



April 13, 2011

**VIA ELECTRONIC FILING**

Kirsten Walli, Board Secretary  
Ontario Energy Board  
P.O Box 2319  
2300 Yonge Street  
Toronto, Ontario, Canada  
M4P 1E4

Re: *North American Electric Reliability Corporation*

Dear Ms. Walli:

The North American Electric Reliability Corporation (“NERC”) hereby submits this petition seeking approval of the following proposed Protection and Control (“PRC”) standard and Emergency Preparedness and Operations (“EOP”) standard set forth as **Exhibit A** to this petition that were approved by the NERC Board of Trustees on November 4, 2010.

- PRC-006-1 – Automatic Underfrequency Load Shedding
- EOP-003-2 – Load Shedding Plans

In developing the standards proposed in this filing, the standard drafting team also addressed some of FERC’s directives in Order No. 693.<sup>1</sup> In doing so, the standard drafting team determined that it was necessary to retire several Reliability Standards to prevent duplication in the new standards being proposed in this filing. Accordingly, as explained below, the Implementation Plans for the new EOP and PRC Reliability

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<sup>1</sup> See *Mandatory Reliability Standards for the Bulk-Power System*, 18 CFR Part 40, Docket No. RM06-16-000 (March 16, 2007) (“Order No. 693”) at PP 627-630, 636-638.

Standards recommend retirement of the following standards when PRC-006-1 and EOP-003-2 become effective:

- § PRC-006-0 – Development and Documentation of Regional UFLS Programs
- § PRC-007-0 – Assuring Consistency of Entity Underfrequency Load Shedding Programs
- § PRC-009-0 – Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event
- § EOP-003-1 – Load Shedding Plans

This filing discusses each of the new standards (PRC-006-1 and EOP-003-2), including how the standards meet the goals of reliability, and the basis for the retirement of the other listed standards.

This filing consists of the following:

- This transmittal letter;
- A table of contents;
- A narrative description explaining how the proposed Reliability Standards meet the goals of reliability;
- Reliability Standards submitted for approval (**Exhibit A**);
- Implementation Plans submitted for approval (**Exhibit B**);
- Mapping of Existing Requirements to New Requirements (**Exhibit C**);
- Consideration of Comments Document (**Exhibit D**);
- Standard Drafting Team Roster (**Exhibit E**); and,
- Development Record of the proposed Reliability Standards (**Exhibit F**)

Please contact me if you have any questions regarding this filing.

Respectfully submitted,

/s/ Holly A. Hawkins

Holly A. Hawkins

*Assistant General Counsel for*

*Standards and Critical*

*Infrastructure Protection*

*North American Electric Reliability*

*Corporation*

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**BEFORE THE  
ONTARIO ENERGY BOARD  
OF THE PROVINCE OF ONTARIO**

**NORTH AMERICAN ELECTRIC )  
RELIABILITY CORPORATION )**

**PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY  
CORPORATION FOR APPROVAL OF PROPOSED NEW RELIABILITY  
STANDARDS AND IMPLEMENTATION PLANS RELATED TO UNDER-  
FREQUENCY LOAD-SHEDDING**

Gerald W. Cauley  
President and Chief Executive Officer  
David N. Cook  
Senior Vice President and General Counsel  
North American Electric Reliability  
Corporation  
116-390 Village Boulevard  
Princeton, NJ 08540-5721  
(609) 452-8060  
(609) 452-9550 – facsimile  
[david.cook@nerc.net](mailto:david.cook@nerc.net)

Holly A. Hawkins  
Assistant General Counsel for Standards and  
Critical Infrastructure Protection  
Andrew M. Dressel  
Attorney  
North American Electric Reliability  
Corporation  
1120 G Street, N.W.  
Suite 990  
Washington, D.C. 20005-3801  
(202) 393-3998  
(202) 393-3955 – facsimile  
[holly.hawkins@nerc.net](mailto:holly.hawkins@nerc.net)  
[andrew.dressel@nerc.net](mailto:andrew.dressel@nerc.net)

April 13, 2011

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**Exhibit A** — Reliability Standards Proposed for Approval

**Exhibit B** — Implementation Plans Proposed for Approval

**Exhibit C** — Mapping of Existing Requirements to New Requirements

**Exhibit D** — Consideration of Comments Documents

**Exhibit E** — Standard Drafting Team Roster

**Exhibit F** — Record of Development of Proposed Reliability Standards

## I. INTRODUCTION

The North American Electric Reliability Corporation (“NERC”) hereby requests approval of the following Reliability Standards:

- PRC-006-1 – Automatic Underfrequency Load Shedding
- EOP-003-2 – Load Shedding Plans

Additionally, NERC requests approval for implementation plans that call for the retirement of the following standards, pending the approval of PRC-006-1 and EOP-003-2:

- § PRC-006-0 – Development and Documentation of Regional UFLS Programs
- § PRC-007-0 – Assuring Consistency of Entity Underfrequency Load Shedding Programs
- § PRC-009-0 – Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event
- § EOP-003-1 – Load Shedding Plans

The NERC Board of Trustees approved the proposed Reliability Standards and Implementation Plans on November 4, 2010. In this filing, NERC requests approval of the proposed Reliability Standards, to be made effective in accordance with the implementation plan accompanying this filing. NERC also requests that existing Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) be applied to the modified requirements proposed in this filing.

**Exhibit A** to this filing sets forth the proposed Reliability Standards. **Exhibit B** includes the Implementation Plan proposed for approval. **Exhibit C** presents the mapping of the existing requirements to new requirements. **Exhibit D** presents the Consideration of Comments Documents. **Exhibit E** presents the roster for the drafting team that developed the proposed Reliability Standards. And **Exhibit F** contains the complete development record of the proposed Reliability Standards. NERC filed these proposed Reliability Standards and implementation

plans with the Federal Energy Regulatory Commission (“FERC”), and is also filing these proposed Reliability Standards and implementation plans with the other applicable governmental authorities in Canada.

## **II. NOTICES AND COMMUNICATIONS**

Notices and communications with respect to this filing may be addressed to the following:

Gerald W. Cauley  
President and Chief Executive Officer  
David N. Cook  
Senior Vice President and General Counsel  
North American Electric Reliability Corporation  
116-390 Village Boulevard  
Princeton, NJ 08540-5721  
(609) 452-8060  
(609) 452-9550 – facsimile  
[david.cook@nerc.net](mailto:david.cook@nerc.net)

Holly A. Hawkins  
Assistant General Counsel for Standards  
and Critical Infrastructure Protection  
Andrew M. Dressel  
Attorney  
North American Electric Reliability  
Corporation  
1120 G Street, N.W.  
Suite 990  
Washington, D.C. 20005-3801  
(202) 393-3998  
(202) 393-3955 – facsimile  
[holly.hawkins@nerc.net](mailto:holly.hawkins@nerc.net)  
[andrew.dressel@nerc.net](mailto:andrew.dressel@nerc.net)

## **III. BACKGROUND**

The principal purpose of the proposed Reliability Standard, PRC-006-1 – Automatic Underfrequency Load Shedding, is to establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs which arrest declining frequency, and assist recovery of frequency following system events leading to frequency degradation. UFLS programs provide automated system preservation measures in such events. EOP-003-2 – Load Shedding Plans was revised to eliminate duplicative requirements pertaining to automatic UFLS that are addressed in PRC-006-1. The purpose of EOP-003-2 – Load Shedding Plans is to

ensure that a Balancing Authority and Transmission Operator operating with insufficient generation or delivery system capacity during a system event have the capability and authority to shed load rather than risk an uncontrolled separation or cascading of the Interconnection.

Additionally, to resolve potential discrepancies, NERC recommends the retirement of three existing Reliability Standards coincident with the implementation of the proposed standards. The three standards proposed for retirement are PRC-007-0, PRC-009-0, and EOP-003-1. NERC also requests approval to retire the NERC Board of Trustees' approved PRC-006-0 standard as addressed in this filing.

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC *Standard Processes Manual*, which is incorporated into the Rules of Procedure as Appendix 3A. NERC's rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards.

The Development Process is open to any person or entity with a legitimate interest in the reliability of the bulk power system. NERC considers the comments of all stakeholders and a vote of stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard for submission to the applicable governmental authorities.

Three versions of the Standards Authorization Request (SAR) were developed between 2006 and March, 2007. Six versions of PRC-006-1 – Automatic Underfrequency Load Shedding were developed between March, 2007 and October, 2010. The drafting team developed four drafts of EOP-003-2 – Load Shedding Plans in 2010. An initial ballot was conducted in July, 2010, and two successive ballots were conducted between July, 2010 and early October, 2010.



A final recirculation ballot was conducted in mid-October, 2010. The ballot achieved a weighted segment vote of 84.67%.

The proposed Reliability Standards set out in **Exhibit A** have been developed and approved by industry stakeholders using the procedures described in NERC's *Standard Processes Manual*. A narrative of this process appears in section VI of this filing. These proposed Reliability Standards were approved by the NERC Board of Trustees on November 4, 2010.

#### **IV. JUSTIFICATION FOR APPROVAL OF PROPOSED RELIABILITY STANDARDS**

##### **a. Section Overview**

This section summarizes the development of the two proposed Reliability Standards and identifies the associated necessary changes or retirements to other Reliability Standards. The discussion in this section also demonstrates that the proposed Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

**Exhibit D** includes the Consideration of Comments documents, which includes a discussion of how comments were considered by the standard drafting team in developing the proposed standards. The standard drafting team roster is provided in **Exhibit E**. The complete development record for the proposed Reliability Standards, including the Implementation Plan referenced in this filing, is available in **Exhibit F**. This extensive development record includes successive drafts of the Reliability Standards, the ballot pool, the final ballot results by registered ballot body members, and stakeholder comments received during the development of these Reliability Standards.

The discussion of the two proposed Reliability Standards below is followed by discussion of the various standards that are recommended for retirement when the new Reliability Standards becomes effective.

## **DISCUSSION OF PRC-006-1**

NERC proposes the addition of a new Reliability Standard PRC-006-1 to the current suite of Reliability Standards. PRC-006-1 is presented in **Exhibit A** of this filing.

The proposed Reliability Standard is necessary for reliability because Underfrequency Load Shedding programs provide last resort system preservation measures by shedding load during system disturbances that result in substantial imbalances between load and generation. The proposed Reliability Standard establishes common performance characteristics that all UFLS programs must meet. UFLS programs with differing design specifications can be successfully coordinated if they are designed to achieve the same system performance characteristics, even across interconnected regions.

### ***1. Proposed Reliability Standard is designed to achieve a specified reliability goal***

The purpose of the proposed standard, PRC-006-1 – Automatic Underfrequency Load Shedding, is to establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures. UFLS programs provide last resort system preservation measures by shedding load during system disturbances that result in substantial imbalances between load and generation. The proposed PRC-006-1 standard is intended to replace PRC-006-0—Development and Documentation of

Regional UFLS Programs, PRC-007-0—Assuring Consistency of Entity Underfrequency Load Shedding Programs, and PRC-009-0—Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event.

The proposed standard, PRC-006-1, establishes common performance characteristics that all UFLS programs must meet. The standard requires that Planning Coordinators design and document Underfrequency Load Shedding programs that perform as specified in Requirement R3 of the proposed standard. The proposed standard does not specify program specifics such as load shedding frequency thresholds, step sizes, and time delays. Prescribing specific UFLS program parameters for the entire continent is unnecessary for reliability and hinders flexibility necessary to adapt UFLS designs to system characteristics specific to interconnections and regions. A uniform set of prescribed UFLS program parameters may not provide adequate system performance for all possible electrical islands that may form during a disturbance due to differences in system characteristics present in the four interconnections or even within different regions in the Eastern Interconnection. For example, the WECC Coordinated Off-Nominal Frequency Load Shedding Plan allows different set points and associated armed load for two sub-areas that may form within the Western Interconnection, provided they conform to the same methodology, assumptions, and objectives as the Coordinated Plan.

Requirements R1 and R2 establish the basis for the UFLS program design assessments by requiring that the Planning Coordinator establish island identification criteria (Requirement R1) and then apply the criteria to identify islands as the basis for assessing the design of its UFLS program (Requirement R2).

