

**Exhibit A**

**Proposed Reliability Standard PRC-006-2**

## A. Introduction

1. **Title:** Automatic Underfrequency Load Shedding
2. **Number:** PRC-006-2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. **Effective Date:**

This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

## B. Requirements and Measures

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
  - 2.2.** 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, and
  - 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
  - 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
  - Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
  - Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.
- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.
- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
  - 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
  - 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA

(gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.

- 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.
- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per

Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. *[VRF: High][Time Horizon: Long-term Planning]*
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.
- R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*
- M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.
- R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

**R13.** Each 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, shall 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 following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following [*VRF: Lower*][*Time Horizon: Long-term Planning*]:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

**R15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [*VRF: High*][*Time Horizon: Long-term Planning*]

**15.1.** For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

**15.2.** For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

**M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.



## C. Compliance

### 1. Compliance Monitoring Process

#### 1.1. Compliance Enforcement Authority

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

#### 1.2. Evidence Retention

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, R14, and R15, Measures M1, M2, M3, M4, M5, M12, M14, and M15 as well as any evidence necessary to show compliance since the last compliance audit.
- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year’s UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

**1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

**1.4. Additional Compliance Information**

None

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to</p>	<p>The Planning Coordinator identified an island(s) to serve</p>	<p>The Planning Coordinator identified an island(s) to serve</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		<p>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.</p>	<p>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.</p>	<p>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.</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.</p>
<p><b>R3</b></p>	<p>N/A</p>	<p>The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = <math>[(\text{load} - \text{actual generation output}) / (\text{load})]</math>, of up to 25 percent within the identified island(s), 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.</p>	<p>The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = <math>[(\text{load} - \text{actual generation output}) / (\text{load})]</math>, of up to 25 percent within the identified island(s), 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.</p>	<p>The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = <math>[(\text{load} - \text{actual generation output}) / (\text{load})]</math>, of up to 25 percent within the identified island(s), but failed to meet all the performance characteristic in Requirement R3, Parts 3.1, 3.2, and 3.3 in simulations of underfrequency conditions.</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				including notification of and a schedule for implementation by UFLS entities within its area
<b>R4</b>	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.	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.	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.	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 items as specified in Requirement R4, Parts 4.1 through 4.7.  OR  The Planning Coordinator failed to conduct and document a UFLS 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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R5</b>	N/A	N/A	N/A	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>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 60 calendar days following the request.  OR

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				The Planning Coordinator failed to provide its UFLS database to other Planning Coordinators.
<b>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) 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.	<p>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.</p> <p>OR</p> <p>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.</p>	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.	<p>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.</p> <p>OR</p> <p>The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.</p>
<b>R9</b>	The UFLS entity provided less than 100% but more than (and including) 95% of automatic tripping of Load in accordance with the UFLS	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	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	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for implementation,

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	program design and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.
<b>R11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program,



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	<p>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.</p>	<p>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.</p>	<p>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 an 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>	<p>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 an 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 an 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</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				as specified in Requirement R11, Parts 11.1 and 11.2.
<b>R12</b>	N/A	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.	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.	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>R13</b>	N/A	N/A	N/A	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>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>
<b>R14</b>	N/A	N/A	N/A	<p>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>R15</b>	N/A	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		<p>R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</p>	<p>R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</p>	<p>R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>OR</p> <p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</p>

## D. Regional Variances

### D.A. Regional Variance for the Quebec Interconnection

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

- D.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*
- D.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- D.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- D.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
- DA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES
- DA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES
- DA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.
- M.D.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement D.A.3 Parts D.A.3.1 through DA3.3.

- D.A.4.** Each Planning Coordinator shall 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 D.A.3 for each island identified in Requirement R2. The simulation shall model each of the following; *[VRF: High][Time Horizon: Long-term Planning]*
- D.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1A, and
  - D.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 - Attachment 1A, and
  - D.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.
- M.D.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement D.A.4 Parts D.A.4.1 through D.A.4.3.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

D#	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>DA3</b>	N/A	The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts D.A.3.1, D.A.3.2, or D.A.3.3 in simulations of underfrequency conditions	The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts D.A.3.1, D.A.3.2, or D.A.3.3 in simulations of underfrequency conditions	The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts D.A.3.1, D.A.3.2, and D.A.3.3 in simulations of underfrequency conditions  OR  The Planning Coordinator failed to develop a UFLS program.
<b>DA4</b>	N/A	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.A.3 but simulation failed to include one (1) of the items as specified in Parts D.A.4.1, D.A.4.2 or D.A.4.3.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D3 but simulation failed to include two (2) of the items as specified in Parts D.A.4.1, D.A.4.2 or D.A.4.3.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D3 but simulation failed to include all of the items as specified in Parts D.A.4.1, D.A.4.2 and D.A.4.3.  OR

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D#	Lower VSL	Moderate VSL	High VSL	Severe VSL
				The Planning Coordinator failed to conduct and document a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.A.3



**D.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**D.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.D.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement D.B.1.

**D.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per D.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**D.B.2.1.** Those islands selected by applying the criteria in Requirement D.B.1, and

**D.B.2.2.** 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.

**M.D.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per D.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement D.B.2 Parts D.B.2.1 and D.B.2.2.

**D.B.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**D.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

- D.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- D.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
  - D.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
  - D.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
  - D.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.
- M.D.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement D.B.3 Parts D.B.3.1 through D.B.3.3.
- D.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
  - D.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - D.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - D.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation

above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.

- D.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
- D.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
- D.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
- D.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.D.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement D.B.4 Parts D.B.4.1 through D.B.4.7.

**D.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**D.B.11.1.** The performance of the UFLS equipment,

**D.B.11.2** The effectiveness of the UFLS program

**M.D.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement D.B.11.

- D.B.12.** Each Planning Coordinator, in whose islanding event assessment (per D.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. [*VRF: Medium*][*Time Horizon: Operations Assessment*]
- M.D.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements D.B.12 and D.B.4 if UFLS program deficiencies are identified in D.B.11.

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>D.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>D.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement D.B.2, Parts D.B.2.1 or D.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement D.B.2, Parts D.B.2.1 or D.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>D.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 D.B.3, Parts D.B.3.1, D.B.3.2, or D.B.3.3 in</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 D.B.3, Parts D.B.3.1, D.B.3.2, or D.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement D.B.3, Parts D.B.3.1, D.B.3.2, and D.B.3.3 in</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		simulations of underfrequency conditions		simulations of underfrequency conditions  OR The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.
<b>D.B.4</b>	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2 but the simulation failed to include one (1) of the items as specified in Requirement	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2 but the simulation failed to include two (2) of the items as specified in	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2 but the simulation failed to include three (3) of the items as specified in	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2 but the simulation failed to include four (4) or more of the items as

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	D.B.4, Parts D.B.4.1 through D.B.4.7.	Requirement D.B.4, Parts D.B.4.1 through D.B.4.7.	Requirement D.B.4, Parts D.B.4.1 through D.B.4.7.	<p>specified in Requirement D.B.4, Parts D.B.4.1 through D.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement D.B.3 for each island identified in Requirement D.B.2</p>
<b>D.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and



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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>same islanding event and evaluated the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.</p>	<p>evaluated the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.</p>	<p>evaluated the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.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 an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement D.B.11, Parts D.B.11.1 or D.B.11.2.</p>	<p>evaluated the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.11.2 within a time greater than 15 months of actuation.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented</p>

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as specified in Requirement D.B.11, Parts D.B.11.1 and D.B.11.2.</p>
<b>D.B.12</b>	N/A	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement D.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.</p>	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement D.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.</p>	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement D.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement D.B.11, failed to participate in</p>

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies

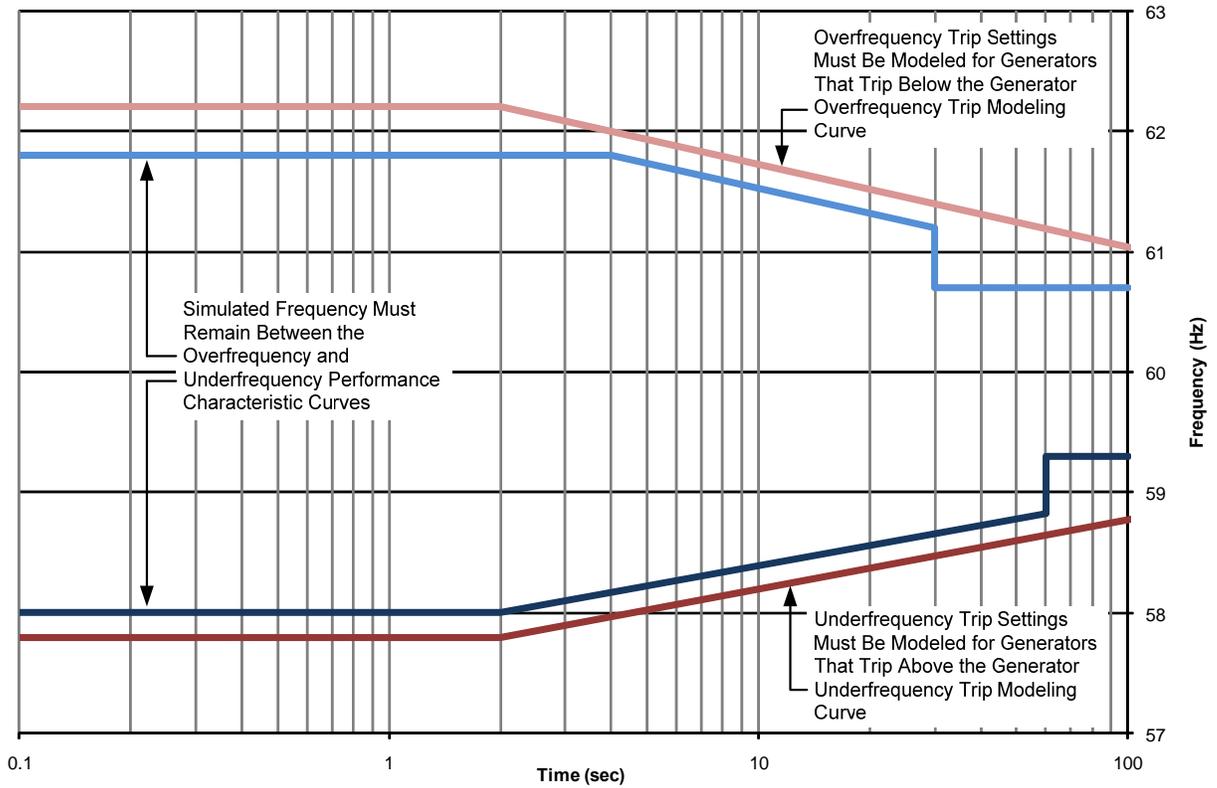
**E. Associated Documents**

**Version History**

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	November 13, 2014	Adopted by the Board of Trustees	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.  Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.

