

## Meeting Notes

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

### Standard Drafting Team

March 17, 2014  
3:00-5:00 p.m. Eastern

Conference Call

#### Administrative

##### 1. Introductions and chair remarks

The meeting was brought to order by Kevin Jones, vice chair, at 3:04 p.m. Eastern Monday, March 17, 2014. Mr. Middaugh was traveling to attend the Project 2010-05.1 – Protection System (Misoperations) standard drafting team meeting as a member of that team. Mr. Jones thanked everyone for joining and noted the team was making good progress. Mr. Barfield took roll of members and observers. Those in attendance were:

Name	Company	Member/ Observer
Kevin W. Jones, P.E.	Xcel Energy, Inc.	Vice Chair
David Barber, P.E.	FirstEnergy	Member
Steven Black	Southern Company Services	Member
Ding Lin	Manitoba Hydro	Member
Fabio Rodriquez	Duke Energy - Florida	Member
John Schmall	Electric Reliability Council of Texas (ERCOT)	Member
Matthew H. Tackett, P.E.	Midcontinent Independent System Operator (MISO)	Member
Dan Woldermeriam	Federal Energy Regulatory Commission	Observer
Scott Barfield-McGinnis (Standard Developer)	North American Electric Reliability Corporation (NERC)	Observer

Name	Company	Member/ Observer
Michael Gildea (Reliability Standards Advisor)	North American Electric Reliability Corporation	Observer
Phil Tatro (Technical Advisor)	North American Electric Reliability Corporation	Observer
Ramzi Chahine	Hydro Québec	Observer
Eric Loiselle	Hydro Québec	Observer
Jonathan Meyer	Idaho Power	Observer
Si Truc Phan	Hydro Québec	Observer
Sudhir Thakur	Exelon Nuclear Generation	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 seven 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 is the initial roster approved by the Standards Committee. No changes have been made.

## 5. Review meeting agenda and objectives

Mr. Barfield reviewed the meeting agenda and objectives.

## Agenda

### 1. Previous business or action items

Mr. Middaugh – Look for any references in the Order Nos. 733, 733-1, and 733-2 regarding backup remote protection (P. 140-142). Done.

## 2. Continue with Standard Development

Mr. noted the team finished with the Applicability during the last call and asked if there were any questions from that work. Mr. Thakur questioned what the Applicability was implying in 4.1.4 Generator Owner that applies protective relays at the terminals of the Elements listed in Section 2.0, Facilities” with regard to 4.2 Facilities. Mr. Barfield noted that the section may need more refinement. He also wanted to confirm if a generator has out-of-step relaying applied that the standard aims to ensure the relays do not trip in response to a stable power swing and that the standard is not requiring the installation of power swing blocking. Mr. Barfield affirmed that was the current approach. Mr. Tackett asked whether series reactor at a generating bus should be included in the Applicability for thoroughness. Mr. Rodriguez noted that Florida has a few of those installations. Mr. Tatro questioned the team whether the reactor’s impedance would change the behavior of the coherent groups of generation on each side of the reactor. Also, whether a power swing would actually pass through the reactor. Mr. Jones questioned where reactors are installed in relation to generation and lines. One example was a reactor between two generating unit buses to reduce available fault current. An action item was taken to evaluate the concern further.

The team moved to reviewing and editing the Requirements that were taken from the initial straw man provided by Mr. Bill Middaugh, chair of the team. The following is the proposed R1:

**R1.** Each Planning Coordinator and Transmission Planner shall conduct an assessment of its portion of the Bulk Electric System (BES) at least once each calendar year, with no more than 15 months between assessments, to identify which Generation and Transmission Elements meet any of the following criteria: [Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]

Questions were raised about the use of “assessments” within the body of the requirements. The approach outlined in the SPCS Report<sup>1</sup> does not link the proposed criteria to transmission Planning Assessments (i.e., TPL-001-4). Mr. Barfield presented an alternative to Requirement R1 which the team endorsed. The alternative Requirement R1 was:

**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:

The team considered using timing language like “once each calendar year not to exceed fifteen months.” Mr. Youngblood did not believe the additional timing and each calendar year is sufficient. Mr. Barfield noted the concept is meant to prevent entities from “bookending” the performance meaning an entity perform the requirement in December and in January of the next year (~2 months between performance) and wait until December the following year (~22 months between performance). The agreed to remove the “not to exceed 15 months” created clarity issues with writing the requirement was not necessary. Suggestions about the performance included “shall

<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)

create a list,” “shall identify,” and “shall evaluate” (for its portion of the BES). Mr. Barfield noted that a “list” could be perceived as administrative and it is essentially the evidence that would be produced by an entity; therefore, the performance should be doing something that produces the list. The team concluded that “shall evaluate” (for its portion of the BES) was the best approach.