Requirement R3 requires each Planning Coordinator to develop a UFLS program including notification of and a schedule for implementation by the UFLS entities within its area

that meet specific performance characteristics (subrequirements 3.1 through 3.3) in simulations of underfrequency conditions resulting from an imbalance of up to 25 percent within the identified island. Requirement R3 specifies the performance criteria that each Planning Coordinator's UFLS programs must be designed to achieve in simulation. These criteria consist of frequency versus time performance characteristic curves that frequency must remain within when simulating underfrequency events. Additionally, the criteria include V/Hz limits at generating plants that must not be exceeded to avoid unnecessary protection system operation that could remove that generation and make underfrequency conditions worse. The performance characteristics specified in subrequirements 3.1 and 3.2 were coordinated with generator trip setting boundaries specified in PRC-024-1—Generator Frequency and Voltage Protective Relay Settings appropriate to maintain margin between the system frequency excursions allowed in PRC-006-1 and generator trip settings.

Requirement R3 also requires the Planning Coordinator to develop a schedule for implementation by the UFLS entities along with the program. The applicability section of the standard defines UFLS entities as entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more Transmission Owner and Distribution Provider. Requirement R3 is important because the UFLS entities will need transition time to become compliant should the program be altered or redesigned. UFLS performance requirements were established for an imbalance scenario defined by a 25 percent imbalance between load and generation. This threshold was selected based on the common characteristics of the existing regional programs. This threshold requirement supports the reliability of the bulk

power system by specifying that UFLS programs must be designed for imbalance scenarios that may be observed during major system disturbances.

Requirement R4 requires that the Planning Coordinator conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2. Subrequirements 4.1 through 4.7 of Requirement R4 specify that the simulation must model under and overfrequency trip settings of individual and aggregate generating units connected to the BES that trip above and below the generator underfrequency and overfrequency trip modeling curves contained in Attachment 1 to the standard (subrequirements 4.1 through 4.6). In addition, the simulation must model any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

Requirement R5 and Requirement R13 establish coordination requirements for Planning Coordinators whose areas or portions of whose areas are part of an island identified by it or another Planning Coordinator that includes multiple Planning Coordinator areas or portions of those areas. Requirement R5 states that the Planning Coordinator must coordinate its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island, through specific actions that include either (1) developing a common UFLS program design and schedule for implementation per Requirement R3 among the Planning Coordinators whose areas or portions of whose areas are part of the same identified island; or (2) conducting a joint UFLS design assessment per Requirement R4 among the Planning Coordinators whose areas or portions of whose areas are part of the same identified island; or (3) conducting an independent UFLS design assessment per Requirement R4 for the

identified island, and in the event the UFLS design assessment fails to meet Requirement R3, identify modifications to the UFLS program(s) to meet Requirement R3 and report these modifications as recommendations to the other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island and to the ERO.

Requirement R13 requires that each Planning Coordinator, in whose area a bulk electric system islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, must coordinate its event assessment (in accordance with Requirement R11) with all other Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event by either (1) conducting a joint event assessment per Requirement R11 among the Planning Coordinators whose areas or portions of whose areas were included in the same islanding event; or (2) conducting an independent event assessment per Requirement R11 that reaches conclusions and recommendations consistent with those of the event assessments of the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event; or (3) conducting an independent event assessment per Requirement R11 and where the assessment fails to reach conclusions and recommendations consistent with those of the event assessments of the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event, identifying differences in the assessments that likely resulted in the differences in the conclusions and recommendations and report these differences to the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event and to the ERO.

Requirements R6 through R8 establish requirements to maintain a UFLS database and exchanging data to maintain the UFLS database. Each Planning Coordinator is required to maintain a UFLS database containing data necessary to model its UFLS program for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities in Requirement R6. Requirement R7 requires the Planning Coordinators to exchange UFLS databases within 30 calendar days of a request. Finally, Requirement R8 requires that each UFLS entity provide its data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.

Requirements R9 through R10 are the implementation requirements of the proposed standard. Requirement R9 requires that each UFLS entity provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. Requirement R10 requires each Transmission Owner to provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.

Requirements R11 and R12 require the Planning Coordinators, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, to conduct and document an assessment (R11) and, should the assessment identify deficiencies, the Planning Coordinators must conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation (R12).

Requirement R14 establishes a method for the UFLS entities and Transmission Owners to provide input on the UFLS program and the schedule for implementation by requiring the Planning Coordinators to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes will be made or reasons why changes will not be made to the UFLS program, including the schedule for implementation; the UFLS design assessment and; the format and schedule of UFLS data submittal (subrequirements 14.1 through 14.3).

***2. Proposed Reliability Standard contains a technically sound method to achieve the goal***

The proposed standard, PRC-006-1 –Automatic Underfrequency Load Shedding, establishes a technically sound method to achieve the goal of arresting declining frequency and assisting recovery of frequency following underfrequency events. The proposed standard establishes a framework for developing, designing, assessing and coordinating UFLS programs.

Requirements R1 and R2 require development of island identification criteria and application of the criteria to identify islands as a basis for assessing the design of the UFLS program. When evaluating the performance of UFLS programs, it is necessary to identify islands on which to base the evaluation. Requirement R1 requires Planning Coordinators to consider how islands involving their areas may be identified and develop and document the criteria. Their consideration will need to include any islands that may have formed in the past, or any that may have some probability, as determined in system studies, of occurring in the future. By making this a requirement, the standard drafting team is ensuring that all Planning Coordinators are not only identifying islands within their Planning Coordinator areas, but they are also considering interconnected portions of the BES in adjacent Planning Coordinator and



Regional Entity areas that may form islands. Requirement R2 requires Planning Coordinators to identify the islands for use in the UFLS assessments (Requirement R4). Subrequirements 2.1, 2.2, and 2.3 serve as a checklist of items that the entity must consider when identifying islands. Subrequirement 2.3 is included in order to continue the present practice of coordinating UFLS systems on a regional basis by requiring all Planning Coordinators in a region to assess the collective performance of the UFLS systems in the region as a whole. In satisfying this requirement, this same assessment may be done by each Planning Coordinator individually, but in the interest of efficiency, it would be advantageous that all Planning Coordinators collaborate on a single regional assessment.

Requirement R3 requires each Planning Coordinator to develop a UFLS program including notification of and a schedule for implementation by the UFLS entities within its area that meet specific performance characteristics (subrequirements 3.1 through 3.3) in simulations of underfrequency conditions resulting from an imbalance of up to 25 percent within the identified island. This requirement specifies the performance criteria that each Planning Coordinator's UFLS programs must be designed to achieve in simulation. These criteria consist of frequency versus time performance characteristic curves that frequency must remain within when simulating underfrequency events. Additionally, the criteria include V/Hz limits at generating plants that must not be exceeded to avoid unnecessary protection system operation that could remove that generation and make underfrequency conditions worse. The performance characteristics specified in Parts 3.1 and 3.2 were coordinated with generator trip setting boundaries specified in PRC-024-1—Generator Frequency and Voltage Protective Relay Settings so as to maintain consistent margins between the system frequency excursions allowed here and generator trip settings. The requirement also requires the Planning Coordinator to

develop a schedule for application by the UFLS entities along with the program. This is important because the UFLS entities will need transition time to become compliant should the program be altered or redesigned. UFLS performance characteristics were established for a 25 percent imbalance between load and generation. While most regions define the imbalance as a generation deficiency (*i.e.*, load – generation/load), some regions treat this as an overload (*i.e.*, load-generation/generation). The equation in this requirement eliminates ambiguity and potential confusion, because, for example, a 25 percent generation deficiency would result in a 33 percent overload. Requirement R3 requires that UFLS programs be designed to achieve the specified performance characteristics for imbalances between load and generation of up to 25 percent. This threshold was selected based on the common characteristics of the existing regional programs. This threshold supports reliability of the BES by providing an effective safety net for imbalances that may be observed during major system disturbances.

Requirement R4 requires each Planning Coordinator to conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2. Subrequirements 4.1 through 4.7 specify items that the simulation must model. Subrequirements 4.1 through 4.6 are included to make sure that any generator trip settings that do not conform to the requirements set forth in PRC-024-1—Generator Frequency and Voltage Protective Relay Settings are factored into the analyses, and the UFLS program design will accommodate the possible loss of generation in these instances in addition to the initial load-generation imbalance. Subrequirement 4.7 is included to make sure that any automatic load restoration schemes to limit high frequency conditions are also factored into the analyses. Subrequirements 4.1 through 4.3 pertain to underfrequency coordination with

generators, and subrequirements 4.4 through 4.6 pertain to overfrequency coordination with generators. Subrequirement 4.7 pertains to automatic load restoration schemes. The assessment is to be performed every five years to account for system changes that may alter the effectiveness of the UFLS program, or sooner when a UFLS event occurs to incorporate information obtained through analysis of system events.

Requirement R5 and Requirement R13 require that each Planning Coordinator coordinate with other Planning Coordinators by defined actions when its Planning Coordinator area or portions of its area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas. Requirement R5 specifically requires that the Planning Coordinator coordinate its UFLS design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island through specific actions identified in Requirement R5. This requirement was written to foster coordination among Planning Coordinators when an island is identified which overlaps multiple Planning Coordinator areas. In a fashion similar to R5, where a UFLS event included portions of two or more Planning Coordinator areas, the assessment of that event (per R11) must be acceptable to each of the respective Planning Coordinators in order to conclude that a valid event assessment has been performed. Requirement R13 ensures that acceptance.

Requirements R6 through R8 establish responsibilities related to defining, collecting, and maintaining data necessary to support UFLS assessments. Requirement R6 requires each Planning Coordinator to maintain a UFLS database containing data necessary to model its UFLS program for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities. The UFLS assessments (R4) will require the simulation of UFLS automatic load tripping and other

automatic switching actions where applicable. This requirement assigns responsibility to the Planning Coordinators to ensure that the necessary data will be maintained in a database. Should significant UFLS events occur, this requirement also serves to ensure data availability to conduct the event assessments required by R11. Requirement R7 requires that each Planning Coordinator provide its UFLS database to other Planning Coordinators within its Interconnection within 30 calendar days of a request. Where identified islands include portions of two or more Planning Coordinator areas, UFLS assessments will need to include the UFLS data applicable to each of those areas. This requirement ensures the necessary sharing of that data between Planning Coordinators. Finally, Requirement R8 requires that each UFLS entity provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of the UFLS database. This requirement assigns responsibility to the Distribution Providers and Transmission Owners that have UFLS relays implemented as a part of the Planning Coordinator's UFLS program to supply the data necessary to populate the applicable Planning Coordinator's UFLS database.

Requirements R9 and R10 establish the implementation framework for the UFLS program. Requirement R9 requires that each UFLS entity provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. This requirement ensures that the equipment and relay settings necessary to implement the automatic load shedding specified by the Planning Coordinator's UFLS program are in place and ready to trip load. Requirement R10 requires that each Transmission Owner provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for

application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. Similar to Requirement R9, if there are any other automatic switching actions besides load tripping specified in the UFLS program design, this requirement ensures that that switching capability is in place and ready to operate.

Requirement R9 focuses on automatic tripping of load and may be performed by either the Distribution Provider or the Transmission Owner; Requirement R10 focuses on switching of devices performed by the Transmission Owner to control over-voltage as a result of underfrequency load shedding. Requirement R10 was added to address control of overvoltage conditions during underfrequency events (*e.g.*, the West has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event).

Requirements R11 and R12 relate to event assessments. Requirement R11 requires that each Planning Coordinator, in whose area a bulk electric system islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall conduct and document an assessment of the event within one year of event actuation that evaluates the performance of the UFLS equipment (subrequirement 11.1), and the effectiveness of the UFLS program (subrequirement 11.2). It is desirable to analyze underfrequency events that have involved UFLS operations in order to determine how successful the UFLS program was in arresting frequency decline and restoring load-generation balance. This requirement assigns responsibility to the Planning Coordinator to perform an event assessment. PRC-009-0

Requirement R1 currently requires an event assessment of the performance of UFLS equipment and program effectiveness following system events resulting in system frequency excursions below the initializing set points of the UFLS program. Requirement R12 requires that each

Planning Coordinator, in whose islanding event assessment (subrequirement R11) UFLS program deficiencies are identified, shall conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation. As a follow-up to R11, this requirement ensures that improvements to the UFLS program design will be considered that address UFLS program deficiencies identified in a UFLS event assessment.

