

Meeting Notes Project 2008-2.2 Phase 2 UVLS: Misoperations Standard Drafting Team

January 14-15, 2015

NERC Headquarters
Atlanta, GA

Administrative

1. Introductions

The meeting was brought to order by Mr. Vallasso, chair, at 1:00 p.m. ET, Wednesday, January 14, 2015. He provided the group a synopsis of the meeting goals and objectives. Those in attendance over the two day meeting were:¹

| Name | Company | Member/ Observer | In-person (IP) / Web (W) | |
|-----------------------|---|---------------------|-----------------------------|------|
| | | | 1/14 | 1/15 |
| Greg Vassallo | Bonneville Power Administration | Chair | IP | IP |
| Jose Conto | Electric Reliability Council of Texas, Inc. | Member | W | W |
| Bill Harm | PJM | Member | IP | IP |
| Sharma Kolluri | Entergy | Member | IP | IP |
| Charles-Eric Langlois | Hydro-Québec | Member | IP | IP |
| Manish Patel | Southern Company Services | Member | IP | IP |
| Fabio Rodriguez | Duke Energy Florida | Member | IP | IP |
| Hari Singh | Xcel Energy | Member | IP | IP |
| Matthew H. Tackett | MISO | Member | W | W |
| Guy V. Zito | Northeast Power Coordinating Council (NPCC) | Observer | - | IP |
| Juan Villar | Federal Energy Regulatory Commission (FERC) | Observer | IP | IP |

¹ A continuation to this meeting was held on January 27, 2015. Notes to that conference call meeting are contained herein.

| Name | Company | Member/ Observer | In-person (IP) / Web (W) | |
|-----------------------------|---|---------------------|-----------------------------|------|
| | | | 1/14 | 1/15 |
| Rich Bauer | North American Electric Reliability Corporation | Observer | IP | - |
| Scott Barfield- McGinnis | North American Electric Reliability Corporation | Observer | IP | IP |
| William Edwards | North American Electric Reliability Corporation | Observer | W | W |
| Al McMeekin | North American Electric Reliability Corporation | Observer | W | W |
| Craig Struck | North American Electric Reliability Corporation | Observer | W | IP |
| Connie Davis | | Observer | W | - |
| Larisa Loyferman | CenterPoint Energy | Observer | W | - |

2. Determination of Quorum

NERC standard drafting meetings require two-thirds of the members to meet quorum when a particular matter requires a vote. Quorum was achieved each day as all of the nine members were present for the two-day meeting. Quorum was also achieved for the January 27, 2015 conference as seven of the nine members were present for the call.

3. NERC Antitrust Compliance Guidelines and Public Announcement

NERC Antitrust Compliance Guidelines and public disclaimer were presented by Mr. Barfield. There were no questions. Each day, Mr. Barfield reminded participants that the NERC Antitrust Compliance Guidelines and public disclaimer remain in effect. The group was also apprised of the NERC SDT meeting conduct and list serve policies. During the January 27, 2015 call, Mr. Barfield reminded participants that the NERC Antitrust Compliance Guidelines and public disclaimer remain in effect.

4. Review Roster

Mr. Barfield reviewed the roster with the team. Mr. Tatro is a previous member of NERC staff and will be removed from the roster. Also, Anthony Sleva is a previous member of the team that remained on the team's distribution list and will be moved to the team's "plus" list.

Agenda

1. Technical discussion of UVLS inclusion in PRC-004

Mr. Vassallo noted that he believed the team addressed the issue. The last interaction by NERC staff with the SDT was in December 2014. The call was well attended by NERC staff, but not so much by SDT members leading to confusion about what the exact gap is with PRC-010-1. The SDT believed that Misoperations is inherently covered in PRC-010-1. Mr. Barfield explained that with the retirement of PRC-022, the words "Misoperation" went away and that PRC-010-1 did not speak to how Misoperations were specifically covered, giving concern by NERC that a gap exists in the standards. Additionally, both the Misoperation and undervoltage load shedding

(UVLS) teams during their development of PRC-004 and PRC-010, respectively, communicated to industry and NERC that Misoperation of UVLS equipment would be addressed by the UVLS team at the conclusion of each team’s current work. The issue of addressing UVLS Misoperation was deferred to a later time as not to interrupt current progress of both teams.

Mr. Patel noted that one or two UVLS relays operating unnecessarily or not operating as expected has little impact to reliability if the UVLS Program operated to mitigate the voltage collapse. Although PRC-004 is suggested to be used for addressing UVLS, he believes it is more effective for the planner to address. In his opinion, the planner will have all the necessary inputs from the UVLS Entities to perform a thorough assessment of the event and identify any relay Misoperation.

