NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Meeting Notes

Project 2010-13.2 Phase 2 of Relay Loadability: Generation Standard Drafting Team

November 13-16, 2012

Salt River Project
Phoenix, AZ

Administrative

1. **Introductions**

   The meeting was brought to order by Charlie Rogers, chair, at 8:00 a.m. ET, Tuesday, November 13, 2012. The chair recognized the in-person meeting host, Salt River Project and member Benson Vuong, for their hospitality and use of the facilities. Remote attendance was being hosted via a ReadyTalk web-based conference call. Mr. Vuong provided housekeeping and logistic items to the attendees. The chair recommended the team develop a short list of issues from the comments before embarking on the comments themselves. Roll call and introductions were made of those in-person and attending remotely. Those in attendance were:

Name	Company	Member/ Observer	In-person (IP) or Conference Call/Web (W)			
			11/13	11/14	11/15	11/16
Charles Rogers (Chair)	Consumers Electric	Member	IP	IP	IP	IP
Jeff Billo	ERCOT	Member	IP	IP	IP	IP
S. Bryan Burch	Southern Company	Member	IP	IP	IP	IP
Steven Hataway	Florida Power and Light Company	Member	IP	IP	IP	IP
Mike Jensen	Pacific Gas and Electric Company	Member	IP	IP	IP	IP
Xiaodong Sun	Ontario Power Generation Inc.	Member	IP	IP	IP	IP
Joe T. Uchiyama	U.S. Bureau of Reclamation	Member	IP	IP	IP	IP
Benson Vuong	Salt River Project	Member	IP	IP	IP	IP
David Youngblood	Luminant	Member	-	W	W	W

Name	Company	Member/ Observer	In-person (IP) or Conference Call/Web (W)			
			11/13	11/14	11/15	11/16
Syed Ahmad	Federal Energy Regulatory Commission	Observer	W	W	-	W
Ken Hubona	Federal Energy Regulatory Commission	Observer	W	W	W	-
Scott Barfield-McGinnis (Standard Developer)	North American Electric Reliability Corporation	Observer	IP	IP	IP	IP
Barbara Nutter (Standard Developer)	North American Electric Reliability Corporation	Observer	IP	IP	IP	IP
William D. (Bill) Schultz	Southern Company	Observer	W	-	-	-

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 eight of the eleven members were present the first day and nine members the remaining three days.

3. **NERC Antitrust Compliance Guidelines and Public Announcement**

   NERC Antitrust Compliance Guidelines and public announcement were reviewed by Scott Barfield. There were no questions. The participants were reminded at the beginning of each day of the NERC Antitrust Guidelines and disclaimer.

4. **Roster Updates**

   The advisor noted the roster has not changed since the Niagara-On-the-Lake meeting August 21-23, 2012.

Agenda

1. **Review of meeting notes from previous meetings (Reviewed with amendments)**

   The team reviewed meeting notes and made the following amendments:

   a. August 21-23, 2012 In-person Meeting – Removed the phrase noting that Requirement R3 was removed because of potential confusion when translating to another language. The concern, raised by team members, was the use of double negative sentence construction which made the requirement difficult to read and understand.

b. August 30, 2012 Conference Call – Corrected the two occurrences stating that the 40% or light load point was the most conservative. The 40% point was not substantively different from the 100% or full load point and provided no additional reliability benefit and only made the standard more difficult to understand when to apply the two options.

c. September 17, 2012 Conference Call – No changes.

d. September 19, 2012 Conference Call – The team revisited a discussion about the location of the potential transformer (PT) and current transformer (CT) concerning the load-responsive protective relay (i.e., IEEE Function 21) and if the configuration of the PT on the high-side of the generation step-up (GSU) transformer and the CT on the low-side of the GSU was typical or atypical. The team agreed that the configuration is uncharacteristic (i.e., atypical) and amended the notes accordingly. Mike Jensen will research a paper written by Elmo Price from ABB, and if located and authorized, distribute to the team.

e. September 28, Conference Call – No changes.

2. **Open business from last meeting (Reviewed)**

a. Project Advisor – Issue announcement for Phoenix meeting. (Complete)

b. Project Advisor – Provide feedback to team concerning NERC staff opinion on the potential differences in PRC-023-1 and the draft PRC-025-1. Mr. Barfield noted that he is working with NERC staff, Greg Henry. (Ongoing)

The team continues to work the below action items contemporaneously with the posting of the standard:

c. Team – Work on developing additional technical basis for asynchronous ratings (Option 4) during the first formal comment period. (Ongoing)

d. Team – Work on developing the additional technical basis for the margins used in each of the options found in Table 1 of the attachment. The basis may be covered in the introduction or individually in each option. The chair noted that based on time, this option might be covered in this meeting. (Modified to the inverter characteristics, ongoing)

3. **General discussion of the comments**

The chair collectively listed on a flip chart the team's input about the common themes from the comments for discussion. The following bullet list outlines the general themes itemized before undertaking the response to comments and revisions to the standard.