PRC-006-2 – Attachment 1

Underfrequency Load Shedding Program  
 Design Performance and Modeling Curves for  
 Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

Curve Definitions

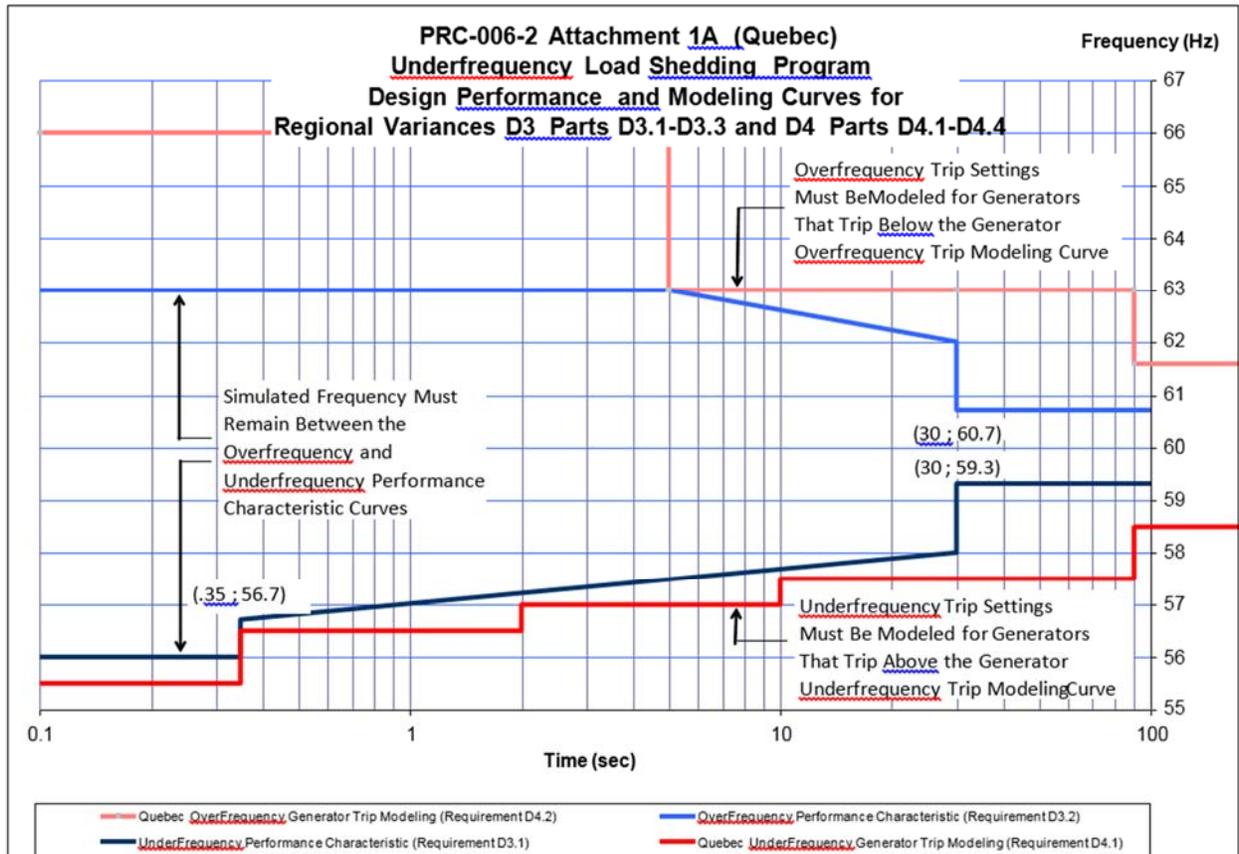
Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic
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## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575\log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575\log(t) + 57.83$ Hz	$f = 59.3$ Hz



### **Rationale:**

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from the rationale text boxes was moved to this section.

### **Rationale for R9:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

### **Rationale for R10:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

### **Rationale for R15:**

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.



## A. Introduction

1. **Title:** Automatic Underfrequency Load Shedding
2. **Number:** PRC-006-~~1~~2
3. **Purpose:** 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.
4. **Applicability:**
  - ~~1.1.4.1.~~ 1.1.4.1. Planning Coordinators
  - ~~1.2.4.2.~~ 1.2.4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. ~~4.3~~—Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. ~~(Proposed)~~ **Effective Date:**
  - ~~1.3.~~ This standard, ~~with the exception of Requirement R4, Parts 4.1 through 4.6,~~ is effective on the first day of the first calendar quarter ~~one year~~six months after the date that the standard is approved by an applicable regulatory approvals.
  - ~~1.4.~~ Parts 4.1 through 4.6 of Requirement R4 governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the 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 on the first day of the first calendar quarter after applicable regulatory approvals of PRC-006-1 the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

## B. Requirements and Measures

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
  - 2.2.** 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, and
  - 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-12 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

- 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-12 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
  - Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
  - Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
  - Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.
- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.
- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
  - 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.

- 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.
- 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.
- 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.
- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators

- whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for application implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. *[VRF: High][Time Horizon: Long-term Planning]*
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

- R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*
- M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.
- R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*
- 11.1.**    The performance of the UFLS equipment,
- 11.2.**    The effectiveness of the UFLS program.
- M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.
- R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. *[VRF: Medium][Time Horizon: Operations Assessment]*
- M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.
- R13.** Each 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, shall 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 following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

~~R14. Each Planning Coordinator shall 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 following [VRF: Lower][Time Horizon: Long-term Planning]:~~

~~14.1. UFLS program, including a schedule for implementation~~

~~14.2. UFLS design assessment~~

~~14.3. Format and schedule of UFLS data submittal~~

## ~~G. Measures~~

~~M13. Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.~~

~~M14. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.~~

~~M15. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.~~

- ~~M16. Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.~~
- ~~M17. Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.~~
- ~~M18. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.~~
- ~~M19. Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.~~
- ~~M20. Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.~~
- ~~Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for application per Requirement R9.~~
- ~~Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application per Requirement R10.~~
- ~~M21. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.~~



- M22.** ~~Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.~~
- M23.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.
- R15.** Each Planning Coordinator shall 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 following [VRF: Lower][Time Horizon: Long-term Planning]:
- 15.1. UFLS program, including a schedule for implementation
  - 15.2. UFLS design assessment
  - 15.3. Format and schedule of UFLS data submittal
- M24.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.
- R16.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]
- 16.1. For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.
  - 16.2. For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

**M25.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

## **D.C. Compliance**

### **1. Compliance Monitoring Process**

#### **1.1. Compliance Enforcement Authority**

~~Regional Entity~~

Data As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

#### **1.2. Evidence Retention**

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, ~~and R14,~~ and R15, Measures M1, M2, M3, M4, M5, M12, M14, and ~~M14~~M15 as well as any evidence necessary to show compliance since the last compliance audit.
- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year’s UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.

- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

**1.3. Compliance Monitoring and Assessment Processes:**

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting

~~• Complaint~~

Complaints

**1.4. Additional Compliance Information**

~~Not applicable.~~

None

2. Violation Severity Levels

#	Lower VSL	Moderate VSL	High VSL	Severe VSL
1	N/A	<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</p>	<p>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.</p>	<p>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>

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
		Regional Entity areas, that may form islands.		
2	N/A	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.	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.	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.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
3	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
		<p>within the identified island(s), 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.</p>	<p>within the identified island(s), 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.</p>	<p>island(s), but failed to meet all the performance characteristic in Requirement R3, Parts 3.1, 3.2, and 3.3 in simulations of underfrequency conditions.</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program including notification of and a schedule for implementation by UFLS entities within its area</p>
4	<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</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</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</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 items as specified in</p>

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
	specified in Requirement R4, Parts 4.1 through 4.7.	specified in Requirement R4, Parts 4.1 through 4.7.	specified in Requirement R4, Parts 4.1 through 4.7.	Requirement R4, Parts 4.1 through 4.7.  OR  The Planning Coordinator failed to conduct and document a UFLS 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
5	N/A	N/A	N/A	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.

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
6	N/A	N/A	N/A	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.
7	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.	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.	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.	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.
8	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the	The UFLS entity provided data to its Planning Coordinator(s) more than 10 calendar days but less	The UFLS entity provided data to its Planning Coordinator(s) more than 15 calendar days but less	The UFLS entity provided data to its Planning Coordinator(s) more than 20 calendar days following



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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.</p>	<p>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.</p> <p>OR</p> <p>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.</p>	<p>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.</p>	<p>the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.</p> <p>OR</p> <p>The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.</p>
9	<p>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 <u>application implementation, including any Corrective Action Plan, as</u> determined by</p>	<p>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 <u>application implementation, including any Corrective Action Plan, as</u> determined by</p>	<p>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 <u>application implementation, including any Corrective Action Plan, as</u> determined by</p>	<p>The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for <u>application implementation, including any Corrective Action Plan, as</u> determined by the</p>

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
	the Planning Coordinator(s) area in which it owns assets.	the Planning Coordinator(s) area in which it owns assets.	the Planning Coordinator(s) area in which it owns assets.	Planning Coordinator(s) area in which it owns assets.
10	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 <u>application implementation, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>application implementation, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>application implementation, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>application implementation, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.
11	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	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	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	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

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>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.</p>	<p>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.</p>	<p>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 an 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>	<p>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 an 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 an 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</p>

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
				event actuation but failed to evaluate all of the Parts as specified in Requirement R11, Parts 11.1 and 11.2.
12	N/A	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.	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.	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.
13	N/A	N/A	N/A	The Planning Coordinator, in whose area a BES islanding event

#	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>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>
14	N/A	N/A	N/A	<p>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</p>

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#	Lower VSL	Moderate VSL	High VSL	Severe VSL
				made to the items in Parts 14.1 through 14.3.