Mr. Kolluri noted that his UVLS Program (for example), has only four BES relays and if two relays were to misoperate, it would result in 50 percent of the relays not operating correctly even though the voltage collapse might have been mitigated.

Mr. Harm refreshed everyone’s mind that the SDT anticipated that the PRC-010-1 Corrective Action Plan (CAP) would address the issue of Misoperation.

Mr. Patel noted that a UVLS relay that trips on a distribution feeder for no reason would be addressed. Mr. Villar questioned what if the relay were never addressed and this happened over and over again? Mr. Patel argues that a UVLS relay will only operate when called to operate; therefore, it should be addressed through events analysis and assessment of the UVLS Program. Mr. Harm notes that it is up to the Transmission Operator (TOP) to identify system anomalies where the voltage dipped in other places than just the places being analyzed by the planner.

The SDT developed the following needs, goals, and objectives (NGO)

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| <p>NEEDS</p> <ol style="list-style-type: none"> 1. Address “Misoperation” of UVLS that was retired with PRC-022. 2. Distribution Providers are properly accounted for regarding risk-based registration (e.g., PRC-006 and PRC-010-1 are included, but not PRC-004). 3. UVLS Misoperations are reported. |
| <p>GOALS</p> <ol style="list-style-type: none"> 1. Minimize redline changes to existing or industry approved standards. |
| <p>OBJECTIVES</p> <ol style="list-style-type: none"> 1. Address the UVLS Misoperation gap created by the retirement of PRC-022. 2. Ensure clarity on how UVLS Misoperations are covered by a standard. 3. Ensure reporting of UVLS Misoperations continues and is not impacted. |

With the NGO identified, the SDT began identifying various approaches to addressing the gap concerning UVLS Misoperation with the retirement of PRC-022-1.

Mr. Patel ask the question whether distribution level relays will be covered. Mr. Villar noted that broadly not covering distribution UVLS relays could not be supported by FERC staff.

The SDT argued their intent was to include Misoperations in R5 regarding deficiencies of the UVLS Program and subsequently Requirement R2 requires the UVLS Entity to adhere to the UVLS Program specifications and implementation schedule determined by the Planning Coordinator (PC) or Transmission Planner (TP).

The SDT argued that their intent was to include UVLS in the same manner that underfrequency load shedding (UFLS) was addressed in PRC-004-3. Some team members were concerned that UFLS may not have covered as comprehensively as needed. Mr. Vassallo provided the following SDT response to a commenter from the PRC-010 work:

“In response to the comments that expressed concern over the coordination with PRC-004 and/or how Requirements R4 and R5 may be redundant with PRC-004, the drafting team notes that PRC-010-1 applies specifically to UVLS Program design, development, and assessment and not to the associated equipment as addressed by PRC-004. PRC-004-3, which is currently under development and nearing completion, does NOT include UVLS as part of its applicable facilities. As such, the UVLS drafting team is making the recommendation for PRC-004-3 to be revised (once complete) to include UVLS Programs that trip one or more BES Elements to address Misoperations of this equipment. The drafting team notes that this approach is consistent with the treatment of UFLS Misoperations: PRC-006-1 Automatic UFLS does not address UFLS equipment Misoperations to the necessary extent of PRC-004, and PRC-004-3 has subsequently included UFLS that trips one or more BES Elements under its applicable facilities.”

The SDT continued discussion about the similarities between UVLS and UFLS determining that it would be appropriate to address UVLS in PRC-004-4, which superseded PRC-004-3 due to dispersed generation resource work under Project 2014-01. Although, this appeared to cover the necessary concerns raised by NERC staff, the SDT agreed that additional work was needed in PRC-010-1 to fully cover the gap.

Mr. Singh provided his opinion on the similarities between UVLS, UFLS, and Special Protection Systems (SPS). For example, that UVLS and UFLS effectiveness is based on program performance and not so much the individual operation of the relays themselves. However, it was conceivable that a SPS would need to be addressed differently than UVLS and UFLS, but all may be addressed better by the planner.

Mr. Bauer raised a few points about PRC-010-1, R4 and R5 on how to adequately capture equipment. He felt that Requirement R4 needs to include a clause to capture UVLS equipment in addition to the performance of the UVLS Program. For example, “the Misoperation of UVLS Program equipment.”

Mr. Bauer and Mr. Barfield agreed that Requirement R5 needs further revision to connect UVLS equipment from Requirement R4 to the CAP. The SDT agreed Requirement R4 could be revised. Everyone agreed that Requirement R2 concerning the UVLS Entity being required to implement the CAP as provided by the planner is sufficient to address both UVLS Program deficiencies and any included UVLS Misoperation identified during an assessment by the planner.

