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NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# PRC-010-1 FAQ

In Response to Comments

Project 2008-02 Undervoltage Load Shedding  
March 14, 2014

**RELIABILITY | ACCOUNTABILITY**



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## Introduction

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The Project 2008-02 Undervoltage Load Shedding (UVLS) Standard Drafting Team (drafting team) thanks all commenters who submitted comments on the revised Standard Authorization Request (SAR). The revised SAR and accompanying drafted portions of a proposed PRC-010-1 were posted for a 30-day informal comment period from September 10, 2013 through October 9, 2013. Stakeholders were asked to provide feedback on the revised SAR and supporting draft standard through a special electronic comment form. There were 30 sets of responses, including comments from approximately 93 different people from approximately 57 companies representing 9 of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the [project page](#).

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel your concern has not been addressed, you can contact the Standards Developer, Erika Chanzas, at 404-446-2583 or at [erika.chanzas@nerc.net](mailto:erika.chanzas@nerc.net).

## FAQ in Response to Comments

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The drafting team appreciates industry comments on the revised SAR and proposed PRC-010-1 standard. The drafting team reviewed all comments carefully and made changes to the standard accordingly; however, the Standard Processes Manual (SPM) does not require the drafting team to respond to each comment during an informal comment period. Comments or suggested changes with which the drafting team agreed are reflected in a subsequent informal comment period posting of a proposed PRC-010-1. To succinctly address key issues needing clarification with respect to drafting team approach and intent, common comment themes that required drafting team response are reflected on the following pages in the construct of a frequently-asked questions format (FAQ).

### Purpose of Standard Revision

#### *What is the basis for a revision of the existing UVLS standards?*

The initial input into a revision of the existing UVLS standards is FERC Order No. 693, Paragraph 1509, which directed the ERO to develop a modification of PRC-010-0 that “requires that an integrated and coordinated approach be included in all protection systems on the Bulk-Power System, including generators and transmission lines, generators’ low voltage ride through capabilities, and UFLS and UVLS programs.” In addition, the August 14 Blackout Report showed that proper coordination would have mitigated effects if UVLS was used as a tool.

Additional inputs included 1) recommendations from the NERC System Protection and Control Subcommittee (SPCS) in its December 2010 *Technical Review of UVLS-Related Standards* to combine the four existing UVLS standards, revise the applicability to entities responsible for UVLS program design, implementation, and coordination, specifically include a requirement for assessment of coordination between UVLS programs and all other protection systems, and differentiate post-event validation of UVLS program design from verifying correct operation of UVLS equipment; 2) the existing UVLS standards were not in the current results-based format; 3) the preceding revision of the underfrequency load shedding (UFLS) standards had similar types of requirements and had been completed under the construct of a consolidation; and 4) the Independent Expert Review Panel recommendations, which included an evaluation of the existing standards’ applicability and level of specificity.

The drafting team agrees that a lack of coordination among protection systems is a key risk to reliability. As part of the revision to address this, the drafting team also agreed that an evaluation and consolidation of the existing UVLS standards was necessary to meet current Reliability Standard development initiatives and to provide clear, comprehensive requirements to address the application and coordination of UVLS.

#### *UVLS programs are not mandatory—is compliance for an optional tool necessary?*

The drafting team asserts that a key takeaway from the August 14 Blackout Report is that coordination of UVLS with other protection systems could have mitigated the effects if UVLS was used as a tool. Although the use of UVLS is not mandatory, when one is installed, the program needs to be properly coordinated, implemented, and assessed due to the inherent associated reliability risks. As such, there needs to be a level of performance required to properly protect system reliability. Of note, PRC-010-1 applies only to the proposed defined term UVLS Program, which limits the standard’s applicability to only those undervoltage-based load shedding programs whose performance have an impact on system reliability.

## Coordination with Project 2009-03 Emergency Operations

### *EOP-003-2 has potential redundant requirements with the proposed PRC-010-1—how is this being addressed?*

As part of its five-year review, Project 2009-03 Emergency Operations (EOP) identified EOP-003-2, Requirements R2, R4, and R7 as being more properly covered by Project 2008-02 UVLS. Now that both projects are in formal development, they are strategically coordinating to move in lockstep from a timing perspective to address these requirements. Project 2009-03 EOP, which is proposing to revise and consolidate EOP-001-2.1b, EOP-002-3, and EOP-003-2 to create EOP-011-1, will retire the noted EOP-003-2 requirements (among other revisions), and the Project 2008-02 UVLS Mapping Document will show how PRC-010-1 encompasses the retired content accordingly. Slated to have aligning effective dates, both EOP-011-1 and PRC-010-1 will be posted and balloted separately but concurrently, so that industry stakeholders will be able to clearly evaluate the transition. Please see the posted Project 2008-02 UVLS Project Coordination Plan for more information.