Mr. Thakur if Criteria 1 should be limited to BES generating plants. The team agreed the Applicability already establishes that limitation. He noted that the structure (i.e., Elements terminating...) was confusing and suggested starting at “[A] generating plant stability...” The team did not concur.

**Criteria 1.** Elements 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), including the generating unit(s) if an impedance based protection scheme is used.

The team agreed to add “located at or” to clarify the concern. The team questioned the last clause beginning with “including.” Mr. Youngblood believed all plant equipment should be included or at least by the megavoltampere (MVA) rating of the generating unit. Mr. Tatro theorized that generating plant size may not be as a significant factor as the number of lines terminating at a plant. Mr. Barfield noted the team added the clause during the Needs, Goals, and Objectives (NGO) development. Mr. Barber noted that the clause was inserted to address impedance relays that could be on the generator step-up transformer or generating unit. Mr. Tatro did not believe the clause was necessary because of the Applicability. The team considered how other generating plants, other than what Criteria 1 prescribes, may be impacted and agreed that the approach should be based on the SPCS Report criteria. Because of the approach, the team removed the last clause starting at (i.e., “including...”) because it was unnecessary. Mr. Tackett suggested to add “located at or” and eliminate the clause. Mr. Barber pointed out that the Applicability captures the intent for generators and transformers. The team concurred and the following text resulted from discussions:

**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).

The team decided to leave Requirement R1, Criteria 2 and 3 as-is. Mr. Tackett raised a question about the clarity of Criterion 4. The following is the original text:

**Criterion 4.** Elements that form a boundary of the BES that may form an island.

Mr. Jones noted that the boundary of an island should be those Elements that are not planned to be a boundary of an island. The suggestion by Mr. Tackett resulted in the following revised text:

**Criterion 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.

Mr. Tatro was concerned about the way Criterion 5 was written because as it relates to planning events in TPL-001-4, that Elements should not be identified as tripping for power swings and that it is different from the SPCS Report. Perhaps the intent is to address extreme events. Mr. Schmall was concerned about the number of scenarios that would need to be run as well as demonstrating compliance and preferred the defined term “Planning Assessments.” Other concerns included

whether Criterion 5 is exhaustive and not needed, will it be perceived as option, and how would an auditor approach it. Mr. Tatro noted that the SPCS Report discussions by members were thinking of criteria that would be analogous to PRC-023, Attachment B, B1 through B4. The team agreed to leave Criterion 5 as-is and see what is revealed through outreach and/or industry comments. After discussion, Mr. Tatro was comfortable Criterion 5 that anything that results in tripping whether a stable or unstable power swing would be captured for further analyses.

The straw man standard resulted is located at the end of the meeting notes.

### **3. Review of the schedule**

Mr. Barfield reviewed the schedule reminding team members to add a placeholder to their calendars for a 2<sup>nd</sup> or 3<sup>rd</sup> week of June in-person meeting to respond to comments from the 45-day ballot.

### **4. Action items or assignments**

Team – Do operational studies need to be included in Requirement R1, Criterion 2.

Mr. Rodriguez – Investigate the use of reactors in the Florida system to determine if those Elements need to be included in the 4.2 Facilities section.

Mr. Barfield – Issue a poll for calls the week of March 24 to finish up the standard and prepare for a webinar of the concepts.

### **5. Next steps**

Discuss TPL-001-4 again to make certain it can be a basis for the standard (Mr. Youngblood's request).

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

Conference calls the week of March 24, 2014.

### **7. Adjourn**

The conference call adjourned at 5:08 p.m. ET on March 17, 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:**

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 System will not operate for the provided Stable Power Swing characteristics, or
  - Where possible, revise its Protection System settings as necessary to prevent operating for the provided Stable Power Swing characteristics, or
  - If necessary, develop a Corrective Action Plan to begin the replacement of Protection System components that operate for the provided Stable Power Swing characteristics, or
  - Show why operation of the Protection System for a Stable Power Swing is acceptable.