<p><u>ER1</u> <u>5</u></p>	<p><u>N/A</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</u></p> <p><u>OR</u></p> <p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</u></p>
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## **D. Regional Variances**

### **ED.A. Regional Variance for the Quebec Interconnection**

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**ED.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]

**ED.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-12 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**ED.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-12 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**ED.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EADA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EADA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EADA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**EM.D.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement D.A.3 Parts D.A.3.1 through DA3.3.

**D.A.4.** Each Planning Coordinator shall 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 **ED.A.3** for each island identified in Requirement R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**ED.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1A, and

**ED.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 - Attachment ~~2A.1A~~, and

**ED.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

~~**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.~~

~~**M.EM.D.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement **ED.A.4** Parts **ED.A.4.1** through **ED.A.4.3**.~~

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<u>D#</u>	Lower VSL	Moderate VSL	High VSL	Severe VSL
<p><del>A3D</del> <del>A3</del></p>	<p>N/A</p>	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts <del>ED</del>.A.3.1, <del>ED</del>.A.3.2, or <del>ED</del>.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts <del>ED</del>.A.3.1, <del>ED</del>.A.3.2, or <del>ED</del>.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts <del>ED</del>.A.3.1, <del>ED</del>.A.3.2, and <del>ED</del>.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<p><del>A4D</del> <del>A4</del></p>	<p>N/A</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement <del>ED</del>.A.3 but simulation failed to include one (1) of the items as</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement <del>E3D3</del> but simulation failed to include two (2) of the items as</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement <del>E3D3</del> but simulation failed to include all of the items as</p>

D#	Lower VSL	Moderate VSL	High VSL	Severe VSL
		specified in Parts <a href="#">E</a> <a href="#">D</a> .A.4.1, <a href="#">E</a> <a href="#">D</a> .A.4.2 or <a href="#">E</a> <a href="#">D</a> .A.4.3.	specified in Parts <a href="#">E</a> <a href="#">D</a> .A.4.1, <a href="#">E</a> <a href="#">D</a> .A.4.2 or <a href="#">E</a> <a href="#">D</a> .A.4.3.	specified in Parts <a href="#">E</a> <a href="#">D</a> .A.4.1, <a href="#">E</a> <a href="#">D</a> .A.4.2 and <a href="#">E</a> <a href="#">D</a> .A.4.3.  OR  The Planning Coordinator failed to conduct and document a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement <a href="#">E</a> <a href="#">D</a> .A.3

**ED.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**ED.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**EM.D.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement D.B.1.

**D.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per **ED.B.1.**) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**ED.B.2.1.** Those islands selected by applying the criteria in Requirement **ED.B.1.**, and

**ED.B.2.2.** 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.

**EBM.D.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per D.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement D.B.2 Parts D.B.2.1 and D.B.2.2.

**D.B.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**ED.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-~~12~~ - Attachment 1,

either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**ED.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-~~12~~ - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**ED.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**ED.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**ED.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**ED.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**EM.D.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement D.B.3 Parts D.B.3.1 through D.B.3.3.

**D.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement **ED.B.3** for each island identified in Requirement **ED.B.2**. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*

**ED.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~12~~ - Attachment 1.

**ED.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly

connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1.

**ED.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-12 - Attachment 1.

**ED.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.

**ED.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.

**ED.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-12 — Attachment 1.

**ED.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**EM.D.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement D.B.4 Parts D.B.4.1 through D.B.4.7.

**D.B.11.** \_\_\_\_\_ Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: [VRF: Medium][Time Horizon: Operations Assessment]

**ED.B.11.1.** The performance of the UFLS equipment, \_\_\_\_\_

**ED.B.11.2** The effectiveness of the UFLS program

**EM.D.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it



participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement D.B.11.

D.B.12. Each Planning Coordinator, in whose islanding event assessment (per ~~E~~D.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. [VRF: Medium][Time Horizon: Operations Assessment]

~~M.E.B.1.~~ Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

~~M.E.B.2.~~ Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

~~M.E.B.3.~~ Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

~~M.E.B.4.~~ Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

~~M.E.B.11.~~ Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

~~M.E.B.12.~~ M.D.B.12. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements ~~E~~D.B.12 and ~~E~~D.B.4 if UFLS program deficiencies are identified in ~~E~~D.B.11.



<u>D</u> #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<u>D.B.1</u>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria but failed to include the consideration of system studies, to select portions of the BES, including interconnected</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		portions of the BES in adjacent Planning Coordinator areas, that may form islands		
D.B.2	N/A	N/A	The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement <del>E</del> D.B.2, Parts <del>E</del> D.B.2.1 or <del>E</del> D.B.2.2	The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement <del>E</del> D.B.2, Parts <del>E</del> D.B.2.1 or <del>E</del> D.B.2.2  OR The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.
D.B.3	N/A	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for

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D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		<p>implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Requirement <u>ED</u>.B.3, Parts <u>ED</u>.B.3.1, <u>ED</u>.B.3.2, or <u>ED</u>.B.3.3 in simulations of underfrequency conditions</p>	<p>implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Requirement <u>ED</u>.B.3, Parts <u>ED</u>.B.3.1, <u>ED</u>.B.3.2, or <u>ED</u>.B.3.3 in simulations of underfrequency conditions</p>	<p>implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement <u>ED</u>.B.3, Parts <u>ED</u>.B.3.1, <u>ED</u>.B.3.2, and <u>ED</u>.B.3.3 in simulations of underfrequency conditions</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<u>D</u> .B.4	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program</p>

Standard PRC-006-12 — Automatic Underfrequency Load Shedding

<u>D</u> #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>program design meets the performance characteristics in Requirement <u>ED</u>.B.3 for each island identified in Requirement <u>ED</u>.B.2 but the simulation failed to include one (1) of the items as specified in Requirement <u>ED</u>.B.4, Parts <u>ED</u>.B.4.1 through <u>ED</u>.B.4.7.</p>	<p>design meets the performance characteristics in Requirement <u>ED</u>.B.3 for each island identified in Requirement <u>ED</u>.B.2 but the simulation failed to include two (2) of the items as specified in Requirement <u>ED</u>.B.4, Parts <u>ED</u>.B.4.1 through <u>ED</u>.B.4.7.</p>	<p>design meets the performance characteristics in Requirement <u>ED</u>.B.3 for each island identified in Requirement <u>ED</u>.B.2 but the simulation failed to include three (3) of the items as specified in Requirement <u>ED</u>.B.4, Parts <u>ED</u>.B.4.1 through <u>ED</u>.B.4.7.</p>	<p>design meets the performance characteristics in Requirement <u>ED</u>.B.3 for each island identified in Requirement <u>ED</u>.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement <u>ED</u>.B.4, Parts <u>ED</u>.B.4.1 through <u>ED</u>.B.4.7.</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The</p> <p>Planning Coordinator failed to participate in and document a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement <u>ED</u>.B.3 for each island identified in Requirement <u>ED</u>.B.2</p>
<u>D</u> .B.11	<p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area a BES islanding event</p>	<p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area a BES islanding event</p>	<p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area a BES islanding event</p>	<p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area a BES islanding event</p>

Standard PRC-006-12 — Automatic Underfrequency Load Shedding

D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement <u>ED</u>.B.11, Parts <u>ED</u>.B.11.1 and <u>ED</u>.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.</p>	<p>resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement <u>ED</u>.B.11, Parts <u>ED</u>.B.11.1 and <u>ED</u>.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.</p>	<p>resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement <u>ED</u>.B.11, Parts <u>ED</u>.B.11.1 and <u>ED</u>.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same</p>	<p>resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement <u>ED</u>.B.11, Parts <u>ED</u>.B.11.1 and <u>ED</u>.B.11.2 within a time greater than 15 months of actuation.</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The</p> <p>Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate</p>

Standard PRC-006-12 — Automatic Underfrequency Load Shedding

D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement <del>ED</del>.B.11, Parts <del>ED</del>.B.11.1 or <del>ED</del>.B.11.2.</p>	<p>the parts as specified in Requirement <del>ED</del>.B.11, Parts <del>ED</del>.B.11.1 and <del>ED</del>.B.11.2.</p> <hr/> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as specified in Requirement <del>ED</del>.B.11, Parts <del>ED</del>.B.11.1 and <del>ED</del>.B.11.2.</p>
<del>D</del> .B.12	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement



Standard PRC-006-12 — Automatic Underfrequency Load Shedding

D #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		<p>ED.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.</p>	<p>ED.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.</p>	<p>ED.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement ED.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies</p>

**E. Associated Documents**

**Version History**

Version	Date	Action	Change Tracking
<u>0</u>	<u>April 1, 2005</u>	<u>Effective Date</u>	<u>New</u>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	