## “UVLS Program” Definition

### *Why is the introduction of the new NERC Glossary term “UVLS Program” necessary?*

PRC-010-1 introduces a new NERC Glossary term, UVLS Program, to clearly establish which UVLS programs PRC-010-1 will apply to: automatic load shedding programs consisting of distributed relays and controls used to mitigate the risk of Cascading, voltage instability, voltage collapse, or uncontrolled separation resulting from undervoltage conditions.

It is also noted in the definition that this term excludes centrally-controlled undervoltage-based load shedding. As part of the development to clearly establish PRC-010-1’s applicability, the drafting team found it is necessary to establish a bright line with respect to the characteristics of centrally-controlled undervoltage-based load shedding with regard to its reliability requirement-related needs. Because the reliable performance of centrally-controlled undervoltage-based load shedding could be affected by a single component failure, the drafting team maintains that this type of load shedding is consistent with the nature of Special Protection Systems (SPSs) and should be covered by SPS-related Reliability Standards.

For further explanation, please see the rationale box for the UVLS Program definition on page 3 of the PRC-010-1 draft standard document and the portion of the Guidelines and Technical Basis that addresses the definition within the standard document on pages 16–17.

### *Where will centrally-controlled undervoltage-based load shedding be covered?*

As explained immediately above, the requirements of PRC-010-1 are applicable to the proposed new NERC Glossary term “UVLS Program,” which excludes centrally-controlled undervoltage-based load shedding because it is consistent in nature with SPSs. The current NERC Glossary definition of “Special Protection System” excludes UVLS. Therefore, Project 2010-05.2 Protection Systems: Phase 2 (Special Protection Systems), which is also currently under formal development, will revise the NERC Glossary definition of “Special Protection System” to exclude UVLS Programs (among other planned revisions).

As a result, the existing SPS-related standards (PRC-012 through PRC-017) will be applicable to centrally-controlled undervoltage-based load shedding upon the effective date of the revised definition of “Special Protection System.” Similar to the coordination effort with Project 2009-03 EOP explained above, Project 2008-02 UVLS and Project 2010-05.2 SPS are working together in lockstep from a timing perspective to ensure that the revised SPS definition and retirement of legacy UVLS standards align, and that both the proposed revised SPS definition and PRC-010-1 are posted and balloted separately but concurrently, so that industry stakeholders will be able to clearly evaluate the transition.

***If the definition excludes certain types of UVLS, does this preclude an “integrated” approach (FERC Order No. 693, Paragraph 1509)?***

The defined term UVLS Program clarifies which UVLS systems are subject to the requirements in PRC-010-1. The resulting exclusions from PRC-010-1 do not preclude an “integrated” approach because the standard requires that an entity coordinate with all other protection and control systems, which include other types of UVLS (i.e., locally-applied UVLS relays and centrally-controlled undervoltage-based load shedding).

## **Applicability**

***What is meant by the phrase “Planning Coordinator or Transmission Planner”?***

PRC-010-1 is applicable to both the Planning Coordinator and Transmission Planner because either may be responsible for designing and coordinating the program based on agreements, memorandums of understanding, or tariffs. The phrase “Planning Coordinator or Transmission Planner” provides the flexibility for applicability to the entity that will perform the action. The expectation is not that both parties will perform the action, but rather that the Planning Coordinator and Transmission Planner will engage in discussion to determine the appropriate responsible entity.

***Why is the Transmission Operator not included?***

While the Transmission Operator may be involved with UVLS Program activities, the drafting team did not identify any required performance that was necessary to capture within PRC-010-1. To the extent that the Transmission Operator is required to have knowledge of system relays and protection systems, the drafting team notes that this requirement is covered under PRC-001.

***What about UVLS programs owned by Transmission Owners and Distribution Providers that are not required by the planner?***

Requirement R3 requires the Planning Coordinator or Transmission Planner to perform a comprehensive assessment to evaluate the effectiveness of each existing UVLS Program *in its area* at least once every 60 calendar months (or sooner). It is noted that this is regardless of whether the planner initially developed the program; the planner has ultimate responsibility for the effectiveness of all UVLS Programs residing within its area.

## Clarifications on Requirements R1, R3, R4, and R5

### *How would the coordination referenced in Requirement R1, Part 1.2 be demonstrated?*

Requirement R1 requires each Planning Coordinator or Transmission Planner that develops a UVLS Program to demonstrate the program's viability and effectiveness prior to implementation. This demonstration should include studies and analyses used when developing the program that show implementation of the program resolves the identified undervoltage issues that led to its design. These studies and analyses should also show that the UVLS Program is integrated through coordination with generator voltage ride-through capabilities and other protection and control systems. The studies that show coordination considerations and that the program addresses undervoltage issues may be interrelated and presented as one comprehensive analysis. For further guidance on and examples of coordination considerations, please see the portion of the Guidelines and Technical Basis section that addresses Requirement R1 on pages 17–18 of the draft PRC-010-1 standard document.