- Example calculations
- Unit auxiliary transformers
- Potential conflicts in other standards

- Table 1 formatting
- Nameplate vs. capability
- R+jX (1+j1.5) in IEEE C37.102
- Capability – what does it mean
- R2 ratings – simulation of initial conditions
- Timing (coordination of protective relays)
- Voltage points – 0.85/0.95/etc.
- Loadability vs. protection – "Exemptions"?
- Use of blinders and load encroachment
- Implementation Plan – 48 months is too short

The team contrasted the issue between using the rating of the generator unit based on its prime mover or the actual nameplate of the generator concerning Reactive Power output. Consensus was that nameplate was the best alternative in determining the settings for the load-responsive protective relays for the Reactive Power output because prime movers have too many variables (i.e., equipment issues, environmental factors, etc.) controlling output. The generator unit ability is fixed based on its nameplate rating and is standard throughout the industry.

The team discussed the 48-month implementation plan time period and associated comments. Several approaches were considered, including: (1) one timeframe at "X" number of months, (2) phased in by a percentage of fleet capacity, (2a) by Planning Coordinator area, (2b) or by Generator Owner fleet, (3) phased in by individual generator unit size, (4) phased in by scope of work (setting changes vs. replacement) required to apply settings, and (5) a combination of items 1 and 4 which includes 48 months to complete settings calculations and their implementation, and if equipment replacement is necessary, to implement replacement within 72 months.

The following was determined over the course of discussion; (1) one timeframe is the easiest to allow. For generation units that are phased in by a percentage (2a and 2b) were discarded because it would be challenging to determine individual Generator Owner responsibility in Planning Coordinator area, Transmission Planning area, or by fleet. (3) The team discarded phasing in by unit size because of concerns where to draw a bright line between unit sizes. (4) The team discarded this item due to concerns raised that the scope of work and might require intermediate status for those requiring replacement. (5) The team welcomed the two-phase approach as an alternative. FERC staff offered the suggestion that the implementation period should be closer to a 36/48 implementation; however, the team concurred that a 48/72 month phased approach is substantially improved from an overall implementation of 48 months.

The team discussed comments about Violation Severity Level (VSL) that commenter(s) would not vote affirmative without accompanying VSLs. The advisor noted that the team discussed holding

the VSL until a later date pending the outcome of the changes to the Standards Process manual. The advisor confirmed with NERC staff that the VSLs needed to be worked on and that originally VSLs may have been difficult to apply to the original R2 and R3. Now with only one requirement, the VSL and justification would be worked on.

The team recognized that additional clarity is needed regarding the values used in calculating the currents and impedances for setting relays. In one case, the value is based on gross seasonal Real Power output reported to the Planning Coordinator and the other component of the calculation is based on the generation unit nameplate rating. The team agreed to add examples to the Guidelines and Technical Basis.

The team recognizes from the NERC Compliance Process Bulletin #2012-001, stakeholder comments, and previous team discussion that potential overlap may be present between the draft PRC-025-1 and the approved PRC-023-2 which went into effect July 1, 2012 and has a staged implementation.

Comments revealed a lack of clarity in the Table 1 structure. The team restructured the table by grouping the load-responsive protective relay application (i.e., synchronous, asynchronous, generator step-up, and auxiliary transformer) in the first column, then group by relay type or function (i.e., 21, 51, 51C, and 51V) in the second column. The options or index numbers 1-17 in draft 1 of the standard now relate to index numbers that align with the application and relay function. The team agreed the new structure is more apparent to the reader and easier to follow. Team members noted that textual changes would be required in the Guidelines and Technical Basis to align the discussion with the new index numbers.

The team discussed the comments regarding new concepts of restructuring requirements to the “in a manner that identifies, assesses, and corrects” that has been implemented in the recent posting of COM-003-1 and the industry approved CIP version 5 reliability standards. The consensus was to discuss the matter further at the next meeting in December 2012 at NERC Headquarters in Atlanta. NERC compliance staff can then provide a thorough discussion of the precepts involved in using the new requirement framework.

Concerns about the potential overlap with the PRC-024-1 draft 4 standard that commenters posed were discussed by the team. Discussion included how the use of load-responsive relays (i.e., 21-distance and 51-overcurrent voltage controlled and restrained) identified in PRC-024-1 interact with the objectives of PRC-025-1. The team considered the System Protection and Control Subcommittee – Power Plant and Transmission System Protection Coordination document with respect to timing and coordination. Consensus was retain the load-responsive relays in PRC-025-1 and communicate with the Project 2007-09 Generator Verification Standard Drafting Team (GVSDT) working on PRC-024-1 to assure coordination with the two standards.

The team assigned David Youngblood, also a member of the GVSDT, to raise the application issue (i.e., use of load-responsive relays) between draft 4 of PRC-024-1 and draft 1 of PRC-025-1 with the

GVSDT. The GVSDT will be meeting the week prior to the Generator Loadability team in December 2012 which will provide opportunity to make revisions to either standard.