Finally Requirement R14 is a coordination requirement that requires the Planning Coordinator to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes will be made or reasons why changes will not be made to the UFLS program, including a schedule for implementation (subrequirement 14.1) and the UFLS design assessment (subrequirement 14.2). This requirement was added in response to industry comments on the standard expressing concern that the UFLS entities and Transmission Owners should have a role in the process of defining the UFLS program and schedule for implementation. The standard drafting team considered the role of the Planning Coordinator and the coordination activities that the Planning Coordinator performs to meet its obligations. However, the standard drafting team agreed that it would be beneficial to involve explicitly the UFLS entities and the Transmission Owners in the process of defining the UFLS program and the schedule for implementation. These entities may provide information based on practical implementation experience that improves the overall effectiveness of the UFLS program.

***3. Proposed Reliability Standard is applicable to users, owners, and operators of the bulk power system, and not others***

The proposed standard is applicable to users, owners, and operators of the bulk power system and not others. The standard applies to Planning Coordinators, UFLS entities and

Transmission Owners. Section 4.2 of the Applicability section explains that UFLS entities are all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include Transmission Owners or Distribution Providers.

The Planning Coordinators are the most appropriate entities to be assigned responsibility for the design, assessment and coordination of the UFLS programs. As defined in version 5 of the Functional Model, the Planning Coordinator is:

The functional entity that coordinates, facilitates, integrates and evaluates (generally one year and beyond) transmission facility and service plans, and resource plans within a Planning Coordinator area, and coordinates those plans with adjoining Planning Coordinator areas.

In addition, the Functional Model explains that:

While the area under the purview of a Planning Coordinator may include as few as one Transmission Planner and one Resource Planner, the Planning Coordinator's scope of activities may include extended coordination with integrated Planning Coordinators' plans for adjoining areas beyond individual system plans. By its very nature, Bulk Electric System planning involves multiple entities.

Therefore, based on the definition of the role and based on existing practice, the Planning Coordinator is appropriately assigned the UFLS design, assessment and coordination activities.

The requirements related to the implementation of the UFLS program are assigned to the UFLS entities and Transmission Owners. For decades, underfrequency load shedding programs have been implemented by different entities depending on how the transmission system was constructed and owned. In some parts of the country, Distribution Providers accomplish this task, in others it is the Transmission Owners. Indeed, the set of standards intended to be replaced by this new standard allowed either of these registered entities, along with others in some cases, to accomplish the task of owning and operating UFLS relays. Because of this historical nature of the entities involved in the implementation of UFLS programs, and consistent with the

Applicability sections in the PRC-007-0 and PRC-009-0 standards that this standard is intended to replace, the Transmission Owners and the Distribution Providers will have a role in implementing UFLS programs. Requirement R10, which includes the automatic switching of capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding, is a function which would be performed by Transmission Owners specifically and therefore provides a basis for assigning Requirement R10 to Transmission Owners rather than UFLS entities (which includes Distribution Providers). UFLS entities, that may be Distribution Providers, Transmission Owners, or both, are responsible for the implementation of the UFLS program by providing automatic tripping of Load in accordance with the UFLS program and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator are in which it owns assets (Requirement R9).

***4. Proposed Reliability Standard is clear and unambiguous as to what is required and who is required to comply***

The proposed standard is clear and unambiguous as to what is required and who is required to comply. Requirements R1 through R7 establish requirements for the Planning Coordinator related to identifying islands, designing and assessing the UFLS program, coordinating the UFLS program with other Planning Coordinators, and maintaining the UFLS database including exchanging information with other Planning Coordinators. Requirements R11 through R13 are also assigned to the Planning Coordinator and require them to conduct event assessments, coordinate such assessments with other Coordinators where necessary, and consider modifying UFLS program design should any design deficiencies be identified in the event assessments. Requirement R14 is assigned to the Planning Coordinator and requires them to coordinate by way of responding to comments submitted by UFLS entities (DPs, TOs or both)



on the UFLS program including the schedule for implementation, the UFLS design assessment, and format and schedule of UFLS data submittal.

Requirements R8 and R9 are assigned to the UFLS entities. Requirement R8 requires that they provide data to their Planning Coordinators according to the format and schedule specified by the Planning Coordinators to support maintenance of each Planning Coordinator's UFLS database. Requirement R9 requires that the UFLS entities provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by their Planning Coordinators in each Planning Coordinator area in which they own assets.

Requirement R10 is assigned to the Transmission Owner. Requirement R10 requires that the Transmission Owner provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.

***5. Proposed Reliability Standard includes clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation***

The proposed standard includes clear and understandable consequences and a range of penalties for a violation by establishing Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs) for each requirement. **Exhibit A** to this filing containing the proposed standard also includes the proposed VRFs and VSLs by Requirement. Additionally, the VRFs and VSLs proposed for approval are discussed later in this filing.

***6. Proposed Reliability Standard identifies clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner***

The proposed standard identifies clear and objective measures for compliance by establishing measures for each requirement. The measures support the requirements by identifying what evidence or types of evidence could be used to show that an entity is compliant with the requirement. **Exhibit A** to this filing includes the proposed measures by Requirement.

***7. Proposed Reliability Standard achieves a reliability goal effectively and efficiently — but does not necessarily have to reflect “best practices” without regard to implementation cost***

The proposed standard achieves a specific reliability goal of establishing design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency and assist recovery of frequency following underfrequency events. UFLS programs provide last resort system preservation measures by shedding load during system disturbances that result in substantial imbalance between load and generation. The proposed standard does not reflect “best practices” without regard to implementation cost. The standard drafting team reviewed the regional practices in place during the standard development to understand existing practice. The standard drafting team took into consideration the current practices in developing one set of common performance characteristics that all regional underfrequency load shedding programs must meet (Requirement R3). The drafting team concluded that UFLS programs with differing design specifications can be successfully coordinated if they are designed to achieve the same system performance characteristics, even across interconnected regions, and that there is not one best way to design a UFLS program. In light of these observations, the drafting team determined that most effective and efficient method to achieve the desired reliability goal is to establish common performance characteristics,

because prescribing uniform UFLS program parameters would require most, if not all, entities to modify their UFLS equipment for little or no added reliability benefit.

In addition to establishing common performance characteristics, the proposed standard establishes additional requirements for the Planning Coordinators to ensure that the performance characteristics are applied consistently and in a coordinated manner. The Planning Coordinators are required to define island identification criteria and apply that criteria to identify islands to serve as a basis for assessing the design of the UFLS program (Requirement R1 and R2); perform design assessments on a defined periodic basis (Requirement R4); coordinate assessments with other Planning Coordinators by defined actions should a Planning Coordinator's area (or portions of its area) be contained in an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas (or portions of those areas) (Requirement R5); conduct, document, and coordinate with other Planning Coordinators where necessary on UFLS event assessments, and consider design changes that could address deficiencies that may be identified in an event assessment (Requirement R11 through R13); and involve the UFLS entities in the Planning Coordinator's responsibilities established in the standard by requiring the Planning Coordinators to respond to written comments on the UFLS program including the schedule for implementation, UFLS design assessment, and the format and schedule of UFLS data submittal (Requirement R14).

The standard also establishes requirements for the Planning Coordinators and UFLS Entities to support the exchange of information necessary to design and assess performance of UFLS programs by way of the establishment of a UFLS database and exchange of data to populate the database (Requirements R6 through R8).

Additionally, the standard establishes requirements for the UFLS entities and Transmission Owners to ensure effective and efficient implementation of the UFLS programs. The UFLS entities are required to provide load shedding, and the Transmission Owners are required to provide automatic switching of capacitor banks, Transmission Lines, and reactors as necessary to control over-voltage that may result from underfrequency load shedding as determined by the Planning Coordinator(s) (Requirements R9 and R10).

**8. *Proposed Reliability Standards is not “lowest common denominator,” i.e., does not reflect a compromise that does not adequately protect bulk power system reliability***

The Reliability Standard does not aim at a “lowest common denominator.” Regional criteria for UFLS programs have traditionally specified detailed parameters that define quantities such as the number of steps in the program, the load shed at each step, and the frequency threshold and time delay at each step. Adopting such an approach in the proposed continent-wide UFLS standard could lead to selection of parameters based on the lowest common denominator among the existing UFLS programs. Rather than following this approach, the proposed standard establishes common performance characteristics that all UFLS programs must meet to effectively protect Bulk-Power System reliability. These performance characteristics were selected to establish requirements on the system performance during and following an underfrequency event. It is more appropriate to define the effectiveness of UFLS programs in terms of parameters that directly measure system performance (*i.e.*, frequency and voltage versus time) rather than indirect measures such as the amount and timing of load shedding. The performance characteristics were selected to require that UFLS programs are designed to arrest declining frequency at a level that coordinates with capabilities of system equipment, particularly generation equipment, and that following UFLS operation, frequency remains within equipment capabilities and is restored to a sustainable level from which operator action can restore normal

frequency. The boundary conditions established in the proposed standard within which UFLS programs must be designed to operate were selected based on coordination with generator capabilities and generator protection requirements in consultation with the Generator Verification Standard Drafting Team and a review of IEEE Guides on design and protection of generators and power transformers.

***9. Proposed Reliability Standard considers costs to implement for smaller entities but not at consequence of less than excellence in operating system reliability***

The proposed Reliability Standard does not reflect any differentiation in requirements based on entity size. In addition, the proposed standard was posted for public comment on three occasions during the development of the standard prior to balloting. During these postings, no entities expressed concerns that the requirements would be too costly for smaller entities to implement. Nevertheless, the proposed PRC-006-1 standard does provide the opportunity for Planning Coordinators to consider input from smaller entities when developing the UFLS program. Some UFLS programs do make allowances regarding the practicality of smaller entities to implement the UFLS program parameters, and PRC-006-1 allows Planning Coordinators to continue this practice so long as the reliability objectives of this standard are met (*i.e.*, the UFLS program, including allowances for smaller entities, meets all of the performance characteristics embodied in this standard).

***10. Proposed Reliability Standard is designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one area or approach***

The requirements in this Reliability Standard apply throughout North America, with two exceptions. The proposed standard includes a Variance for the Western Interconnection and another Variance for the Quebec Interconnection.

In the aftermath of system-wide disturbances occurring within the Western Interconnection on July 2 and 3 and August 10, 1996, President Clinton appointed a “Blue Ribbon” panel to perform a comprehensive assessment of these disturbances and make recommendations to enhance reliability within the Western Interconnection. The investigations culminated in two reports: the *WSCC Disturbance Report for the Power System Outages that Occurred on the Western Interconnection on July 2, 1996 and July 3, 1996*, and *WSCC Disturbance Report for the Power System Outage that Occurred on the Western Interconnection on August 10, 1996* (“Disturbance Reports”). The Disturbance Reports’ recommendations identified several reliability issues for further investigation. One of these issues was the efficacy of existing policies and procedures related to off-nominal frequency (UFLS programs), the purposes of which are to arrest potential system collapses due to large frequency deviations, minimize associated adverse impacts caused by cascading outages, and aid in quickly restoring the system to normal operations.

The Western Electricity Coordinating Council (“WECC”) Planning Coordination Committee (“PCC”) and the Operating Committee (“OC”) developed a coordinated off-nominal frequency load shedding and restoration plan for the Western Interconnection in the fall of 1997 (“1997 Coordinated Plan”). The WECC Board of Trustees approved the 1997 Coordinated Plan on December 4, 1997.

In 2009, the WECC PCC and OC formed a task force to review the effectiveness of the existing protection relays associated with the 1997 Coordinated Plan. The results indicated that WECC members’ relay settings conform to the 1997 Coordinated Plan performance requirements, both in arresting frequency decline before frequency reaches 58.0 Hz and in recovering frequency to 59.5 Hz or higher. These results also indicated that UFLS relays will

not activate until there has been a cascading disturbance across multiple entities' systems. In addition, none of the Western Interconnection's sub-areas will experience an off-nominal frequency event due to either single or dual most severe contingency losses of generation resources if the losses occur within known island configurations.

The members of WECC recognize the need for a common plan for underfrequency load shedding. The members of WECC have agreed to follow and operate their systems in accordance with the Coordinated Plan as an essential element of a well-planned and operated Western Interconnection electric system.

WECC believes it is necessary to maintain the reliability benefits of the WECC Coordinated Plan as NERC moves forward with the revision to PRC-006-1—Automatic Underfrequency Load Shedding. The language in the proposed variance is intended to ensure that the Planning Coordinators in the Western Interconnection continue to implement the WECC Coordinated Plan rather than developing new UFLS Plans that are not fully coordinated with the WECC Coordinated Plan. The variance language requires this coordination, while still requiring the individual Planning Coordinators to meet the system performance levels identified in the NERC Continent-wide Reliability Standard.