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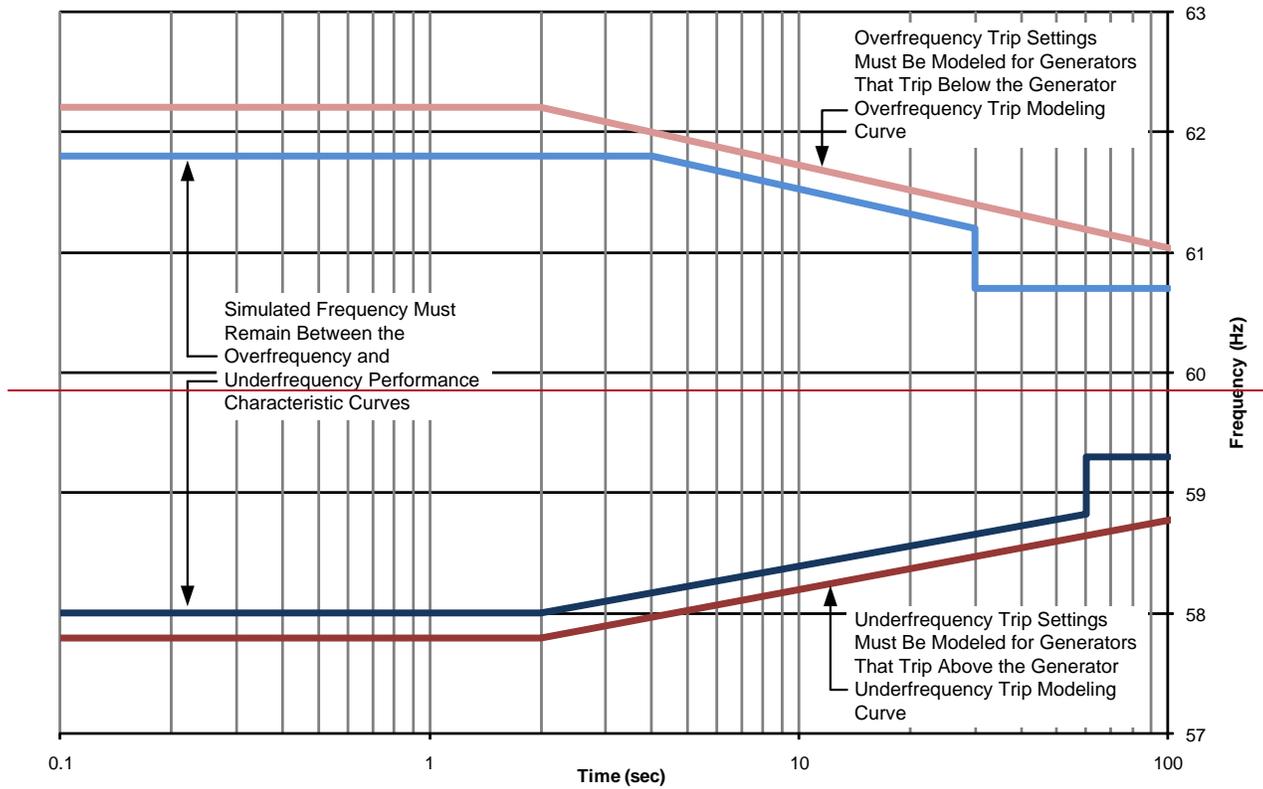
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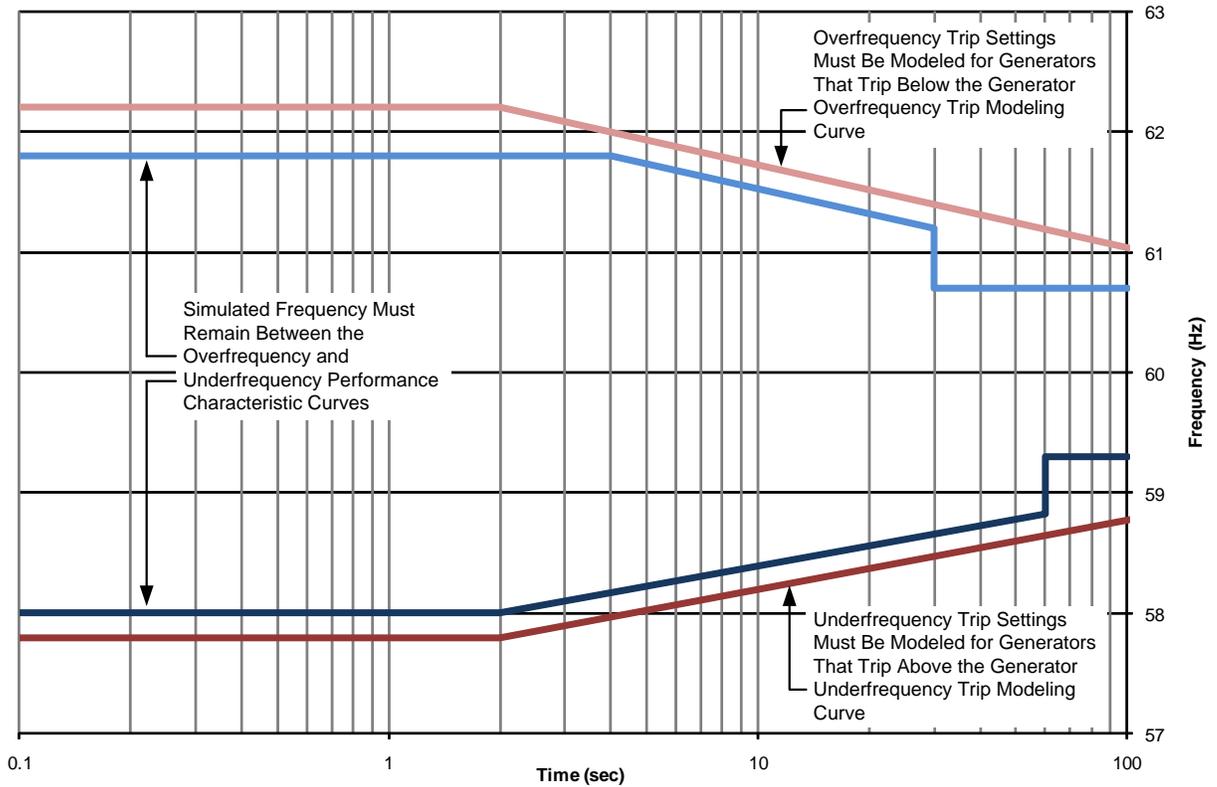
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<u>2</u>	<u>November 13, 2014</u>	<u>Adopted by the Board of Trustees</u>	<u>Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) &amp; Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.</u>  <u>Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.</u>
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**PRC-006-~~1~~2 – Attachment 1**  
**Underfrequency Load Shedding Program**  
**Design Performance and Modeling Curves for**  
**Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6**



- ~~Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)~~
- ~~Overfrequency Performance Characteristic (Requirement R3 Part 3.2)~~
- ~~Underfrequency Performance Characteristic (Requirement R3 Part 3.1)~~
- ~~Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)~~



- [Generator Overfrequency Trip Modeling \(Requirement R4 Parts 4.4-4.6\)](#)
- [Overfrequency Performance Characteristic \(Requirement R3 Part 3.2\)](#)
- [Underfrequency Performance Characteristic \(Requirement R3 Part 3.1\)](#)
- [Generator Underfrequency Trip Modeling \(Requirement R4 Parts 4.1-4.3\)](#)

Curve Definitions

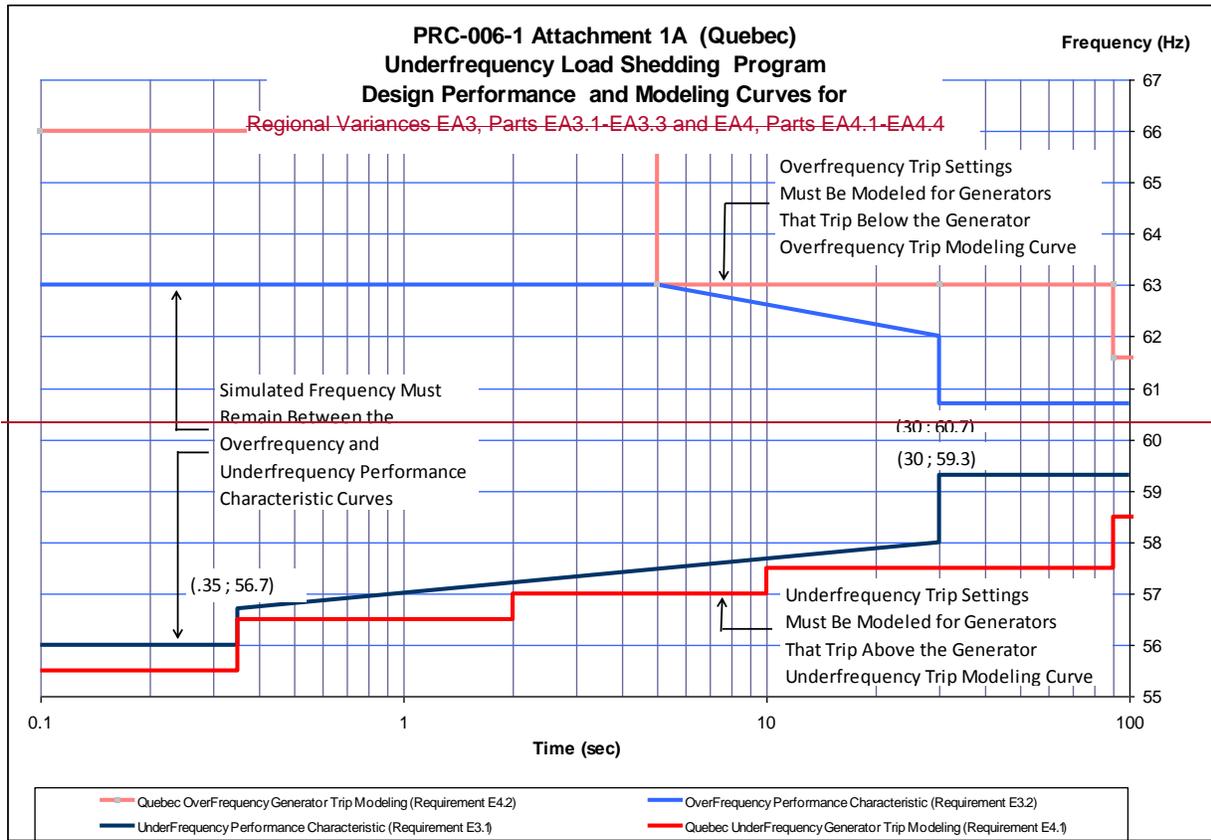
Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