Mr. Barfield expressed concern that the term “deficiency” does not adequately describe that Misoperation of UVLS relays is inclusive of that term. Also, that “deficiency,” according to the

PRC-010-1 Application Guidelines related more to a shortcoming of the UVLS Program. He suggested that additional language needs to be added to support the meaning of a deficiency.

The SDT agreed that PRC-010-1 should be modified to include “equipment” in Requirement R4 to clarify that this requirement not only addresses the performance of the UVLS Program itself, but also the performance of the equipment on which the program relies to be effective.

Mr. Singh provided the following strawman revision to Requirement R4:

“R4. Each Planning Coordinator or Transmission Planner shall conduct an assessment for a BES event that produces voltage excursions resulting in the operation of its UVLS Program(s). The assessment (event analysis) shall be performed within 12 calendar months of event actuation, and shall evaluate the:

4.1 Performance (operation or Misoperation) of the UVLS Program’s equipment.

4.2 Effectiveness of the UVLS Program’s design and implementation (per R1 and R2).”

Mr. Patel was concerned about the new inclusion of “BES” (Bulk Electric System) in Mr. Singh’s proposed Requirement R4, in that it changed the SDT’s original work under version one. Mr. Harm noted that the SDT’s goal from the beginning of the meeting was to minimize redlining changes to the standard to avoid confusion on what the SDT is addressing. The SDT reviewed the defined term, “UVLS Program” and found it includes the necessary reference to the BES; therefore, the SDT concluded that “BES” is not necessary.

Mr. Villar raised concern that the proposed language did not specify the criteria for Misoperation similar to PRC-022-1. Mr. Singh pointed out that the standard is addressing the “what” and not the “how.” Also, that the specifications on the UVLS Program for which an assessment is performed is based on the planner’s specifications within the design of the UVLS Program. Mr. Barfield pointed out that covering the “what” is consistent with the “results-based standard” (RBS) construct. Mr. McMeekin noted that any specifications that the team deemed mandatory must be in the Requirements because the Application Guidelines are not enforceable. Mr. Harm emphasized that the planner designing the UVLS Program is going to know the specification (e.g., set points and tripping times); therefore, the planner knows what to use in its assessment of whether UVLS Program equipment operated properly or experienced a Misoperation. The following language resulted from the discussion:

R4. Each Planning Coordinator or Transmission Planner shall, within 12 calendar months of an event that resulted in a voltage excursion for which its UVLS Program was designed to operate, perform an assessment to evaluate:
[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]

4.1 whether its UVLS Program resolved the undervoltage issues associated with the event; and

4.2 the performance (i.e., operation and non-operation) of the UVLS Program equipment.

Mr. Zito was concerned that if the UVLS Program was designed to trip more than one relay as additional margin, what if some distribution level equipment misoperated? Is the expectation

that the Requirement would require the UVLS Entity to perform some action? If the UVLS equipment tripping distribution level feeders, it is a part of the UVLS Program and included in the scope of PRC-010-2.

January 27, 2015 Conference Call

The SDT reconvened again on a conference call held January 27, 2015 from 4:00 p.m. to 5:00 p.m. Eastern to discuss minor edits found on quality review after the in-person meeting. The following were in attendance on the conference call.

| Name | Company | Member/Observer |
|-------------------------|---|-----------------|
| Greg Vassallo | Bonneville Power Administration | Chair |
| José Conto | Electric Reliability Council of Texas (ERCOT) | - |
| Bill Harm | PJM Interconnection, LLC | - |
| Sharma Kolluri | Entergy | Member |
| Charles-Eric Langlois | Hydro-Québec | Member |
| Manish Patel | Southern Company Services | Member |
| Fabio Rodriguez | Duke Energy Florida | Member |
| Hari Singh | Xcel Energy | Member |
| Matthew H. Tackett | MISO | Member |
| Scott Barfield-McGinnis | North American Electric Reliability Corporation | Observer |
| William Edwards | North American Electric Reliability Corporation | Observer |
| Elsa Prince | North American Electric Reliability Corporation | Observer |
| Phil Winston | Southern Company | Observer |

The SDT reviewed the incremental redline documents since the in-person meeting in Atlanta. Most edits were non-substantive. Mr. Barfield pointed out a flow problem in the PRC-010-2 Application Guidelines concerning “material changes.” He proposed footnoting the first occurrence and using the paragraph discussing material changes as the footnote text. Some members did not want to make a change; however, Mr. Singh convinced the team the flow was awkward. The SDT agreed to delete the paragraph and create a footnote as Mr. Barfield proposed removing some of the paragraph text because it was no longer necessary. The SDT agreed to replace “supplements” with “complements” in the Application Guidelines to better reflect the standard complements Planning Assessments under TPL-001-4.