Commenters had concerns about relays which may only be armed during startup, when disconnected, or when other protection system components fail. The team addressed these by adding specific exclusions to the standard's Attachment 1.

Team discussed concerns about potential overlap (i.e., double jeopardy) between PRC-023-2 and the draft PRC-025-1. Mr. Barfield noted that he and Phil Tatro, the team technical advisor, have an action item in progress to address the issue with NERC staff. Feedback is expected at the December 2012 meeting.

The team made updates to the IEEE function numbers of the relays referenced in the standard to better align with the NERC Power Plant and Transmission System Protection Coordination document.

Mr. Jensen will work on developing additional technical basis for asynchronous ratings (Option 4) during the formal comment period and initial ballot. There is concern that the standard's technical basis may not be in alignment with the manufacturer's published capability.

4. **Respond to industry stakeholder comments**

   The team began with a review of the formal comments received from industry stakeholders. The review started with the North American Generator Forum as their comments were comprehensive and the team was more familiar with the comments due to previous informal outreach conducted prior to posting the standard for industry comment. The team was able to respond to questions one through three during the three and a half days of meetings. To complete the response to comments, question four was assigned to the chair and others agreed to review question five which asked for general comments.

5. **Revise draft standard**

   The team revised the draft 1 standard that was posted for industry stakeholder comment to create draft 2 for the next 45-day formal comment period posting and initial ballot.

6. **Development of questions for the comment period**

   The team did not review comment questions at this time.

7. **Review of the schedule**

   The advisor updated the team regarding the 15-week slide in the schedule. Every effort to get the project back on schedule is paramount to not having to request a second extension from the Commission. The advisor updated the team on the schedule and the risks to meeting the September 30, 2013 filing deadline. The schedule was already compressed due to when the standard was approved for formal development and the extension of time that was filed. The

advisor noted the schedule will be re-evaluated following the initial ballot which should end in February 2012.

8. **Action items**

   a. Chair – Develop VSLs and justifications.

   b. Mr. Tatro – Need more examples for the Guidelines and Technical Basis. The goal is to use a simulation 3.1 example and apply the data to option 1.1 and 1.2 for a single generator. Mr. Vuong and Steven Hataway will work on 1.1 and 1.2.

   c. Mr. Hataway – Provide the calculations of the 150% values using the nameplate and seasonal Real Power out as reported to the Planning Coordinator and Transmission Planner.

   d. Mr. Jensen will research a manufacturer paper written by Elmo Price from ABB and distribute to the team, if located.

   e. Mr. Youngblood – Coordinate the application issues (i.e., use of voltage relays) between the draft 3 of PRC-019, draft 4 of PRC-024-1 and draft 1 of PRC-025-1 with the GVSDT on Project 2007-09. The GVSDT will be meeting the week prior to the Generator Loadability team in December 2012.

   f. Mr. Barfield and Mr. Tatro – Provide feedback to team concerning NERC staff opinion on the potential differences in PRC-023-1 and the draft PRC-025-1. Need to review PRC-023-2 to see what has to change to remove the Generator Owner from the Applicability and report back to the team before the December 2012 meeting.

   g. Chair – Draft a Standard Authorization Request and redline of the standard to the Standards Committee for its December 13, 2012 conference call. Agenda items are due by November 30, 2012.

   h. Mr. Barfield – Arrange and announce an industry webinar at the December 2012 meeting to address the standard, technical issues, and obtain feedback from industry prior to initial ballot.

   i. Mr. Barfield – Clean up consideration of comments with responses identified by the team in preparation of the December 2012 meeting in Atlanta.

   j. Chair – Address Question 4 issues.

   k. Mr. Jensen and Mr. Vuong – Address other issues in Question 5.

   l. Mr. Hataway and Mr. Jensen – Work on developing additional technical basis for asynchronous ratings (Option 4) during the formal comment period and initial ballot.

   m. Team – Work on developing the additional technical basis for the margins used in each of the options found in Table 1 of the attachment. The basis may be covered in the introduction or individually in each option.

n. Chair and Mr. Jensen – Those members that have relationships with asynchronous generation entities are to reach out to asynchronous Generator Owners about the PRC-025-1 standard to ensure this group is sufficiently engaged in the standard's development.

o. Team – Those members that have relationships with commenters are to reach out about the PRC-025-1 standard to gain more support and better understanding of the issues concerning comments and the standard.

p. Mr. Jensen – Reach out to entities with asynchronous inverters to determine if their rating and/or capabilities are within the boundaries of the standard.

9. **Next steps**

   a. Complete response to comments

   b. Complete webinar slides

   c. Prepare standard for posting

   d. Complete Guidelines and Technical Basis

   e. Prepare the Issues and Directives for posting

   f. Prepare the VSL Justification

10. **Future meeting(s)**

    There is a meeting scheduled for December 11-14, 2012 at NERC Headquarters in Atlanta, Georgia.

11. **Adjourn**

    The meeting adjourned at 11:15 a.m. MT on November 16, 2012.