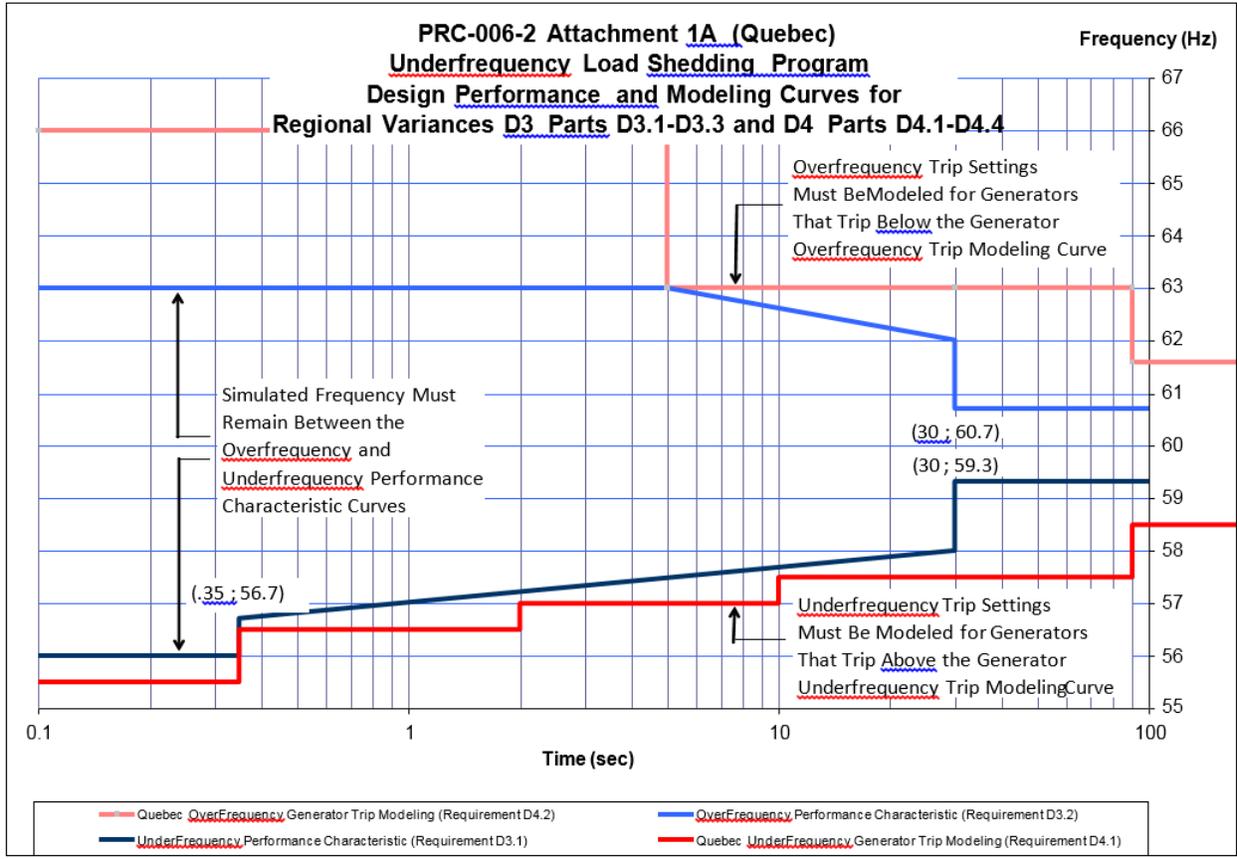
Generator Underfrequency Trip Modeling		Underfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$

## Standard PRC-006-12 — Automatic Underfrequency Load Shedding

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f = 57.8 Hz	f = 0.575log(t) + 57.63 Hz	f = 58.0 Hz	f = 0.575log(t) + 57.83 Hz	f = 59.3 Hz
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**Rationale:**

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from the rationale text boxes was moved to this section.

**Rationale for R9:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**Rationale for R10:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**Rationale for R15:**

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

**Exhibit B**  
**Implementation Plan**

# Implementation Plan

## Project 2008-02: Underfrequency Load Shedding (UFLS)

### Requested Approval

- PRC-006-2: Automatic Underfrequency Load Shedding

### Requested Retirement

- PRC-006-1: Automatic Underfrequency Load Shedding

### Prerequisite Approvals

- None

### Revisions to Defined Terms in the NERC Glossary

- None

### Applicable Entities

- Planning Coordinators
- UFLS entities 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 one or more of the following:
  - Transmission Owners
  - Distribution Providers
- Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators

### Effective Date

This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

### Retirement of Existing PRC-006-1

PRC-006-1 shall be retired at midnight of the day immediately prior to the Effective Date of PRC-006-2.

**Exhibit C**  
**Order No. 672 Criteria**

**Exhibit C**  
**Order No. 672 Criteria**

In Order No. 672,<sup>1</sup> the Commission identified a number of criteria it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors and explains how the proposed Reliability Standard has met or exceeded the criteria:

**1. Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.<sup>2</sup>**

Proposed Reliability Standard PRC-006-2, as compared to PRC-006-1, continues to achieve the specific reliability goal of establishing a framework for developing, designing, assessing and coordinating automatic underfrequency load shedding (“UFLS”) programs. Proposed PRC-006-2 enhances the language of the currently effective version of this Reliability Standard by adding language requiring the applicable entities to implement any corrective actions according to a schedule established by the Planning Coordinator.

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<sup>1</sup> *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, *order on reh’g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>2</sup> Order No. 672 at P 321. The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection.

Order No. 672 at P 324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO’s process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons.

**2. Proposed Reliability Standards must be applicable only to users, owners and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.<sup>3</sup>**

The proposed Reliability Standard applies to Planning Coordinators, UFLS entities responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators (Transmission Owners and Distribution Providers), and Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators. The changes reflected in the proposed Reliability Standard do not change the applicability of the PRC-006-1 Reliability Standard.

The proposed Reliability Standard is clear and unambiguous as to what is required and who is required to comply. The proposed new Requirement R15 clearly specifies that the Planning Coordinator should develop a Corrective Action Plan and a schedule for implementation by the UFLS entities if deficiencies in the UFLS program are identified. In addition, the revised language of Requirements R9 and R10 unambiguously specify that the UFLS entities and Transmission Owners should follow the Corrective Action Plan implementation schedule established by the Planning Coordinator.

**3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.<sup>4</sup>**

The Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) for the proposed Reliability Standard comport with NERC and Commission guidelines related to their

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<sup>3</sup> Order No. 672 at P 322. The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others.

Order No. 672 at P 325. The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability.

<sup>4</sup> Order No. 672 at P 326. The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply.

assignment. The assignments of the severity levels for the VSLs, including the VSL for the new Requirement R15, are consistent with the corresponding Requirement and will ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, and support uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standard includes clear and understandable consequences.

**4. A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.<sup>5</sup>**

The proposed Reliability Standard contains Measures that support the Requirements by clearly identifying what is required and how the Requirements will be measured for compliance. The Measures, listed after the Requirements of the proposed PRC-006-2 Reliability Standard, are unchanged from the currently effective version of the standard, except for the Measures for the new Requirement R15, and the modified R9 and R10. The Measures for these three proposed Requirements are as follows:

**M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.

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<sup>5</sup> Order No. 672 at P 327. There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.

**M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

**5. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently — but do not necessarily have to reflect “best practices” without regard to implementation cost or historical regional infrastructure design.<sup>6</sup>**

The proposed Reliability Standard achieves its reliability goal effectively and efficiently in accordance with Order No. 672. The proposed Reliability Standard continues to employ the same process for establishing and implementing UFLS programs, but clarifies that the applicable entities should implement any Corrective Action Plan according to the schedule established by the Planning Coordinator. This clarification removes any potential ambiguities in the language of the proposed Reliability Standard and promotes efficiency in implementing and monitoring compliance of the Reliability Standard.

**6. Proposed Reliability Standards cannot be “lowest common denominator,” *i.e.*, cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.<sup>7</sup>**

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<sup>6</sup> Order No. 672 at P 328. The proposed Reliability Standard does not necessarily have to reflect the optimal method, or “best practice,” for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently.

<sup>7</sup> Order No. 672 at P 329. The proposed Reliability Standard must not simply reflect a compromise in the ERO’s Reliability Standard development process based on the least effective North American practice — the so-called “lowest common denominator” — if such practice does not adequately protect Bulk-Power System reliability. Although FERC will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability.

Order No. 672 at P 330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a “lowest common denominator” Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it.



The proposed Reliability Standard does not reflect a “lowest common denominator” approach. The changes directly respond to the directive issued by the Commission in Order No. 763.

**7. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.<sup>8</sup>**

The proposed Reliability Standard includes variances for the Western Electricity Coordinating Council and the Quebec Interconnection. These variances remain the same as those included in PRC-006-1, with the exception of minor changes to reflect the updated version number in cross references within each variance.

**8. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.<sup>9</sup>**

Proposed Reliability Standard PRC-006-2 has no undue negative effect on competition and does not unreasonably restrict transmission or generation operation on the Bulk-Power System.

**9. The implementation time for the proposed Reliability Standard is reasonable.<sup>10</sup>**

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<sup>8</sup> Order No. 672 at P 331. A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.

<sup>9</sup> Order No. 672 at P 332. As directed by section 215 of the FPA, FERC itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another.

<sup>10</sup> Order No. 672 at P 333. In considering whether a proposed Reliability Standard is just and reasonable, FERC will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability.

