any of the following criteria:

Criteria:

1. Elements located at or terminating at a generating plant, where a generating plant stability constraint is addressed by an operating limit or a Special Protection System (SPS) (including line-out conditions),
2. Elements that are associated with a System Operating Limit (SOL) that has been established based on stability constraints identified in system planning or operating studies (including line-out conditions).
3. Elements that have tripped due to power swings during system disturbances.
4. Elements that form a boundary of a potential island of the BES as identified by the Planning Coordinator or Transmission Planner that may form an island.

5. Additional Elements that are identified as tripping for power swings in Planning Assessments (e.g., TPL-001-4).
- R2.** Within three calendar months of identifying Elements in Requirement R1, each Planning Coordinator and Transmission Planner shall assess the power swing apparent impedance characteristics of those Elements using criteria of the categories of disturbances in Transmission System Planning Performance requirements to determine which identified Elements are subject to Stable Power Swings. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]*
- R3.** Within one calendar month of determining which Elements are subject to Stable Power Swings in Requirement R2, each Planning Coordinator and Transmission Planner shall provide the apparent power swing impedance characteristics of each Element that was identified in Requirement R2 as being subject to Stable Power Swings to the Transmission Owner(s) and Generator Owner(s) that own a Protection System applied to a terminal of that Element: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]*
- R4.** Each Transmission Owner and Generator Owner that receives apparent power swing impedance characteristics as a result of Requirement R3 shall, within three months: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]*
- Show that the existing Protection Systems will not operate for the provided Stable Power Swing characteristics, or
  - Revise its Protection System settings as necessary to prevent operating for the provided Stable Power Swing characteristics, or
  - Develop a Corrective Action Plan to modify or replace Protection System components that operate for the provided Stable Power Swing characteristics, or
  - Demonstrate that operation of the Protection System for a Stable Power Swing is acceptable.