Earlier in 2009, NPCC identified the need for a variance to the standard for the Québec Interconnection within NPCC. Due to the physical characteristics of the Québec system, the UFLS program in Québec arrests frequency at a lower threshold and permits higher frequency overshoot than allowed in the proposed standard. The installed generation in the Québec Interconnection is 98 percent hydraulic generation, allowing wider tolerances on frequency performance without jeopardizing reliability. The variance also establishes a different capacity threshold for the generating units for which underfrequency and overfrequency trip settings must

be modeled to address concerns that by 2020, 10 percent of the installed capacity in Québec may be located at plants less than 75 MVA. The Standards Committee appointed a member from the Québec Interconnection to the drafting team to develop the variance for Québec. Working closely with this representative, the team developed the variance to Requirement R3 parts 3.1 and 3.2 and Requirement R4 parts 4.1 and 4.2. The variance to these requirements reference separate under and overfrequency curves included as attachment 1A to the standard.

***11. Proposed Reliability Standard causes no undue negative effect on competition or restriction of the grid***

The requirements in the Reliability Standards do not cause negative effect on competition or restriction of the grid. Automatic UFLS is a program that does not impact the normal grid operation until there is a serious disturbance. It is intended solely to prevent cascading outages and blackouts. It is a last tier of system protection against cascading and blackouts that has no effect and causes no restrictions during normal operating conditions.

***12. The implementation time for the proposed Reliability Standard is reasonable***

Given the complexity, and importance of the program, the Implementation Plan (see **Exhibit D**) does not allow an excessively long time period for entities to become fully compliant, but allows them sufficient time to transition and install the necessary processes to become compliant. The implementation plan specifies that compliance with the new version PRC-006-1—Automatic Underfrequency Load Shedding Reliability Standard, Requirements R1 through R14, with the one exception for Requirement R4, subrequirements 4.1 through 4.6, is effective one year following the first day of the first calendar quarter after applicable regulatory approvals.

The one year phase-in for compliance is intended to provide Planning Coordinators sufficient time: 1) to develop, modify, or validate (to determine that an existing program meets



required performance characteristics) existing UFLS programs and 2) to establish a schedule for implementation, or validate a schedule for completion of program revisions already in progress. Transmission Owners and Distribution Providers shall comply with the schedule determined by the Planning Coordinator but no sooner than the effective date of the standard.

With the exception for PRC-024-1, there are no other reliability standards or Standard Authorization Requests (SARs), in progress or approved, that must be implemented before the Underfrequency Load Shedding standard and any associated regional reliability standards can be implemented. Subrequirements 4.1 through 4.6 of Requirement R4 of the Underfrequency Load Shedding standard shall become effective and enforceable one year following the receipt of generation data as required in PRC-024-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approvals of PRC-006-1. PRC-006-1 Subrequirements 4.1 through 4.6 of Requirement R4 require that the Planning Coordinator model any generator trip settings that do not conform to the requirements set forth in PRC-024-1—Generator Frequency and Voltage Protective Relay Settings to ensure that they are factored into the analyses (subrequirements 4.1 through 4.6). The UFLS program design will need to accommodate the possible loss of generation in these instances in addition to the initial load-generation imbalance. Because this requirement is dependent on data that is provided by way of another standard, PRC-024-1—Generator Frequency and Voltage Protective Relay Settings, many industry commenters expressed concern that the responsibilities outlined in PRC-006-1 Requirement R4, subrequirements 4.1 through 4.6 could not be fulfilled until PRC-024-1 was approved and effective. As a result, the standard drafting team modified the implementation plan to include a dependency on PRC-024-1 approval as described above.

Compliance with the revised EOP-003-2 — Load Shedding Plans reliability standard is effective one year following the first day of the first calendar quarter after applicable regulatory approvals (or the standard otherwise becomes effective the first day of the first calendar quarter after NERC Board of Trustees adoption in those jurisdictions where regulatory approval is not required). The effective date for EOP-003-2 was selected to ensure that requirements regarding automatic UFLS programs are not retired from this standard until the requirements in PRC-006-2 are effective.

### ***13. The Reliability Standard Development Process was open and fair***

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC *Standard Processes Manual*, which is included in the NERC Rules of Procedure as Appendix 3A. NERC's rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards. The Development Process is open to any person or entity with a legitimate interest in the reliability of the bulk power system. NERC considers the comments of all stakeholders and a vote of stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard for submission to the applicable governmental authorities. The drafting team developed this standard by following the Reliability Standards Development Process. In this case, the proposed standards were publicly posted for comment on three occasions between 2008 and 2010. The standard drafting team considered comments from the industry and revised the standards and implementation plan accordingly. The standards were posted for initial ballot in July, 2010, with two additional successive ballots conducted thereafter, and a final recirculation ballot was conducted in October 2010. A total of six drafts of the PRC-

006-1 standard were developed and a total of four drafts of EOP-003-2 were developed. The ballot achieved a weighted segment vote of 84.67%

***14. Proposed Reliability Standard balances with other vital public interests***

The Reliability Standard does not conflict with any vital public interests. Responding successfully to system disturbances which result in frequency decline is a vital public interest. Compliance with this standard supports the reliability of the interconnected systems by assisting in the prevention of cascading outages and blackouts.

***15. Proposed Reliability Standard considers any other relevant factors***

No other factors for consideration were identified in the development of these proposed standards.

**Retirement of PRC-006-0, PRC-007-0, and PRC-009-0**

To resolve potential discrepancies, NERC recommends the retirement of two existing Reliability Standards, PRC-007-0, and PRC-009-0, and the NERC Board of Trustees approved PRC-006-0 concurrent with the implementation of the proposed standard, PRC-006-1. The requirements contained in PRC-006-0, PRC-007-0, and PRC-009-0 were reviewed during the development of PRC-006-1—Automatic Underfrequency Load Shedding to ensure that the requirements with a reliability objective are captured in the proposed standard. A detailed mapping of the existing requirements to the proposed standard, PRC-006-1, is included in **Exhibit C** to this filing.

PRC-006-0—Development and Documentation of Regional UFLS Programs is a NERC Board of Trustees approved standard and will be retired coincident with the implementation of the proposed standard, PRC-006-1. Requirement R1 in PRC-006-0 requires that the RRO

develop, coordinate, and document an UFLS program. This requirement will be replaced by PRC-006-1 Requirement R3 that requires the Planning Coordinators to develop a UFLS program for a generation load imbalance of up to 25% that meets the performance characteristics in subrequirements 3.1 through 3.3 in simulations. PRC-006-0 sub-requirement R1.1 requires that the RRO establish requirements for coordination of UFLS programs within the subregions, RRO and, where appropriate, among RROs. This requirement is captured in Requirement R5 and R13 in PRC-006-1. These two requirements establish specific coordination actions should a Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas.

Requirement R5 requires that the Planning Coordinator coordinate its UFLS program, and Requirement R13 requires the that Planning Coordinator in whose area a BES islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, coordinate its event assessment (in accordance with Requirement R11) with all other Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event through one of the prescribed actions in Requirement R13.

PRC-006-0 Sub-requirement R1.2 specifies that the RRO must include frequency set-points (R1.2.1), the size of corresponding load shedding blocks (R1.2.2), and intentional and load tripping time delays (R1.2.3). Requirement R3 in PRC-006-1 captures the UFLS program specifics that the Planning Coordinator must include when designing its UFLS program. While the requirement does not include specific frequency-set points, it does specify frequency

performance represented in Attachment 1 (parts 3.1 and 3.2) to the standard and specifies that voltage performance in part 3.3.

Sub-requirement R1.2.4 in PRC-006-0 requires that the RRO specify generation protection in the UFLS program. Generation protection is captured in PRC-006-1 by requiring that the Planning Coordinators ensure that volts per Hz do not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and do not exceed 1.10 per unit for longer than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with the locations specified in 3.3.1 through 3.3.3.

Requirement R4 in PRC-006-1 requires that the Planning Coordinator conduct a UFLS assessment through dynamic simulation. The simulation must model under and over-frequency trip settings of the individual and plants/facilities in parts 4.1 through 4.6. Sub-requirements R1.2.5 and R1.2.6 of PRC-006-0 require that the RRO include tie tripping schemes and islanding schemes in the UFLS program. The replacement standard, PRC-006-1, requires that the Planning Coordinators identify islands by including any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System (Requirement R2 part 2.2).

Sub-requirement R1.2.7 of PRC-006-0 requires that the RRO specify automatic load restoration schemes in the UFLS program. The replacement standard, PRC-006-1, requirement R4 subrequirement 4.7 requires that the Planning Coordinator model any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment. Sub-requirement R1.2.8 in PRC-006-0 requires that the RRO include any other schemes that are part of or impact the UFLS programs in the details of the program. PRC-006-1 captures other schemes in Requirement R10 where the Transmission

Owners are required to provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s).

Sub-requirement R1.3 in PRC-006-0 requires that the RRO develop a UFLS program database, this database must be updated as specified in the RRO program (but at least every five years), and must include sufficient information to model the UFLS program in dynamic simulations of the interconnected transmission systems. Requirement R6, R7 and R8 in PRC-006-1 contain the UFLS database responsibilities. Requirement R6 requires that the Planning Coordinator maintain a UFLS database containing data necessary to model its UFLS program for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities. Requirement R7 requires that the Planning Coordinator provide its UFLS database containing data necessary to model its UFLS program to other Planning Coordinators within its Interconnection within 30 calendar days of a request.

Finally, Requirement R8 requires that each UFLS entity provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.

Sub-requirement R1.4 in PRC-006-0 requires that the RRO conduct an assessment and document the effectiveness of the design and implementation of the Regional UFLS program. This assessment shall be conducted periodically and shall (at least every five years or as required by changes in system conditions) include, but not be limited to a review of the frequency set points and timing, (R1.4.1) and dynamic simulation of possible Disturbance that cause the

Region or portions of the Region to experience the largest imbalance between Demand (Load) and generation (R1.4.2). Requirements R4 and R12 in PRC-006-1 contain the assessment responsibilities. Requirement R4 requires that the Planning Coordinators conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics, and Requirement R12 requires that the Planning Coordinator, in whose islanding event assessment (identified in Requirement R11) UFLS program deficiencies are identified, shall conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation.

Requirement R2 in PRC-006-0 requires the RRO to provide documentation of its UFLS program and its database information to NERC on request (within 30 calendar days), and Requirement R3 requires that RRO provide documentation of the assessment of its UFLS program to NERC on request (within 30 calendar days). Both of these requirements are addressed in Section 401.3 of the NERC Rules of Procedures, which provides:

**Data Access** — All bulk power system owners, operators, and users shall provide to NERC and the applicable regional entity such information as is necessary to monitor compliance with the reliability standards. NERC and the applicable regional entity will define the data retention and reporting requirements in the reliability standards and compliance reporting procedures.

#### PRC-007-0—Assuring Consistency with Regional UFLS Program Requirements

Requirement R1, requires that each Transmission Owner and Distribution Provider with a UFLS program (as required by its RRO) shall ensure that its UFLS program is consistent with its RRO's UFLS program requirements. This requirement is captured in the proposed standard PRC-006-1—Automatic Underfrequency Load Shedding Requirements R9 and R10, which requires UFLS entities to provide automatic tripping of Load in accordance with the UFLS

program design and schedule for application determined by its Planning Coordinator(s) (R9) and Transmission Owner to provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) (R10).

PRC-007-0 Requirement R2 requires entities that own or operate a UFLS program (as required by its RRO) to provide, and annually update, its underfrequency data as necessary for its RRO to maintain and update a UFLS program database. PRC-006-1 captures this responsibility in Requirement R8 by requiring each UFLS entity to provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.

Finally, Requirement R3 in PRC-007-0 requires that the Transmission Owner and Distribution Provider that owns a UFLS program (as required by its RRO) to provide its documentation of that UFLS program to its RRO on request (within 30 calendar days). This requirement is captured in PRC-006-1 Requirement R8 because it contains the requirement that the UFLS entity shall provide the necessary data to support the UFLS database in the format and schedule specified by the Planning Coordinator.