The effective date for the proposed Reliability Standard appropriately balances the urgency to implement the standard against the time needed by those who must comply to develop necessary adjustments to procedures in support of the proposed Reliability Standard. To allow covered Entities adequate and reasonable time to comply with the proposed Reliability Standard, the effective date is the first day of the first calendar quarter six (6) months following the date that the proposed Reliability Standard is approved.

**10. The Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.<sup>11</sup>**

The proposed Reliability Standard was developed in accordance with NERC's Commission-approved, ANSI- accredited processes for developing and approving Reliability Standards. Exhibit G includes a summary of the standard development proceedings, and details the processes followed to develop the Reliability Standard. These processes included, among other things, multiple comment periods, pre-ballot review periods, and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public.

**11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.<sup>12</sup>**

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<sup>11</sup> Order No. 672 at P 334. Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by FERC.

<sup>12</sup> Order No. 672 at P 335. Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard.

NERC has not identified competing public interests regarding the request for approval of the proposed Reliability Standard. No comments were received that indicated the proposed Reliability Standard conflicts with other vital public interests.

**12. Proposed Reliability Standards must consider any other appropriate factors.<sup>13</sup>**

No other factors relevant to whether the proposed Reliability Standard is just and reasonable were identified.

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<sup>13</sup> Order No. 672 at P 323. In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed.

**Exhibit D**

**Consideration of FERC Directive**

# Consideration of FERC Directive

## Project 2008-02: Underfrequency Load Shedding (UFLS)

FERC Directive	Consideration of Directive
<p><b>FERC Order No. 763, Paragraph 48:</b><sup>1</sup></p> <p>In response to the Commission’s concern that Reliability Standard PRC-006-1 does not specify how soon after an event would an entity need to implement corrections in response to any deficiencies identified in the event assessment under Requirement R11 of PRC-006-1, NERC stated in its comments that:</p> <p style="padding-left: 40px;">The amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, as specified in Requirement R9 of PRC-006-1. The time allotted for corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changes in budgeting cycles.</p> <p>Requirement R9 of PRC-006-1 states:</p> <p style="padding-left: 40px;">R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for</p>	<p>Requirement R15 of proposed PRC-006-2 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the Planning Coordinator shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities. A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” The Corrective Action Plan developed by the Planning Coordinator will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the Planning Coordinator as a result of an assessment. The time allotted by the Planning Coordinator for making corrections will depend on the extent of the deficiencies identified. The</p>

<sup>1</sup> *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (May 7, 2012). [[Link to FERC Order No. 763](#)]

FERC Directive	Consideration of Directive
<p>application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. <i>[VRF: High][Time Horizon: Long-term Planning]</i></p> <p>Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard. Within 30 days of the effective date of this Final Rule, NERC is directed to submit a compliance filing indicating how it plans to comply with this directive and a deadline for compliance.</p>	<p>schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changing in budgeting cycles.<sup>2</sup></p> <p>Additionally, for Requirements R9 and R10, the standard drafting team added the “Corrective Action Plan” language to ensure that any Corrective Action Plan developed by the Planning Coordinator under Requirement R15 will be implemented by the UFLS entity and/or Transmission Owner as part of the UFLS program.</p>

<sup>2</sup> See, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (May 7, 2012), citing, *Comments of NERC in Response to Notice of Proposed Rulemaking*, Docket No. RM-11-20-000, at 8 (December 23, 2011).

**Exhibit E**

**UFLS Standard Drafting Team Response to Paragraph 81 and Independent Expert Review Project  
Recommendations for PRC-006-1**

# UFLS Standard Drafting Team Response to Paragraph 81 and Independent Expert Review Project Recommendations for PRC-006-1

## Project 2008-02: Underfrequency Load Shedding (UFLS)

### Part I. Executive Summary

As part of this project, the UFLS standard drafting team (SDT) reviewed five requirements contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81<sup>1</sup> and Independent Expert Review Project (IERP)<sup>2</sup> recommendations. Specifically, the UFLS team reviewed Requirements R6, R7, R8, R10 and R14. For the reasons outlined below, the team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired.

Part II addresses Requirements R7 and R8, which were recommended for retirement as a part of Phase 2 of the Paragraph 81 work. Part III addresses Requirements R6, R10 and R14, which were recommended for retirement by the IERP.

### Part II. Paragraph 81 Recommendations (Requirements R7 and R8)

#### A. PRC-006-1, Requirement R7:

“Each Planning Coordinator shall 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.”

#### Paragraph 81 Recommendation for Requirement R7

The Paragraph 81 team found that Requirement R7 *does* support NERC Reliability Principle No. 3.<sup>3</sup> However, it was recommended as a Phase 2 candidate for retirement because, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.”

#### UFLS Drafting Team Conclusion Regarding Requirement R7

The UFLS drafting team concluded that Requirement R7 should not be retired because it serves a purpose in support of the reliability of the Bulk-Power System (BPS). Before specifically addressing Requirement R7, it is important to outline the entire framework of PRC-006-1, within which R7 is applied. The PRC-006-1 standard establishes common performance characteristics that all UFLS programs must meet. It does

<sup>1</sup> Project 2013-02: Paragraph 81 [[Link to Paragraph 81 project page](#)]

<sup>2</sup> [Link to Independent Expert Review Project Final Report](#)

<sup>3</sup> Reliability Principle No. 3: Information necessary for the planning operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably. [Link to NERC Reliability Principles.](#)



not set mandatory continent-wide UFLS program parameters, such as setting program specific load shedding frequency thresholds, step sizes, and time delays.<sup>4</sup> As outlined by the *Project 2007-1-Underfrequency Load Shedding* drafting team, this is because prescribing specific 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.<sup>5</sup> 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.<sup>6</sup> The *Project 2007-1* 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.<sup>7</sup> In light of these observations, the *Project 2007-1* 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.<sup>8</sup>

Given the approach of establishing common performance characteristics, PRC-006-1 contains requirements to ensure that the Planning Coordinators and UFLS entities support the exchange of information necessary to design and assess performance of UFLS programs. This is achieved through Requirements R6 through R8, which establish requirements to maintain a UFLS database and share data necessary to maintain that database.<sup>9</sup> Under Requirement R6, 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. 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.<sup>10</sup> 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 UFLS database.

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<sup>4</sup> See, *Petition of the North American Electric Reliability Corporation for Approval of Proposed New Reliability Standards and Implementation Plans related to Underfrequency Load-Shedding*, Docket No. RM11-20-000 (March 31, 2011) at 8. (“NERC Petition”)

<sup>5</sup> See, NERC Petition, at 8.

For a full history of Project 2007-1 Underfrequency Load Shedding, click here for the project page: [Link to project page](#)

<sup>6</sup> See, NERC Petition, at 8.

<sup>7</sup> See, NERC Petition, at 24.

<sup>8</sup> See, NERC Petition, at 24.

<sup>9</sup> See, NERC Petition, at 17.

<sup>10</sup> See, NERC Petition, at 17.

As outlined above, because PRC-006-1 does not mandate a continent-wide UFLS program, it is essential that the various PCs coordinate and exchange data regarding their UFLS programs. It is important to point out that the P81 team found that Requirement R7 *does* support a reliability objective, and is based on the reliability principle that the information is necessary for the planning operation of the BPS and should be made available to those entities responsible for reliable system operation.<sup>11</sup> The UFLS SDT agrees. Notably, in reviewing Requirement R7, the P81 team determined that, “there should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters,” *not* that the sharing of data among PCs is unnecessary or fails to support reliability. The requirement simply clarifies what is expected of the PCs and the time frame for action. For these reasons, the UFLS SDT believes that Requirement R7 should not be retired.

**B. PRC-006-1, Requirement R8:**

“Each UFLS entity shall 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.”

**Paragraph 81 Recommendation for Requirement R8**

The P81 team found that Requirement R8 *does* support NERC Reliability Principle No. 3.<sup>12</sup> However, the P81 team identified it as a candidate for Phase 2 retirement because, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.” Additionally, the P81 team noted that Requirement R8 should be applicable to Generator Owners in order to address a reliability gap. Specifically, “[G]enerator Owners need to be required to provide appropriate machine trip points and other data for analysis and coordination done under this standard.”

**UFLS Drafting Team Conclusion Regarding Requirement R8**

The UFLS drafting team concluded that Requirement R8 should not be retired because it serves a purpose in support of the reliability of the BPS. Additionally, the team determined the standard should not be amended to apply to Generator Owners.

Requirement R8 should not be retired

Requirement R8 should not be retired because it serves a purpose in support of reliability. Under Requirement R8, each UFLS entity provides 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.<sup>13</sup> 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. As outlined above, PCs must

<sup>11</sup> See, Reliability Principle No. 3, above.

<sup>12</sup> See, Reliability Principle No. 3, above.

<sup>13</sup> NERC Petition, at 17, 25.

collect data and maintain the UFLS database with the information necessary design and assess performance of UFLS programs. Requirement R8 ensures that the PC has the necessary data to conduct the design and performance assessments. Without Requirement R8, the PCs would not be provided with the UFLS data from the UFLS entities, and thus would not have the data necessary to conduct their design and performance assessments. Also, the SDT notes that the P81 recommendation to revise the applicability to include the Generator Owner contradicts the recommendation to retire Requirement R8. For these reasons, the UFLS SDT team believes Requirement R8 should not be retired.

Requirement R8 should not be revised to add applicability to Generator Owners

Requirement R8 should not be revised to add applicability to Generator Owners because it would create a redundancy, add unnecessary complexity, and possibly cause potential double violations of the standards. As outlined above, PRC-006-1 Requirement R3 establishes common performance characteristics that a PC's UFLS program must be designed to achieve. The performance characteristics specified (in R3.1 and R3.2) were coordinated with the 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 and generator trip settings.<sup>14</sup> Additionally, PRC-024-1 Requirement R4 requires that Generator Owners provide trip settings to the Planning Coordinator or Transmission Planner within 60 calendar days of a written request. For these reasons, the requirement should not be revised to add applicability to Generator Owners.