### *Requirements R1, R3, and R4 seem to all require demonstrations of program effectiveness—how are they different?*

Requirements R1, R3, and R4 do all require demonstrations of program effectiveness, but they are each at distinct points in time.

Requirement R1 requires demonstration of program effectiveness (by way of the qualifying sub requirements) at the onset of program development, or during the initial planning stage, prior to implementation. Requirement R3 requires the same objectives of a demonstration of effectiveness, but at the point of a mandatory periodic review (every 60 calendar months or sooner as required). Requirement R4 addresses a UVLS Program's performance after an event (applicable voltage excursion) to evaluate whether the UVLS Program resolved the undervoltage issues associated with the event.

It is noted that, because of the separate objectives of each requirement, UVLS Program deficiencies found as a result of the assessments performed in Requirement R3 or R4 would not be violations of Requirement R1.

### *Requirement R4 would require the Transmission Planner and Planning Coordinator to review all voltage excursions—isn't this unduly burdensome?*

While Requirement R4 essentially requires the Planning Coordinator or Transmission Planner to review all voltage excursions to see if they fall below the initializing set points of the UVLS Program, the drafting team contends that it will be clearly evident if voltage falls below the UVLS threshold because either a) UVLS devices will operate; or b) the system will experience the adverse conditions the UVLS Program was installed to mitigate.

In addition, the drafting team acknowledges that the Planning Coordinator or Transmission Planner may not have access to the real-time voltage data to monitor the excursions since they are not operating entities. However, the drafting team also contends that there should be an established feedback notification line from the Transmission Operator or Distribution Provider with regard to real-time voltage data to monitor excursions.



***PRC-022-1 required the analysis of UVLS Misoperations. How is this addressed in PRC-010-1?***

One of the SPCS recommendations was to clearly differentiate between the post-event process of validating the effectiveness of the UVLS program design, its coordination with other protection and control systems, and the potential need to modify the program design (activities addressed in PRC-010-1) and the process of verifying correct operation of UVLS equipment (which should be covered in PRC-004).

Relative to a UVLS Program, PRC-010-1, Requirements R4 and R5 require event analysis and a Corrective Action Plan (CAP) to address any identified program deficiencies. The UVLS drafting team maintains that verifying correct operation of UVLS equipment should be addressed in PRC-004 and is coordinating an applicability change to this standard with respect to the development timeline of Project 2010-05.1 Protection Systems (Misoperations), which is in the later stages of development of PRC-004-3. Please see the posted PRC-010-1 Mapping Document and Project 2008-02 UVLS Project Coordination Plan for further information.

## **Concerns with Requirements R6, R7, and R8**

***Do Requirements R6, R7, and R8 overlap with the requirements of MOD-032-1?***

While both MOD-032-1 and Requirements R6, R7, and R8 of PRC-010-1 address data requirements, MOD-032-1 establishes overarching modeling data requirements with respect to consistency in format and reporting procedures, whereas the PRC-010-1 requirements address the need to maintain and share data and databases for the purposes of studies for use in event analyses for UVLS Programs specifically. While Reliability Standards in general may have overlap in this manner, the activities in these requirements remain distinctly different.

***Requirements R6, R7, and R8 appear to be administrative—doesn't this conflict with Paragraph 81 criteria?***

Proper maintenance and timely sharing of UVLS Program data as required by Requirements R6, R7, and R8 is necessary to inform the Planning Coordinator or Transmission Planner's studies and analyses. While administrative tasks are required, the tasks have a core reliability-based need.

In addition, Requirements R6, R7, and R8 were written to emulate FERC-approved PRC-006-1 Automatic Underfrequency Load Shedding data requirements. While these analogous requirements in PRC-006-1 are listed as candidates for Paragraph 81, they are not yet approved as meeting the criteria; furthermore, the Independent Expert Review Panel has recommended that these Paragraph 81 candidates not be included for deletion, citing that "there should be a clear expectation for Planning Coordinators to share data necessary to determine their UFLS program parameters".



## Attachment A – Drafting Team Members

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Table 1: Project 2008-02 UVLS Standard Drafting Team		
	Participant	Entity
Chair	Greg Vassallo	Bonneville Power Administration
Member	José Conto	Electric Reliability Council of Texas, Inc.
Member	Bill Harm	PJM Interconnection, LLC
Member	Sharma Kolluri	Entergy Corporation
Member	Charles-Eric Langlois	Hydro-Quebec TransEnergie
Member	Manish Patel	Southern Company Transmission
Member	Fabio Rodriguez	Duke Energy Florida
Member	Hari Singh	Xcel Energy, Inc.
Member	Matthew H. Tackett	MISO