Mr. Winston asked how the Misoperation data request would be impacted by the work of the SDT when covering Misoperation of UVLS relays. His question was spurned from the recent approval of the PRC-005 standard and recent developments concerning supervisory relays. Mr. Barfield said it was not clear and that there is a belief that if a relay is in the maintenance and

testing standard then it should be addressed in PRC-004 (i.e., Misoperations). This conversation raised a point as to whether the data request will be capable of appropriately tracking the different UVLS Misoperations. For example, UVLS Program relays, centrally controlled UVLS relays that are being addressed by Project 2010-05.1 – Special Protection Systems (SPS) - Phase 2 of Protection Systems regarding Misoperations of SPS. The SPS team recently achieved industry acceptance to use Remedial Action Scheme (RAS) in place of SPS. Mr. Barfield took an action item to investigate reporting of Misoperations as it relates to UVLS Misoperations.

During this meeting, the SDT removed significant portions of the introductory background information to avoid industry confusion. The Basis for Revisions was added to provide enhanced information about why the SDT is having to address Misoperation of UVLS equipment. Overall, the following changes occurred to the standards. In the PRC-004-5 proposed standard, the SDT moved Section 5 - Background to the introductory area of the standard to remove historical information that would not be relevant as time went on. The introductory information, primarily developed from background text in PRC-010-1, was also inserted in to the introductory section of PRC-004-5 for consistency. The SDT added Section “4.2.3 Undervoltage load shedding (UVLS) that is intended to trip one or more BES Elements” under Applicability so that UVLS equipment would be applicable to the standard. The Effective Date was updated to reflect the current Implementation Plan for Project 2008-02.2. The version history was updated to reflect recent formatting and style guidelines from NERC staff. Dated (historical) information in the Rationale section was removed and incorporated in the inductor information of the standard. Other cosmetic changes were made, such as, augmenting the section headers with appropriate titles. For example, “Supplemental Information” for the section containing Rationale text that is found in blue boxes for each Requirement under revision.

In the PRC-010-2 proposed standard, the SDT moved Section 5- Background to the introductory area of the standard to remove historical information that would not be relevant as time went on. A clarifying footnote was added to CAP Example 2 in the PRC-010-2 Application Guidelines to establish a clear link to Misoperation reporting that is primarily covered in PRC-004. The SDT replaced “supplements” with “complements” for correctness and moved part of the Guidelines for Requirement R3 to a footnote because the flow of discussion about “material changes” was not clear. Under Guidelines for Requirement R4, the SDT added the following sentence:

“Misoperation of UVLS equipment is addressed as a deficiency. Reporting of UVLS equipment Misoperations are addressed by the NERC Request for Data and Information, Protection System Misoperation Data Collection.”

Under the Guidelines for Requirements R6-R8, the phrase “remedial action plans” was replaced with “Corrective Action Plans” for correctness. The version history was updated to reflect recent formatting and style guidelines from NERC staff. Dated (historical) information in the Rationale section was removed and incorporated in the inductor information of the standard. Other cosmetic changes were made, such as, augmenting the section headers with appropriate titles. For example, “Supplemental Information” for the section containing Rationale text that is found in blue boxes for each Requirement under revision.

2. Review of the schedule

Mr. Barfield reviewed the posting schedule and potential team meeting dates to respond to comments. He noted that the next in-person meeting would be confirmed once the posting period was known.

3. Action items or assignments

Team Members – Review documents once Mr. Barfield prepares all of the clean and redline versions.

Mr. Barfield – Remove Mr. Tatro from the roster and move Anthony Selva to the plus list.

From the conference call

Mr. Barfield – Review the Misoperation Data Request to see if reporting will be impacted for the different types of UVLS (i.e., UVLS Program relays, centrally controlled relays, and BES only relays)

Mr. Barfield – Prepare a strawman webinar slide deck for the SDT to review.

4. Next steps

Request the Standards Committee to authorize initial posting. Post PRC-004-5 and PRC-010-2 for initial ballot with other associated project documents.

5. Future meeting(s)

April 9, 2015 at ERCOT to respond to industry comments from the initial posting.

6. Adjourn

The in-person meeting recessed on Thursday, January 15, 2015 at 11:30 Eastern. The meeting via conference call adjourned on Tuesday, January 27, 2015 at 5:10 p.m. Eastern.