PRC-009-0—UFLS Performance Following an Underfrequency Event, Requirement R1 requires that the Transmission Owner, Transmission Operator, Load-Serving Entity and Distribution Provider that owns or operates a UFLS program (as required by its RRO) shall analyze and document its UFLS program performance in accordance with its RRO's UFLS program, and the analysis shall address the performance of UFLS equipment and program effectiveness following system events resulting in system frequency excursions below the



initializing set points of the UFLS program. Requirement R1 goes on to specify in sub-requirements R1.1 through R1.4 that the responsible entities must include a description of the events (R1.1); a review of the UFLS set points and tripping times (R1.2); a simulation of the event (R1.3) and; a summary of the findings (R1.4). PRC-006-1 Requirement R11 requires that each Planning Coordinator in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, conduct and document an assessment of the event within one year of event actuation to evaluate the performance of the UFLS equipment (subrequirement 11.1), and the effectiveness of the UFLS program (subrequirement 11.2).

Finally, Requirement R2 in PRC-009-0 requires that the Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UFLS program (as required by its RRO) provide documentation of the analysis of the UFLS program to its RRO and NERC on request 90 calendar days after the system event. This existing requirement is addressed in the NERC Rules of Procedures, Section 401.3 Data Access, which requires all bulk power system owners, operators, and users to provide to NERC and the applicable regional entity such information as is necessary to monitor compliance with the reliability standards.

## **DISCUSSION OF EOP-003-2**

NERC proposes the addition of a revised standard EOP-003-2, to the current suite of Reliability Standards. EOP-003-2 is presented in **Exhibit A** of this filing.

During the public comment periods several entities pointed out redundancy between EOP-003-1 – Load Shedding Plans and PRC-006-1 – Automatic Underfrequency Load

Shedding. The Standards Committee approved a Supplemental SAR for posting on October 7, 2009 that expanded the SDT's scope to include EOP-003-1, but limiting that scope to only eliminating references to automatic Underfrequency Load Shedding in EOP-003-1. The standard drafting team made minimal changes to EOP-003-1 – Load Shedding plans, and focused on eliminating redundancies between it and PRC-006-1 – Automatic Underfrequency Load Shedding. The drafting team clarified Requirement R2 by removing reference to underfrequency load shedding and focused the requirement on undervoltage conditions. Requirements R3 and R5 were modified by clarifying that the load shedding discussed in the requirements excludes automatic load shedding.

Additionally, the drafting team modified Requirements R4 and R7 to clarify that the load shedding discussed in the requirements is automatic under voltage load shedding. The Balancing Authority was removed from Requirements R2 and R4 because the frequency related aspects of these requirements were removed, leaving only consideration of automatic undervoltage load shedding in these two requirements.

#### **b. Violation Risk Factor and Violation Severity Level Assignments**

The proposed Reliability Standards include VRFs and VSLs. The ranges of penalties for violations are based on the applicable VRF and VSLs and will be administered based on the Sanctions table and supporting penalty determination process described in the NERC Sanction Guidelines, included as Appendix 4B in NERC's Rules of Procedure. Each primary requirement is assigned a VRF and a VSL. These elements support the determination of an initial value range for the Base Penalty Amount regarding violations of requirements in Reliability Standards, as defined in the ERO Sanction Guidelines.

## **Assignment of Violation Risk Factors**

The UFLS Standard Drafting Team applied the following criteria when proposing VRFs for the requirements in PRC-006-1 – Automatic Underfrequency Load Shedding.

### ***High Risk Requirement***

A requirement that, if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

### ***Medium Risk Requirement***

A requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, violation of a medium risk requirement is unlikely to lead to bulk electric system instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of a medium risk requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.

### ***Lower Risk Requirement***

A requirement that is administrative in nature and a requirement that, if violated, would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system; or, a requirement that is administrative in nature and a requirement in a planning time frame that, if violated, would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. A planning requirement that is administrative in nature.<sup>1</sup>

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<sup>1</sup> These three levels of risk are defined by NERC and recognized by FERC in the May 18, 2007 Order at P9, and the November 16, 2007 Order at Appendix A.

The team also considered consistency with the FERC Violation Risk Factor Guidelines for setting VRFs:<sup>2</sup>

**Guideline (1) — Consistency with the Conclusions of the Final Blackout Report**

The Commission seeks to ensure that Violation Risk Factors assigned to Requirements of Reliability Standards in these identified areas appropriately reflect their historical critical impact on the reliability of the Bulk-Power System.

In the VSL Order, FERC listed critical areas (from the Final Blackout Report<sup>3</sup>) where violations could severely affect the reliability of the Bulk-Power System:<sup>4</sup>

- Emergency operations
- Vegetation management
- Operator personnel training
- Protection systems and their coordination
- Operating tools and backup facilities
- Reactive power and voltage control
- System modeling and data exchange
- Communication protocol and facilities
- Requirements to determine equipment ratings
- Synchronized data recorders
- Clearer criteria for operationally critical facilities
- Appropriate use of transmission loading relief.

**Guideline (2) — Consistency within a Reliability Standard<sup>5</sup>**

The Commission expects a rational connection between the sub-Requirement Violation Risk Factor assignments and the main Requirement Violation Risk Factor assignment.

**Guideline (3) — Consistency among Reliability Standards**

The Commission expects the assignment of Violation Risk Factors corresponding to Requirements that address similar reliability goals in different Reliability Standards would be treated comparably.

**Guideline (4) — Consistency with NERC’s Definition of the Violation Risk Factor Level**

Guideline (4) was developed to evaluate whether the assignment of a particular Violation Risk Factor level conforms to NERC’s definition of that risk level.

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<sup>2</sup> North American Electric Reliability Corp., 119 FERC ¶ 61,145, order on reh’g and compliance filing, 120 FERC ¶ 61,145 (2007) (“VRF Rehearing Order”).

<sup>3</sup> *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, U.S.-Canada Power System Outage Task Force, April 5, 2004.

<sup>4</sup> *Id.* at n. 15.

**Guideline (5) — Treatment of Requirements that Co-mingle More Than One Obligation**

Where a single Requirement co-mingles a higher risk reliability objective and a lesser risk reliability objective, the VRF assignment for such Requirements must not be watered down to reflect the lower risk level associated with the less important objective of the Reliability Standard.

The following discussion addresses how the drafting team considered FERC’s VSL Guidelines 2 through 5. The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC’s Reliability Standards and implies that these requirements should be assigned a “High” VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The team believes that Guideline 4 is reflective of the intent of VRFs in the first instance and therefore concentrated its approach on the reliability impact of the requirements.

There are 14 requirements in PRC-006-1 – Automatic Underfrequency Load Shedding:

- **VRF for PRC-006-1, Requirement R1: Medium**
  - FERC’s Guideline 2 —Not applicable – this requirement does not have sub-parts.
  - FERC’s Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards
  - FERC’s Guideline 4 — This requirement is assigned a medium VRF because it is a planning requirement that while is administrative in nature is an input to other requirements in the standard that are assigned a higher VRF. Documenting criteria for selecting islands is an important step in designing a UFLS program but is administrative in nature. This is requirement, if violated, would not adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system but violation of the dependent requirements could have a higher impact on the bulk electric system. The assignment is consistent with the NERC VRF guidelines.
  - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.

- **VRF for PRC-006-1, Requirement R2: Medium**
  - FERC’s Guideline 2 — This requirement has sub-parts, but these parts all support the parent requirement and do not have independent objectives.
  - FERC’s Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards.
  - FERC’s Guideline 4 — This requirement in part relies on the output of requirement R1, the criteria for selecting islands. Requirement R1 is a Medium VRF and this requirement is a Medium because the identification of islands for establishing a UFLS program is the intent of the requirement and is more than administrative in nature.
  - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement R3: High**
  - FERC’s Guideline 2 — This requirement has sub-parts, but these parts all support the parent requirement and do not have independent objectives.
  - FERC’s Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards.
  - FERC’s Guideline 4 — This requirement is assigned a High VRF because this requirement requires each Planning Coordinator to design a UFLS program that meets specific performance characteristics. This is a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure (blackout), and could hinder restoration to a normal condition. The assignment is consistent with the NERC definition of High VRF.
  - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement R4: High**
  - FERC’s Guideline 2 — This requirement has sub-parts, but these parts all support the parent requirement and do not have independent objectives.
  - FERC’s Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards.
  - FERC’s Guideline 4 — This requirement is assigned a High VRF because the reliability objective of this requirement is to perform an assessment of the UFLS program every five years. Violation of this requirement, by failing to validate the UFLS program through dynamic simulations, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system failure (blackout), or could place the bulk

electric system at an unacceptable risk of failure (blackout), and could hinder restoration to a normal condition. The assignment is consistent with the NERC definition of High VRF.

- FERC's Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement R5: Medium**
  - FERC's Guideline 2 — This requirement has sub-parts, but these parts all support the parent requirement and do not have independent objectives.
  - FERC's Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards.
  - FERC's Guideline 4 — This requirement is assigned a Medium VRF because the reliability objective of this requirement is to reach concurrence with all other affected Planning Coordinators on assessment results when an island spans multiple areas. This requirement ensures coordination between Planning Coordinators knowing that islands may very possibly span multiple Planning Coordinator areas. While not administrative in nature, violation of this requirement, by failing to reach concurrence, would not necessarily under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure (blackout), and could hinder restoration to a normal condition hence a Medium VRF. The assignment is consistent with the NERC definition of Medium VRF.
  - FERC's Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement R6: Lower**
  - FERC's Guideline 2 — Not applicable – this requirement does not have sub-parts.
  - FERC's Guideline 3 — PRC-006-0 (not FERC approved) contains a similar requirement, Requirement R1.3, but does not have a VRF.
  - FERC's Guideline 4 — This requirement is assigned a Lower VRF because it requires that Planning Coordinators annually maintain a UFLS database. This requirement is clearly administrative; however, it is important that UFLS data/information is stored in a database. This requirement currently exists in PRC-006-0 Requirement R1.3. It is very unlikely that violating this planning requirement, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state of the bulk electric system, or the ability to effectively control or restore the bulk electric system. The assignment is consistent with the NERC definition of Lower VRF.

- FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R7: Lower**
  - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
  - FERC’s Guideline 3 — This is consistent with a similar requirement in PRC-007-0, Requirement R2, that is assigned a lower VRF.
  - FERC’s Guideline 4 — This requirement is assigned a lower VRF because it is a planning requirement that is administrative in nature. This requirement requires the Planning Coordinators to share their UFLS database with other Planning Coordinators. This is administrative and, if violated, would not adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. The assignment is consistent with the NERC definition of Lower VRF.
  - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R8: Lower**
  - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
  - FERC’s Guideline 3 — This is consistent with similar requirements in PRC-007-0, Requirements R2 and R3, that are assigned Lower VRFs.
  - FERC’s Guideline 4 — This requirement is assigned a lower VRF because it is a planning requirement that is administrative in nature. The responsible entities are required to provide data to the Planning Coordinators to maintain the database. This is administrative and, if violated, would not adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. The assignment is consistent with the NERC definition of Lower VRF.
  - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R9: High**
  - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
  - FERC’s Guideline 3 — A similar requirement in PRC-007-0, Requirement R1, is assigned a Medium VRF. As noted below in the discussion for Guideline 4 however, assignment of a High VRF for this requirement is consistent with the NERC definition of a High VRF.
  - FERC’s Guideline 4 — The reliability objective of this requirement is for responsible entities to provide load tripping in accordance with the UFLS program design and schedule for application. This requirement is assigned a High



VRF because violation of it, by failing to provide the load tripping required by the UFLS program design, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure (blackout), and could hinder restoration to a normal condition. The assignment is consistent with the NERC definition of High VRF.

- FERC's Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement R10: High**
  - FERC's Guideline 2 — Not applicable – this requirement does not have sub-parts.
  - FERC's Guideline 3 — Not applicable – this requirement is not related to similar reliability goals in other standards.
  - FERC's Guideline 4 — The reliability objective of this requirement is that Transmission Owners provide automatic switching of Elements according to the UFLS program design. Similar to requirement R9, this requirement is assigned a High VRF because violation of it, by failing to provide automatic switching of Elements required by the UFLS program design, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure (blackout), and could hinder restoration to a normal condition. The assignment is consistent with the NERC definition of High VRF.
  - FERC's Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
  
- **VRF for PRC-006-1, Requirement 11: Medium**
  - FERC's Guideline 2 — This requirement has sub-parts, but these parts all support the parent requirement and do not have independent objectives.
  - FERC's Guideline 3 — This is consistent with a similar requirement in PRC-009-0, Requirement R1, that is assigned a Medium VRF.
  - FERC's Guideline 4 — A similar requirement exists in PRC-009-0 Requirement R1 and is assigned a Medium VRF. This requirement is assigned a Medium VRF because it requires assessment of UFLS equipment performance and UFLS program effectiveness during specified events involving UFLS activation that could identify deficiencies in either, and if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state of the bulk electric system, or the ability to effectively control or restore the bulk electric system. The assignment is consistent with the NERC definition of Medium VRF.

- FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R12: Medium**
    - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
    - FERC’s Guideline 3 — This is consistent with a similar requirement in PRC-009-0, Requirement R1, that is assigned a Medium VRF.
    - FERC’s Guideline 4 — A similar requirement exists in PRC-009-0 Requirement R1 and is assigned a Medium VRF. This requirement is assigned a Medium VRF because it requires assessment of UFLS equipment performance and UFLS program effectiveness during specified events involving UFLS activation that could identify deficiencies in either, and if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state of the bulk electric system, or the ability to effectively control or restore the bulk electric system. The assignment is consistent with the NERC definition of Medium VRF.
    - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R13: Medium**
    - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
    - FERC’s Guideline 3 — This is consistent with a similar requirement in PRC-009-0, Requirement R1, that is assigned a Medium VRF.
    - FERC’s Guideline 4 — This requirement is assigned a Medium VRF because it requires assessment of UFLS equipment performance and UFLS program effectiveness during specified events involving UFLS activation that could identify deficiencies in either, and if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state of the bulk electric system, or the ability to effectively control or restore the bulk electric system. The assignment is consistent with the NERC definition of Medium VRF.
    - FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.
- **VRF for PRC-006-1, Requirement R14: Lower**
    - FERC’s Guideline 2 — Not applicable – this requirement does not have sub-parts.
    - FERC’s Guideline 3 — This is consistent with a similar requirement in FAC-010-2, Requirement R5, that is assigned a Lower VRF.

- FERC’s Guideline 4 — This requirement is assigned a Lower VRF because it is administrative in nature and if violated would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. The assignment is consistent with the NERC definition of Lower VRF.
- FERC’s Guideline 5 — There is only one objective in this requirement and it is assigned an appropriate VRF.

The VRFs for the requirements in EOP-003-2 – Load Shedding Plans were not modified and remain the same as those proposed and approved for EOP-003-1.

### **Violation Severity Levels**

The VSLs are presented below, followed by an analysis of whether the VSLs meet the FERC Guidelines for assessing VSLs:

#### **Guideline 1: Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance**

Compare the VSLs to any prior Levels of Non-compliance and avoid significant changes that may encourage a lower level of compliance than was required when Levels of Non-compliance were used.

#### **Guideline 2: Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties**

A violation of a “binary” type requirement must be a “Severe” VSL.

Do not use ambiguous terms such as “minor” and “significant” to describe noncompliant performance.

#### **Guideline 3: Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement**

VSLs should not expand on what is required in the requirement.

#### **Guideline 4: Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations**

. . . unless otherwise stated in the requirement, each instance of non-compliance with a requirement is a separate violation. Section 4 of the Sanction Guidelines states that assessing penalties on a per violation per day basis is the “default” for penalty calculations.

## VSLs for PRC-006-1

<b>Requirement R1</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	<p>The Planning Coordinator developed and documented criteria but failed to include the consideration of historical events, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands.</p> <p>OR</p> <p>The Planning Coordinator developed and documented criteria but failed to include the consideration of system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands.</p>
Proposed High VSL	The Planning Coordinator developed and documented criteria but failed to include the consideration of historical events and system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands
Proposed Severe VSL	The Planning Coordinator failed to develop and document criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands
<p>FERC VSL G1</p> <p>Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	There is currently no requirement like the requirement proposed in PRC-006-1. The VSL assignment does not lower the current level of compliance.
<p>FERC VSL G2</p> <p>Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<p>FERC VSL G3</p> <p>Violation Severity Level Assignment Should Be Consistent with the</p>	The VSL aligns with the language of the requirement, and does not add to nor take away from it.

Corresponding Requirement	
FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R2</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2 or 2.3.
Proposed High VSL	The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2 or 2.3.
Proposed Severe VSL	<ol style="list-style-type: none"> <li>1. The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all of the Parts as specified in Requirement R2, Parts 2.1, 2.2 or 2.3.</li> <li>2. OR</li> <li>3. The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.</li> </ol>
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are not based on numeric gradations. Instead, they are based on the number of parts an entity did not comply with. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b>	The VSL aligns with the language of the requirement, and does not add to

Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	nor take away from it.
<b>FERC VSL G4</b>	The VSL is based on a single violation of the requirement.
<b>Requirement R3</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	The Planning Coordinator developed an UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Requirement R3, Parts 3.1, 3.2, or 3.3 in simulations of underfrequency conditions.
Proposed High VSL	The Planning Coordinator developed an UFLS program including notification of and a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Requirement R3, Parts 3.1, 3.2, or 3.3 in simulations of underfrequency conditions.
Proposed Severe VSL	The Planning Coordinator developed an UFLS program including notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in parts 3.1, 3.2, and 3.3 in simulations of underfrequency conditions.  OR  The Planning Coordinator failed to develop a UFLS program including notification of and a schedule for implementation by UFLS entities within its area.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are not based on numeric gradations. Instead, they are based on the number of “Parts” of a requirement that an entity did not comply with. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance. PRC-006-0 Requirement R1 requires that the RRO develop a program. This requirement contains four sub-parts that align with separate requirements in the proposed standard. These separate requirements have their own VRF and set of VSLs for compliance. Requirement R1.1 in PRC-006-0 maps to R5, R7, and R13 in draft (3) PRC-006-1.  Requirement R1.2 in PRC-006-0 maps to R3 in draft (3) PRC-006-1  Requirement R1.3 in PRC-006-0 maps to R6, R7, and R8 in draft (3) PRC-006-1.  Requirement R1.4 in PRC-006-0 maps to R4, and R11.
<b>FERC VSL G2</b>	The VSL is written not as a pass/fail VSL and guideline 2A does not apply.

<p>Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	<p>The VSL is written in clear and unambiguous language, meeting Guideline 2B.</p>
<p><b>FERC VSL G3</b></p> <p>Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The VSL aligns with the language of the requirement, and does not add to nor take away from it.</p>
<p><b>FERC VSL G4</b></p> <p>Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The VSL is based on a single violation of the requirement.</p>
<p><b>Requirement R4</b></p>	
<p>Proposed Lower VSL</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include one (1) of the items as specified in Requirement R4, Parts 4.1 through 4.7.</p>
<p>Proposed Moderate VSL</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include two (2) of the items as specified in Requirement R4, Parts 4.1 through 4.7.</p>
<p>Proposed High VSL</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include three (3) of the items as specified in Requirement R4, Parts 4.1 through 4.7.</p>
<p>Proposed Severe VSL</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 but simulation failed to include four (4) or more of the</p>

	<p>items as specified in Requirement R4, Parts 4.1 through 4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<p><b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	<p>The VSLs for the stated requirement are not based on numeric gradations. Instead, they are based on the number of Parts of a Requirement that an entity did not comply with. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance. Failure to complete an assessment every five years was assigned a Level Four noncompliance in PRC-006-0, which is equivalent to a Severe VSL and is also assigned a Severe VSL in the draft (3) PRC-006-1.</p>
<p><b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	<p>The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.</p>
<p><b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The VSL aligns with the language of the requirement, and does not add to nor take away from it.</p>
<p><b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The VSL is based on a single violation of the requirement.</p>



<b>Requirement R5</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	N/A
Proposed High VSL	N/A
Proposed Severe VSL	The Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are not based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written as a pass/fail VSL and contains a Severe in compliance with guideline 2A. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R6</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	N/A
Proposed High VSL	N/A
Proposed Severe VSL	The Planning Coordinator failed to maintain a UFLS database for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are not based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written as a pass/fail VSL and contains a Severe in compliance with guideline 2A. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R7</b>
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Proposed Lower VSL	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 30 calendar days and up to and including 40 calendar days following the request.
Proposed Moderate VSL	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 40 calendar days but less than and including 50 calendar days following the request.
Proposed High VSL	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 50 calendar days but less than and including 60 calendar days following the request.
Proposed Severe VSL	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 60 calendar days following the request. OR The Planning Coordinator failed to provide its UFLS database to other Planning Coordinators.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R8</b>	
Proposed Lower VSL	The UFLS entity provided data to its Planning Coordinator(s) more than 5 calendar days but less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.
Proposed Moderate VSL	The UFLS entity provided data to its Planning Coordinator(s) more than 10 calendar days but less than or equal to 15 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.  OR  The UFLS entity provided data to its Planning Coordinator(s) but the data was not according to the format specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.
Proposed High VSL	The UFLS entity provided data to its Planning Coordinator(s) more than 15 calendar days but less than or equal to 20 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.
Proposed Severe VSL	4. The UFLS entity provided data to its Planning Coordinator(s) more than 20 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database. 5. OR 6. The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b> Violation Severity Level	The VSL aligns with the language of the requirement, and does not add to nor take away from it.

Assignment Should Be Consistent with the Corresponding Requirement	
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R9</b>	
Proposed Lower VSL	The UFLS entity provided less than 100% but more than (and including) 95% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.
Proposed Moderate VSL	The UFLS entity provided less than 95% but more than (and including) 90% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.
Proposed High VSL	The UFLS entity provided less than 90% but more than (and including) 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.
Proposed Severe VSL	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance. Requirement R1 of PRC-007 contains many requirements (in one) that our team has split out into independent requirements and therefore the comparison of VSLs is not apples to apples comparison. The Lower VSL for Requirement R1 of PRC-007 says that the entity missed one or more of the RRO program requirements but was consistent with the amount of load shedding. Because our corresponding requirement (R10) focuses only on load shedding (the other RRO requirements map to other Requirements), adopting the load shedding part of the existing Lower for R1 of PRC-007 would not make sense because, it says that the load shedding requirement was met making it an invalid VSL for our purposes. We cannot write such a VSL. The other VSLs are consistent with the other levels (with the only exception being the Lower). PRC-007-0 R1 Moderate establishes a less than 95% of the regional requirement. PRC-007-0 R1 High establishes a less than 90% of the regional requirement and PRC-007-0 R1 Severe establishes a less than 85% of the regional requirement.
<b>FERC VSL G2</b> Violation Severity Level	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline

<p>Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	<p>2B.</p>
<p><b>FERC VSL G3</b></p> <p>Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The VSL aligns with the language of the requirement, and does not add to nor take away from it.</p>
<p><b>FERC VSL G4</b></p> <p>Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of violations</p>	<p>The VSL is based on a single violation of the requirement.</p>
<p><b>Requirement R10</b></p>	
<p>Proposed Lower VSL</p>	<p>The Transmission Owner provided less than 100% but more than (and including) 95% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>
<p>Proposed Moderate VSL</p>	<p>The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which it owns transmission</p>
<p>Proposed High VSL</p>	<p>The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>
<p>Proposed Severe VSL</p>	<p>The Transmission Owner provided less than 85% automatic switching of existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator</p>

	area in which the Transmission Owner owns transmission.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance. While there isn't an exact requirement in the current body of standards (this cannot be mapped to an existing requirement) a similar requirement PRC-007-0 Requirement R1 VSL's establish the same increments of load shedding as the proposed VSLs for this requirement.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.
<b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R11</b>	
Proposed Lower VSL	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than one year but less than or equal to 13 months of actuation.
Proposed Moderate VSL	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2

	within a time greater than 13 months but less than or equal to 14 months of actuation.
Proposed High VSL	<p>The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.</p> <p>OR</p> <p>The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event within one year of event actuation but failed to evaluate one (1) of the Parts as specified in Requirement R11, Parts 11.1 or 11.2.</p>
Proposed Severe VSL	<p>The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the Parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than 15 months of actuation.</p> <p>OR</p> <p>The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to conduct and document an assessment of the event and evaluate the Parts as specified in Requirement R11, Parts 11.1 and 11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event within one year of event actuation but failed to evaluate all of the Parts as specified in Requirement R11, Parts 11.1 and 11.2.</p>
<p><b>FERC VSL G1</b></p> <p>Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	<p>The VSLs for the stated requirement are not based on numeric gradations. Instead, they are based on the number of parts an entity did not comply with. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.</p>
<p><b>FERC VSL G2</b></p> <p>Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p>	<p>The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.</p>



Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	
<b>FERC VSL G3</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<b>FERC VSL G4</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The VSL is based on a single violation of the requirement.