### Part III. IERP Recommendations (Requirements R6, R10 and R14)

#### A. PRC-006-1, Requirement R6:

“Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning].*”

#### IERP Recommendation for Requirement R6

The IERP recommended Requirement R6 for retirement on the grounds that it is administrative in nature and does not support a reliability objective. The IERP believed that, “[i]t is the actual study that provides for reliability.”

#### UFLS Drafting Team Conclusion Regarding Requirement R6

Requirement R6 should not be retired because it serves a purpose in support of reliability. 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

<sup>14</sup> See, NERC Petition, at 14-15, 70-71, 79-80.

calendar year, with no more than 15 months between maintenance activities. 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 Requirement R11; and, where identified islands include portions of two or more PC areas, the data can be shared with other PCs as needed to conduct an assessment for their respective areas. For these reasons, the UFLS SDT team believes Requirement R6 should not be retired.

**B. PRC-006-1, Requirement R10:**

“Each Transmission Owner shall 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. [*VRF: High*][*Time Horizon: Long-term Planning*]”

**IERP Recommendation for Requirement R10**

The IERP recommended Requirement R10 for retirement on the grounds that it is more appropriate as a Guideline, because accountability is met under the TPL and VAR Reliability Standards. However, the IERP found that Requirement R10 *does* support Reliability Principle Nos. 1 and 4.<sup>15</sup>

**UFLS Drafting Team Conclusion Regarding Requirement R10**

The UFLS drafting team concluded that Requirement R10 should not be retired because it would create a gap causing a risk to reliability. Requirement R10 requires that each Transmission Owner provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control overvoltage 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.<sup>16</sup> Requirement R10 was added to address control of overvoltage conditions during underfrequency events (*e.g.*, the Western Interconnection has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event).

<sup>15</sup> [Link to NERC Reliability Principles](#)

Reliability Principle No. 1: Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Reliability Principle No. 4: Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

<sup>16</sup> NERC Petition, at 17-18.

The IERP recommended retirement on the basis that accountability for controlling voltage is met under the TPL and VAR standards; however, the IERP did not point to any specific standard or requirement in support of that position. The UFLS SDT reviewed the existing TPL and VAR standards and determined that the specific actions required under Requirement R10 – specifically the switching of devices by Transmission Owners – is not covered elsewhere in the TPL or VAR standards. While the TPL and VAR families of standards address similar issues, Transmission Owners are not included as applicable entities under either family of standards, and Transmission Owners therefore are not compelled to provide automatic switching on their equipment or adherence to a schedule of application determined by the Planning Coordinator. For these reasons, the UFLS SDT team believes Requirement R10 should not be retired.

### C. PRC-006-1, Requirement R14

“Each Planning Coordinator shall 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 following [VRF: Lower][Time Horizon: Long-term Planning]:

- 14.1. UFLS program, including a schedule for implementation
- 14.2. UFLS design assessment
- 14.3. Format and schedule of UFLS data submittal”

### IERP Recommendation for Requirement R14

The IERP recommended Requirement R14 for retirement on the grounds that it is administrative in nature and does not support a reliability objective.

### UFLS Drafting Team Conclusion Regarding Requirement R14

The UFLS drafting team concluded that Requirement R14 should not be retired because it serves a purpose in support of reliability. Requirement R14 requires that the Planning Coordinator 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, including a schedule for implementation (R14.1) and the UFLS design assessment (R14.2). In its written response, the PC is to indicate whether changes will be made to the UFLS program as a result of the comments; or, if no changes will be made, the reason why. This requirement was added by the *Project 2007-1* drafting team 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.<sup>17</sup> The *Project 2007-1* drafting team considered the role of the Planning Coordinator and the coordination activities that the Planning Coordinator performs to meet its obligations. The team

<sup>17</sup> NERC Petition, at 19-20, 78.

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 because these entities may provide information based on practical implementation experience that improves the overall effectiveness of the UFLS program. Additionally, Requirement R14 provides 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).<sup>18</sup> For these reasons, the UFLS SDT team believes Requirement R14 should not be retired.

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<sup>18</sup> NERC Petition, at 27.

**Exhibit F**

**Analysis of Violation Risk Factors and Violation Severity Levels**

# Violation Risk Factor and Violation Severity Level Justifications for Requirement R15 of PRC-006-2 Project 2008-02: Underfrequency Load Shedding (UFLS)

This document provides the Standard Drafting Team (SDT) justification for assignment of the violation risk factor (VRF) and violation severity levels (VSLs) for the proposed PRC-006-2 Requirement R15.<sup>1</sup>

For all NERC Reliability Standards, each requirement is assigned a VRF and a set of one or more VSL. These elements support the determination of an initial value range for the Base Penalty Amount regarding violations of requirements in FERC-approved Reliability Standards, as defined in the Electric Reliability Organization (ERO) Sanction Guidelines.

## **Part I. Violation Risk Factor (VRF) Justification**

The SDT applied the following NERC criteria and FERC Guidelines when proposing the VRF for Requirement R15 of PRC-006-2:

### **NERC VRF Criteria**

**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.

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<sup>1</sup> The VRFs for Requirements R9 and R10 were not changed. The VSLs for Requirements R9 and R10 were updated to reflect the revisions to the language of the requirement. Specifically, the “Corrective Action Plan” language was added; also, the word “application” was replaced with “implementation” to achieve consistency of terminology throughout the standard. Otherwise, the VSLs were not changed.



**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.

## **FERC Violation Risk Factor (VRF) Guidelines**

### **FERC VRF 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) where violations could severely affect the reliability of the Bulk-Power System:

- 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.

**FERC VRF Guideline (2) – Consistency within a Reliability Standard**

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

**FERC VRF 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.

**FERC VRF 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.

**FERC VRF 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.

**Proposed VRF for Requirement R15: High**

VRF Justification for PRC-006-2 Requirement R15	
Proposed VRF for Requirement R15	High
Discussion of NERC VRF Criteria	<p>A VRF of High is consistent with the NERC VRF Guidelines. Failure to develop a Corrective Action Plan to address identified deficiencies in the UFLS program could place the Bulk Electric System at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p> <p>Requirement R15 applies to a circumstance in which a PC has conducted a design assessment (under Requirement R4, R5 or R12) and determined that its UFLS program fails to meet the performance characteristics mandated by Requirement R3. In brief, Requirement R3 requires that each PC develop a UFLS program for UFLS entities within its area that meets certain predefined performance characteristics in simulations of underfrequency conditions resulting from an imbalance of up to 25 percent within the identified island. Requirement R3 also requires the PC to develop a schedule for implementation by the UFLS entities. Requirement R3 is assigned a High VRF because if violated, it could directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure, and could hinder restoration to a normal condition.<sup>2</sup></p> <p>Under Requirement R15, if the PC identifies that the UFLS program is deficient and fails to meet the mandatory performance characteristics identified in Requirement R3, the PC must</p>

<sup>2</sup> See, *Petition of the North American Electric Reliability Corporation for Approval of Proposed New Reliability Standards and Implementation Plans related to Underfrequency Load-Shedding*, Docket No. RM11-20-000 (March 31, 2011) (“NERC Petition”).

	<p>develop a Corrective Action Plan and schedule for implementation by the UFLS entities. The Corrective Action Plan will provide a list of actions and an associated timetable for implementation to remedy the specific problem or deficiency that was identified in the UFLS program.</p> <p>Requirement R15 only applies when a UFLS program fails to meet the performance characteristics identified in Requirement R3. Because the Corrective Action Plan required under Requirement R15 is developed as a result of a deficient UFLS program, and for the purpose of implementing corrective action to remedy the identified deficiency, it should have the same violation risk factor assignment as the requirement for the Planning Coordinator to develop a UFLS program that meets the specified performance characteristics. Therefore, because Requirement R3 has a High VRF, Requirement R15 should also be assigned a High VRF.</p>
<p>Discussion of FERC VRF Guideline 1: Consistency with Blackout Report:</p>	<p>Not applicable to this requirement.</p>
<p>Discussion of FERC VRF Guideline 2: Consistency within a Reliability Standard</p>	<p>There is no inconsistency between sub-Requirement and main Requirement VRF assignments because NERC no longer assigns VRFs to sub-Requirements in Reliability Standards.</p>
<p>Discussion of FERC VRF Guideline 3: Consistency among Reliability Standards</p>	<p>There are no comparable standards that address similar reliability goals to that of the UFLS standard. However, it is important to note that the PRC-006 standard was constructed such that there are a number of requirements contained in the standard that are related, affect and/or are conditions precedent to the application of Requirement R15. Because of this construct, these requirements are helpful to consider in determining the proper VRF assignment for Requirement R15. Specifically,</p> <ul style="list-style-type: none"> <li>• <b>Requirement R3 – High VRF</b> – Identifies the specific performance characteristics that each PC’s UFLS program must meet.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Requirement R4 – High VRF</b> – Requires each PC to conduct a design assessment at least once every five years to determine whether the UFLS program meets the performance characteristics of Requirement R3.</li> <li>• <b>Requirement R5 – High VRF</b> – Requires each PC to coordinate its design assessment with other PCs, when the PC area is part of the same island identified by another PC.</li> <li>• <b>Requirement R9 – High VRF</b> – Requires each PC to provide automatic tripping of load in accordance with the PC’s UFLS program, including any Corrective Action Plan.</li> <li>• <b>Requirement R10 – High VRF</b> – Requires each Transmission Owner to provide automatic switching of certain identified devices if required by the PC’s UFLS program, including any Corrective Action Plan.</li> <li>• <b>Requirement R12 – Medium VRF</b> – Requires each PC that identifies deficiencies through an islanding event assessment conducted under Requirement R11, to conduct a design assessment of the UFLS program.</li> </ul> <p>Because the vast majority of these requirements have a High VRF and in order to achieve consistency and treat similar requirements contained within PRC-006 in a like manner, Requirement R15 is assigned a High VRF.</p>
<p>Discussion of FERC VRF Guideline 4: Consistency with NERC Definitions of VRFs</p>	<p>See “NERC VRF Discussion” above.</p>
<p>Discussion of FERC VRF Guideline 5: Treatment of Requirements that Co-mingle More Than One Obligation</p>	<p>Requirement R15 does not co-mingle more than one obligation.</p>

## **Part II. Violation Severity Level (VSL) Justification**

### **NERC VSL Criteria**

Violation Severity Levels (VSLs) define the degree to which compliance with a requirement was not achieved. Each requirement must have at least one VSL. While it is preferable to have four VSLs for each requirement, some requirements do not have multiple “degrees” of noncompliant performance and may have only one, two, or three VSLs. Violation severity levels are based on the NERC overarching criteria shown in the table below:

Lower VSL	Moderate VSL	High VSL	Severe VSL
The performance or product measured almost meets the full intent of the requirement.	The performance or product measured meets the majority of the intent of the requirement.	The performance or product measured does not meet the majority of the intent of the requirement, but does meet some of the intent.	The performance or product measured does not substantively meet the intent of the requirement.