<b>Requirement R12</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than two years but less than or equal to 25 months of event actuation.
Proposed High VSL	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than 25 months but less than or equal to 26 months of event actuation.
Proposed Severe VSL	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than 26 months of event actuation.  OR  The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, failed to conduct and document a UFLS design assessment to consider the identified deficiencies.
<b>FERC VSL G1</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	The VSLs for the stated requirement are not based on numeric gradations. Instead, they are based on the number of Parts of a Requirement that an entity did not comply with. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b> Violation Severity Level Assignments Should Ensure	The VSL is written not as a pass/fail VSL and guideline 2A does not apply. The VSL is written in clear and unambiguous language, meeting Guideline 2B.

<p>Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	
<p><b>FERC VSL G3</b></p> <p>Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The VSL aligns with the language of the requirement, and does not add to nor take away from it.</p>
<p><b>FERC VSL G4</b></p> <p>Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The VSL is based on a single violation of the requirement.</p>

<b>Requirement R13</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	N/A
Proposed High VSL	N/A
Proposed Severe VSL	<p>The Planning Coordinator, in whose area a BES islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, failed to coordinate its UFLS event assessment with all other Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event in one of the manners described in Requirement R13.</p>
<p><b>FERC VSL G1</b></p> <p>Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	<p>The VSLs for the stated requirement are not based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.</p>
<b>FERC VSL G2</b>	<p>The VSL is written as a pass/fail VSL and contains a Severe in compliance with guideline 2A. The VSL is written in clear and unambiguous language,</p>

<p>Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	meeting Guideline 2B.
<p><b>FERC VSL G3</b></p> <p>Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	The VSL aligns with the language of the requirement, and does not add to nor take away from it.
<p><b>FERC VSL G4</b></p> <p>Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	The VSL is based on a single violation of the requirement.

<b>Requirement R14</b>	
Proposed Lower VSL	N/A
Proposed Moderate VSL	N/A
Proposed High VSL	N/A
Proposed Severe VSL	The Planning Coordinator failed to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes were made or reasons why changes were not made to the items in Parts 14.1 through 14.3.
<p><b>FERC VSL G1</b></p> <p>Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	The VSLs for the stated requirement are not based on numeric gradations. As written, the VSL assignments comply with Guideline 1, because the VSLs do not have the unintended consequence of lowering the current or historic level of compliance.
<b>FERC VSL G2</b>	The VSL is written as a pass/fail VSL and contains a Severe in compliance

<p>Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p>Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent</p> <p>Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language</p>	<p>with guideline 2A. The VSL is written in clear and unambiguous language, meeting Guideline 2B.</p>
<p><b>FERC VSL G3</b></p> <p>Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The VSL aligns with the language of the requirement, and does not add to nor take away from it.</p>
<p><b>FERC VSL G4</b></p> <p>Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The VSL is based on a single violation of the requirement.</p>

## VSLs for EOP-003-2

The drafting team utilized the VSLs approved for EOP-003-1 in the VRF/VSL Order in June 2009 and made minor modifications to these VSLs to conform to the requirements. The scope of the changes to the VSLs is minimal and reflects the edits to the Requirements intended to remove redundancies and potential conflicts with PRC-006-1. The modified VSLs can be found in **Exhibit A** to this filing.

**V. Order No. 693 Directives Relative to new Requirements in PRC-006-1 and EOP-003-2**

In FERC Order No. 693 paragraph 1480 addressing the determination on the proposed PRC-006-0 standard, FERC stated:

The Commission understands that UFLS, when properly coordinated with the dynamic response of the Bulk-Power System, is one of the safety nets that safeguards the system from cascading events, assuming it is properly coordinated with the dynamic response of the system. Until this Reliability Standard is submitted to the Commission for approval, we do not expect any lapse in the compliance with this Reliability Standard. As we stated in the NOPR, it is important that the existing regional reliability organizations continue to fulfill their current roles during this time of transition. The Commission expects that this function will pass from the regional reliability organization to the Regional Entity after they are approved.

In response to the expectation to transfer the UFLS function from the regional reliability organization to the Regional Entity, the standard drafting team chose an equally effective approach and assigned responsibility to design, assess, and coordinate the UFLS program to the Planning Coordinator. As explained above, the Planning Coordinators are the most appropriate entities to assign responsibility for the design, assessment, and coordination of the UFLS programs. As defined in version 5 of the Functional Model, the Planning Coordinator is “[t]he functional entity that coordinates, facilitates, integrates and evaluates (generally one year and beyond) transmission facility and service plans, and resource plans within a Planning Coordinator area and coordinates those plans with adjoining Planning Coordinator areas”. In addition, the Functional Model explains that “[w]hile the area under the purview of a Planning Coordinator may include as few as one Transmission Planner and one Resource Planner, the Planning Coordinator’s scope of activities may include extended coordination with integrated Planning Coordinators’ plans for adjoining areas beyond individual system plans. By its very nature, Bulk Electric System planning involves multiple entities.” Based on the definition of the

role and based on existing practice, the Planning Coordinator is appropriately assigned the UFLS design, assessment and coordination activities. Because the Planning Coordinators do not generally have a region-wide view in their assessments, Requirements R2, subrequirement 2.3 is included to continue the present practice of coordinating UFLS systems on a regional basis. In addition, Requirements R5 and R13 require coordination among Planning Coordinators across Planning Coordinator boundaries and across Regional Entity boundaries within an interconnection when islands are identified through system studies or through system events that may cross Planning Coordinator or Regional Entity boundaries.

## **VI. SUMMARY OF THE RELIABILITY STANDARD DEVELOPMENT PROCEEDINGS**

### **a. Development History**

The drafting team developed these standards by following the NERC Reliability Standards development process. PRC-006-1 was publicly posted for comment on three occasions between 2008 and 2010 and EOP-003-2 was publicly posted for comment once in 2010. The standard drafting team considered comments from the industry and revised the standards and implementation plan accordingly. The Consideration of Comments documents are included in this filing as **Exhibit D**. The standards were posted for initial ballot in July, 2010, for two successive ballots in September and October, 2010, and for final recirculation ballot in October, 2010. A total of six drafts of the PRC-006-1 standard were developed and a total of four drafts of EOP-003-2 were developed.

During the first posting conducted July, 2008 through August, 2008, the standard drafting team received many comments on the proposed approach. The first posting proposed a common set of performance characteristics developed with the intent that each of the regional entities

would be directed to develop a UFLS regional reliability standard that would fulfill the performance characteristics.

The standard drafting team's proposed approach of establishing common system performance characteristics rather than prescribing a uniform design specification for all UFLS programs within a continent-wide standard recognizes that, while the objective of the UFLS programs is always to arrest and recover frequency, a variety of design specifications could each be successful in accomplishing this. In addition, UFLS programs with differing design specifications can be successfully coordinated if they are designed to achieve the same system performance characteristics, even across interconnected regions. The drafting team reviewed the existing UFLS programs from each Region, and it became clear that various combinations of load steps and frequency set points exist and can achieve the objective of arresting and recovering frequency. It also became clear that there is not one best way to design a UFLS program. In light of these observations, the drafting team determined that most effective and efficient method to achieve the desired reliability goal is to establish common performance characteristics, because prescribing uniform UFLS program parameters would require most, if not all, entities to modify their UFLS equipment for little or no added reliability benefit. Industry comments were supportive of the approach of using common performance characteristics.

The drafting team also recognized the need to coordinate with the Project 2007-09 Generator Verification drafting team, specifically with regard to the proposed PRC-024-1 standard under development by that team. A mutual agreement on generator off-nominal frequency performance curves was reached between the two teams as well as an agreement that all Generator Owner applicability would be deferred to PRC-024-1 instead of including

Generator Owner applicability in both standards. In conjunction with this coordination between drafting teams, the UFLS team resolved to address the issue of generators that do not conform to the standard off-nominal frequency performance curves by requiring that their trip characteristics be modeled in UFLS design assessments, and thus factored into the overall UFLS program design instead of requiring Generator Owners to arrange for compensatory load shedding for any non-conforming generators.

Based on stakeholder comments received from the first posting and the drafting team's consideration of those comments, the team converted the "Characteristics of UFLS Regional Reliability Standards" into a continent-wide standard which, from that point on, followed the standards development process. While the majority of the comments indicated support for the creation of regional standards that determine the details of the UFLS programs, the majority of the comments also generally supported the concept of applying common continent-wide characteristics. The original intent was for the Regional Standards to meet these common performance characteristics. The creation of a continent-wide standard does not deviate from this approach but rather eliminates the confusion caused with this approach to direct the Regions to create Regional Reliability Standards for UFLS that met the common performance characteristics.

The team acknowledged that this was a shift in approach, but identified benefits to proceeding with a continent-wide standard. Among these identified benefits were the potential for better coordination between interconnected regions, development of the performance characteristics within a formal standards development process, including a mechanism should there be a need for future revisions to the standard, and uniform requirements at the continent-wide level.



The standard drafting team has maintained the position that the creation of a continent-wide standard does not prohibit the creation of Regional Standards for UFLS. Regional Entities may develop other performance requirements through Regional Standards or Regional Variances as permitted by the NERC Rules of Procedure. This approach allows each region the option to develop requirements that meet the specific needs of the region while still maintaining a continent-wide level of reliability.

The team considered the role of the Planning Coordinators as the functional entity most suitable to determine the UFLS program design given that the Regional Entities are not users, owners, or operators of the Bulk Electric System and should not be assigned responsibility for requirements. The second posting of the standard assigned the responsibility for designing the UFLS program to the Planning Coordinators. The Planning Coordinators within each region would define the parameters necessary to meet the performance characteristics in the continent-wide standard, such as the amount of load shedding required, how many blocks, and frequency set points and time delays (these specific parameters would not be contained in the proposed continent-wide-standard).

The standard drafting team recognized that UFLS programs typically have been developed within each Region by representatives from the vertically integrated utilities, Control Areas, and power pools, in that region. In order to continue to utilize that specific expertise within the regions, while recognizing that UFLS programs can be successfully coordinated if they are designed to achieve the same system performance characteristics, the standard drafting team considered that the most appropriate entity to develop the UFLS programs based on function is the Planning Coordinator.

Therefore, the second draft of the proposed standard required that all Planning Coordinators within a Region work together as a group to develop the UFLS program for that Region that conforms to the performance characteristics contained in the proposed continent-wide standard and that the continent-wide standard would not specify how the regional programs are to be developed.

During the second posting conducted in April 2009 through May 2009, the standard drafting team thus assigned applicability to “groups” of Planning Coordinators rather than individual Planning Coordinators. The concept of groups of Planning Coordinators was intended to replicate historical practice where groups of entities within Regions were formed for the purpose of developing coordinated UFLS programs.

The applicability section of the second draft of the standard also included “Distribution Providers” and “Transmission Owners with end-use Load connected to their Facilities where such end use load is not part of a Distribution Provider’s load.” This second draft language reflected the standard drafting team’s intent to establish the applicable entities in the UFLS standard to be those entities that provide UFLS capability. However, as a result of comments submitted in the second posting and further discussions within the standard drafting team, the standard drafting team concluded that the identification of the applicable entities was not an entirely accurate reflection of the participating registered entities. Therefore, the applicability section was modified in the third draft of the standard. The standard drafting team proposed that “UFLS entities” within the standard shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include Transmission Owners and/or Distribution

Providers. The concept to define a group of entities within the body of the standard in the Applicability section currently exists in other Reliability Standards such as CIP-002-1.

In addition to Planning Coordinator and UFLS entity applicability, the standard drafting team included Transmission Owners that own certain Elements identified in the UFLS program established by the Planning Coordinators in the applicability section of the standard.

Transmission Owners would be subject to the standard if they have been identified by the group of Planning Coordinators as having the obligation to switch certain Elements as part of the UFLS program.

In the second posting, many of the requirements were assigned to the groups of Planning Coordinators. These groups were to consist of all the Planning Coordinators within each of the Regional Entity areas. In the third draft of PRC-006-1, the standard drafting team revised these assignments to replace the groups with individual Planning Coordinators due to difficulties involved with enforcing responsibilities assigned to groups that do not currently exist.

Additionally in the third draft, the standard drafting team revised the under and overfrequency performance characteristics to refer to under and overfrequency curves (as Attachments 1 and 2) rather than discrete points as in former drafts. The curves provide more uniform coordination with generator under and overfrequency tripping requirements being proposed in PRC-024-1. In addition, the team extended the underfrequency performance characteristic curve to 60 seconds from the previous 30 second duration. The team agreed to extend the underfrequency performance characteristic to permit the Midwest Reliability Organization Regional Entity to avoid having to specify a variance to cover instances where there may be slower recovery of frequency. The standard drafting team concluded that recovery of frequency within 60 seconds, though somewhat less stringent than requiring recovery within

30 seconds, remains acceptable for reliability and for coordination with generator underfrequency tripping. The standard drafting team similarly substituted the discrete points used in former drafts, for identifying which generator trip settings need to be included in the assessments of UFLS program design, with curves. These curves are shown on the same graphs as the performance characteristic curves (in Attachments 1 and 2) and are the same curves as are proposed in PRC-024-1 for generator under and overfrequency tripping, thus ensuring explicit coordination between UFLS and generator tripping.

Also in the third draft, due to the assignment of requirements to individual Planning Coordinators, the standard drafting team modified the approach for ensuring coordination within and between regions and for selecting islands that overlap adjacent regions within an interconnection.

The standard drafting team modified the approach for ensuring coordination with a region by revising the standard to require that each Regional Entity area be designated as an island for UFLS program design assessment purposes. While the individual Planning Coordinator UFLS program designs could be different, this amendment preserves coordination at the regional level.

The standard drafting team also modified the approach for ensuring coordination between regions. The drafting team deleted the requirement that involved the development of procedures for coordination between groups of Planning Coordinators in neighboring regions in selecting interregional islands (PRC-006-2, Requirement R4). This requirement was replaced with a new requirement that allows Planning Coordinators to select islands including interconnected portions of the bulk electric system in adjacent Planning Coordinator areas and Regional Entity areas, without the need for coordinating this selection with Planning Coordinators in neighboring regions. While concurrence is not required for selecting islands, the Planning Coordinators are

required to reach concurrence on the UFLS assessments for any islands identified by any Planning Coordinator that encompass more than one Planning Coordinator area.

Some commenters noted that switching of certain transmission facilities is sometimes necessary to be carried out as part of a UFLS program design. The standard drafting team agreed and added Requirement R10 in the third draft which requires Transmission Owners to provide automatic switching of Elements in accordance with the UFLS program design should a Planning Coordinator determine that such switching is a necessary part of the UFLS program design.

The standard drafting team added requirements in the third draft to assess the performance of UFLS programs “within one year of an actuation of UFLS resulting in a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program” (Requirement R11). Requirement R12 required the Planning Coordinator, in whose islanding event assessment (determined in Requirement R11) UFLS program deficiencies are identified, to conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation.

Requirement R13 required the Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, to reach concurrence with the other affected Planning Coordinators on the event assessment results before event assessment completion. In earlier drafts of the proposed standard, event analysis was left to be covered by the NERC Rules of Procedure. However, the drafting team determined that including a requirement in this standard for UFLS event analysis is a more appropriate mapping of PRC-009-0 Requirement R1 which will be replaced by this standard, PRC-006-1.

During the posting timeframe, NPCC identified the need for a variance to the standard for the Québec Interconnection within NPCC. Due to the physical characteristics of the Québec system, the UFLS program in Québec arrests frequency at a lower threshold and permits higher frequency overshoot than allowed in the proposed standard. In response to this request for a variance, the team developed the variance to Requirement R3 Subrequirements 3.1 and 3.2 and Requirement R4 Subrequirements 4.1 through 4.6. The variance to these requirements reference separate underfrequency and overfrequency curves included as attachment 1A to the standard.

Finally, during the second posting, several commenters noted that certain requirements in the existing EOP-003-1 standard conflict with or are redundant with the requirements being proposed in PRC-006-1. The team agreed with these commenters and felt that if left unaddressed, the redundancies and conflicts could result in compliance issues in the future. As a result, the team submitted a request to supplement the existing SAR for Project 2007-01 to include a revision to EOP-003-1 in order to exclude those requirements related to automatic underfrequency load shedding since PRC-006-1 will contain these. The Standards Committee approved this action, and the team moved forward with revising the existing EOP-003-1 requirements. The team presented these modifications to the EOP-003-1 requirements in the third posting of the standard. Two other drafting teams are already in place to review the other aspects of EOP-003 as part of Project 2009-02—Real-time Tools and Project 2009-03 — Emergency Operations.

The proposed standard PRC-006-1 was posted a third time in June 2010 through July 2010 along with a first revision of EOP-003-2. Following this posting of PRC-006-1 and EOP-003-2, the standard drafting team made several conforming changes as a result of industry comments received. The fourth version of the proposed standard addresses a coordination issue

over which many commenters expressed concern. These commenters objected to the requirement for Planning Coordinators to reach concurrence with each other in R5 and R13 thus making one entity's compliance dependent on another entity. Some commenters suggested that the Reliability Assurer be assigned responsibility for coordinating UFLS activities and for obtaining concurrence among Planning Coordinators and other entities involved in UFLS planning and implementation. In the third version of the standard, Requirement R5 and R13 required concurrence between Planning Coordinators if an island encompassed more than one Planning Coordinator area. Instead of assigning responsibility to the Reliability Assurer, the standard drafting team revised Requirements R5 and R13 to define a set of actions that are measureable and that will demonstrate that Planning Coordinators worked together should an island span more than one Planning Coordinator area. The standard drafting team reaffirmed that the Planning Coordinator is the appropriate entity to identify islands, design UFLS programs, maintain UFLS data, and conduct assessments on UFLS program performance based on the definition of the Planning Coordinator in the Functional Model Version 5. Requirement R14 was added to provide a peer process by requiring the Planning Coordinators to respond to comments of Distribution Providers and Transmission Owners about the UFLS program design and implementation schedule.

Commenters expressed confusion over draft 3 of PRC-006-1 having Transmission Owners as possible UFLS Entities, but also separated out as Transmission Owners for Requirement R10 and suggested merging Requirements R9 and R10. The standard drafting team clarified that Requirement R9 pertains to automatic tripping of load and may be performed by either the Distribution Provider or the Transmission Operator, and Requirement R10 pertains to switching of devices to control over-voltage that could occur as a result of underfrequency load

shedding. It is possible that the Transmission Owners to which R10 applies may not have any responsibility for automatic tripping of load. Therefore, the team decided not to merge the two requirements.

Many commenters indicated that Generator Owners should be included in the applicability of the standard. Some suggested including a data requirement in PRC-006-1 that requires the Generator Owners to submit the necessary data for the purposes of the Requirement R4 UFLS design assessments. However, because such a data requirement already is proposed in PRC-024, the team clarified in the effective date of the standard that the parts of the requirement related to generators will not be effective until one year after PRC-024 is approved and effective. Adding such a data requirement to PRC-006 would be redundant, add unnecessary complexity, and possibly cause potential double violations of the standards.

A pre-ballot review of the PRC-006-1 and EOP-003-2 standards was conducted from June 11, 2010 through July 2, 2010 and an initial ballot and non-binding VRF/VSL poll was conducted from July 8, 2010 through July 17, 2010. The proposed standards and compliance elements did not receive weighted segment vote approval. The standard drafting team subsequently made substantive changes to the standard in preparation for a second ballot as permitted by the Standards Committee in order to address the comments received in the pre-ballot review and initial ballot. The changes made to PRC-006-1 at that time included modifications to the coordination requirements, Requirement R5 and Requirement R13, to remove the requirement for Planning Coordinators to achieve concurrence, the addition of R14 peer review of the UFLS program design and implementation schedule by UFLS entities, modifications to the implementation plan, and other clarifying changes to the standard requirements. The standard drafting team made minor clarifying changes to EOP-003-2 to



address industry comments that the standard should clearly state that some of the requirements exclude underfrequency load shedding and only address manual load shedding and under-voltage load shedding. A second ballot was conducted from July 24, 2010 through August 3, 2010.

The proposed standards and compliance elements did not receive weighted segment vote approval during the second ballot. Comments received during the second ballot expressed confusion over the actual application of the curves in the Attachment to the standard. Several commenters indicated that the graphical representation of the frequency-time curves alone allows plenty of margin for mis-interpretation of the curves' data points. They suggested that a tabulation of the plotted curves break points should be clearly displayed (in conjunction with the graphical curve representation) in a table immediately below each frequency-time curve to further clarify the under and overfrequency performance characteristic curve data points. The standard drafting team agreed with these commenters and modified the Attachments accordingly. The standard drafting team also clarified that the curves are solely for checking the frequency trajectories of simulations and not for setting UFLS relays.

Several commenters again expressed concern that the Applicability section of the standard, as proposed, excludes generators; however, Requirement R4 requires Planning Coordinators to model generator specific information. The suggestion to include the Generator Owners in the proposed standard would be problematic because Generator Owner data requirements already are proposed in the PRC-024-1 draft and are expected to remain in that proposed standard. The standard drafting team clarified in the effective date of PRC-006-1 that the sub-parts related to modeling of generator trip settings will not be effective until PRC-024 is approved and effective. Adding a Generator Owner data requirement to PRC-006 would be redundant and cause double jeopardy concerns. It is the case that some standards are dependent

on data requirements found in other standards. For example, the data necessary to comply with TPL standards is required under MOD standards

Many entities located in the Western Interconnection expressed concern that there was still a fundamental problem with the standard in that it did not specifically require the Planning Coordinators (PC) within an Interconnection to coordinate their plans among themselves. The standard drafting team worked with WECC to develop a proposed Variance to the continent-wide standard applicable to the Western Interconnection entities that addresses these concerns.

The standard drafting team made minor conforming changes to EOP-003-2 as requested by some commenters to further clarify that the standard excludes automatic underfrequency load shedding.

A successive ballot was conducted on September 24, 2010 through October 4, 2010. The proposed standards received an 81.72% weighted segment vote approval and achieved an 85.71% quorum. For the non-binding poll of VRFs and VSLs, 84% of those who registered to participate provided an opinion; 68% of those who provided an opinion indicated support for the VRFs and VSLs that were proposed. Since at least one negative ballot included a comment, these results were not final and a final recirculation ballot was conducted. The recirculation ballot was conducted on October 18, 2010 through October 28, 2010. The proposed standards received an 84.67% weighted segment vote approval and achieved an 89.84% quorum. As a result, the ballot pool approved PRC-006-1 – Automatic Underfrequency Load Shedding and approved EOP-003-2 – Load Shedding Plans and the associated implementation plan; and approved retirement of the following four standards:

- § PRC-006-0 – Development and Documentation of Regional UFLS Programs
- § PRC-007-0 – Assuring Consistency of Entity Underfrequency Load Shedding Programs

§ PRC-009-0 – Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event

§ EOP-003-1 – Load Shedding Plans

## VII. CONCLUSION

For the reasons stated above, NERC requests approval of two proposed Reliability Standards, EOP-003-2 and PRC-006-1 as set out in **Exhibit A**. NERC also requests that the implementation plans, as also set forth in **Exhibit B**, be approved as part of this filing and that the PRC-006-0, PRC-007-0, PRC-009-0, and EOP-003-1 standards be retired concurrent with implementation of EOP-003-2 and PRC-006-1. NERC requests that approvals be made effective in accordance with the effective date provisions set forth in the proposed Reliability Standards.

Respectfully submitted,

Gerald W. Cauley  
President and Chief Executive Officer  
David N. Cook  
Vice President and General Counsel  
North American Electric Reliability Corporation  
116-390 Village Boulevard  
Princeton, NJ 08540-5721  
(609) 452-8060  
(609) 452-9550 – facsimile  
[david.cook@nerc.net](mailto:david.cook@nerc.net)

/s/ Holly A. Hawkins  
Holly A. Hawkins  
Assistant General Counsel for Standards  
and Critical Infrastructure Protection  
Andrew M. Dressel  
Attorney  
North American Electric Reliability  
Corporation  
1120 G Street, N.W.  
Suite 990  
Washington, D.C. 20005-3801  
(202) 393-3998  
(202) 393-3955 – facsimile  
[holly.hawkins@nerc.net](mailto:holly.hawkins@nerc.net)  
[Andrew.dressel@nerc.net](mailto:Andrew.dressel@nerc.net)

## **Exhibits A - F**

(Available on the NERC Website at

[http://www.nerc.com/fileUploads/File/Filings/Attachments\\_PRC-006-1\\_EOP-003-2.pdf](http://www.nerc.com/fileUploads/File/Filings/Attachments_PRC-006-1_EOP-003-2.pdf))