### **FERC VSL Guidelines<sup>3</sup>**

#### **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.**

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<sup>3</sup> Order on Violation Severity Levels Proposed by the Electric Reliability Organization, 123 FERC ¶ 61,284 (2008)(“VSL Order”), order on rehearing and clarification, 125 FERC ¶ 61,212(2008).

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 provides that assessing penalties on a per violation per day basis is the “default” for penalty calculations.

**Proposed VSLs for Requirement R15**

Lower VSL	Moderate VSL	High VSL	Severe VSL
N/A	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.  OR

			<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</p>
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**VSL Justifications for PRC-006-2 Requirement R15**

<p><b>NERC VSL Guidelines</b></p>	<p>Consistent with the NERC VSL Guidelines, the VSLs describe the degree of noncompliant performance in an incremental manner (moderate, high and severe).</p>
<p><b>FERC VSL Guideline 1:</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	<p>The current levels of compliance are not lowered by the proposed VSLs.</p>



<p><b>FERC VSL Guideline 2:</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p><u>Guideline 2a:</u> The single VSL assignment category for “Binary” Requirements is not consistent</p> <p><u>Guideline 2b:</u> VSL Assignments that contain ambiguous language</p>	<p>The proposed VSL is written to ensure uniformity and consistency in the determination of penalties.</p> <p><u>Guideline 2a:</u> The VSL is not written in a binary (pass/fail) manner; instead the VSL has an incremental time-based approach for assigning the level of violation severity.</p> <p><u>Guideline 2b:</u> The VSL assignments contain clear and unambiguous language.</p>
<p><b>FERC VSL Guideline 3:</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The language of the VSL directly mirrors the language in the corresponding Requirement R15.</p>
<p><b>FERC VSL Guideline 4:</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The proposed VSLs are not based on a cumulative number of violations.</p>

**Exhibit G**

**Summary of Development History and Complete Record of Development**

## **Exhibit G: Summary of Development History**

The development record for proposed Reliability Standard PRC-006-2 is summarized below.

### **I. Overview of the Standard Drafting Team**

When evaluating a proposed Reliability Standard, the Commission is expected to give “due weight” to the technical expertise of the ERO<sup>1</sup>. The technical expertise of the ERO is derived from the standard drafting team. For this project, the standard drafting team consisted of industry experts, all with a diverse set of experiences. A roster of the standard drafting team members is included in Exhibit H.

### **II. Standard Development History**

#### **A. Standard Authorization Request Development**

A revised Standard Authorization Request (“SAR”) for Project 2008-02 Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) was posted for an informal comment period from May 23, 2014 through June 23, 2014. The NERC Standards Committee approved the revised SAR on July 9, 2014.

#### **B. First Posting**

Proposed Reliability Standard PRC-006-2 was posted for a 45-day public comment and ballot period from August 21, 2014 through October 8, 2014. There were 35 sets of comments, including comments from approximately 126 different individuals and approximately 84 companies, representing 9 of the 10 industry segments. The proposed Reliability Standard received a quorum of 84.82% and an approval of 84.05%.

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<sup>1</sup> Section 215(d)(2) of the Federal Power Act; 16 U.S.C. §824(d) (2) (2012).

The standard drafting team considered stakeholder comments regarding proposed Reliability Standard PRC-006-2 and made the following observations and non-substantive modifications based on those comments:

- Modified wording within Justification document for clarity
- Replaced references to PRC-006-1 with PRC-006-2

### **C. Final Ballot**

Proposed Reliability Standard PRC-006-2 was posted for a 10-day final ballot period from October 22, 2014 through October 31, 2014. The proposed Reliability Standard received a quorum of 87.53% and an approval of 83.12%.

### **D. Board of Trustees Adoption**

Proposed Reliability Standard PRC-006-2 was adopted by the NERC Board of Trustees on November 13, 2014.

# Project 2008-02 Underfrequency Load Shedding (UFLS)

**UFLS Status:**

PRC-006-2 was adopted by the NERC Board of Trustees on November 13, 2014 and will be submitted to the appropriate regulatory authority.

**UFLS information**

**Purpose:**

The purpose of the UFLS project is to address an outstanding FERC directive and review [PRC-006-1](#) to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the standard drafting team will revise PRC-006-1 to address the directive included in [FERC Order No. 763](#) and to provide for clear, unambiguous design and documentation requirements for automatic UFLS programs.

**Background:**

The UFLS work will be done in concert with the current efforts underway by the UVLS standard drafting team in order to ensure overall consistency and alignment for these protection systems programs. The revised SAR was posted on May 23, 2014 for a 30-day informal comment period, which concluded on June 23, 2014.

<p style="text-align: center;"><b><u>UFLS</u></b></p> <p style="text-align: center;">PRC-006-2 Clean (22)   Redline to Last Posting (23) Redline to PRC-006-1 (24)</p> <p style="text-align: center;">Implementation Plan (25)</p>	<p style="text-align: center;">Final Ballot</p> <p style="text-align: center;">Info&gt;&gt; (26)</p> <p style="text-align: center;">Vote&gt;&gt;</p>	<p style="text-align: center;">10/22/14 - 10/31/14(closed)</p>	<p style="text-align: center;">Summary&gt;&gt; (27)</p> <p style="text-align: center;">Ballot Results&gt;&gt; (28)</p>	
<p style="text-align: center;"><b><u>UVLS</u></b></p> <p style="text-align: center;">PRC-010-1 Clean   Redline</p> <p style="text-align: center;">Implementation Plan Clean   Redline</p> <p style="text-align: center;"><b>Supporting Materials:</b></p> <p style="text-align: center;">Mapping Document</p> <p style="text-align: center;">UVLS Project Coordination Plan</p> <p style="text-align: center;">PRC-010-1 FAQ Clean   Redline</p>	<p style="text-align: center;">Final Ballot</p> <p style="text-align: center;">Info&gt;&gt;</p> <p style="text-align: center;">Vote&gt;&gt;</p>	<p style="text-align: center;">09/08/14 - 09/18/14 (closed)</p>	<p style="text-align: center;">Summary&gt;&gt;</p> <p style="text-align: center;">Ballot Results&gt;&gt;</p>	

<p>VRF/VSL Justification</p>				
<p><b><u>UFLS</u></b></p> <p>PRC-006-2 Clean (6)   Redline (7)</p> <p>Implementation Plan (8)</p> <p><b>Supporting Materials:</b></p> <p>Unofficial Comment Form (Word) (9)</p> <p>Response to Paragraph 81/Independent Expert Review Project Recommendations for PRC-006-1 (10)</p> <p>VRF and VSL Justification (11)</p> <p>Consideration of FERC Directive (12)</p> <p>Draft RSAW (13)</p>	<p>Initial Ballot and Non-Binding Poll</p> <p>Updated Info&gt;&gt; (14)</p> <p>Info&gt;&gt; (15)</p> <p>Vote&gt;&gt;</p>	<p>09/29/14 - 10/08/14 (closed)</p>	<p>Summary&gt;&gt; (17)</p> <p>Ballot Results&gt;&gt; (18)</p> <p>Non-Binding Poll Results&gt;&gt; (19)</p>	<p>Consideration of Comments&gt;&gt; (21)</p>
	<p>Comment Period</p> <p>Info&gt;&gt; (16)</p> <p>Submit Comments&gt;&gt;</p>	<p>08/21/14 - 10/08/14 (closed)</p>	<p>Comments Received&gt;&gt; (20)</p>	
	<p>Join Ballot Pools&gt;&gt;</p>	<p>08/21/14 - 09/19/14 (closed)</p>		
	<p>Please send RSAW feedback to: <a href="mailto:RSAWfeedback@nerc.net">RSAWfeedback@nerc.net</a></p>	<p>09/10/14 - 10/08/14</p>		
<p><b><u>UVLS</u></b></p> <p>PRC-010-1 Clean   Redline</p> <p>Implementation Plan</p> <p><b>Supporting Materials:</b></p>	<p>Ballot and Non-Binding Poll</p> <p>Updated Info&gt;&gt;</p> <p>Info&gt;&gt;</p> <p>Vote&gt;&gt;</p>	<p>07/29/14 – 08/08/14 (closed)</p>	<p>Summary&gt;&gt;</p> <p>Ballot Results&gt;&gt;</p> <p>Non-Binding Poll Results&gt;&gt;</p>	<p>Consideration of Comments&gt;&gt;</p>

<p>Unofficial Comment Form (Word)</p> <p>Standard Authorization Request Revised SAR   Redline of Revised SAR</p> <p>Mapping Document</p> <p>VRF/VSL Justification</p> <p>UVLS Project Coordination Plan</p> <p>PRC-010-1 FAQ</p> <p>Draft RSAW</p>	<p>Comment Period</p> <p><a href="#">Info&gt;&gt;</a></p> <p><a href="#">Submit Comments&gt;&gt;</a></p>	<p>06/24/14 – 08/08/14 (closed)</p>	<p><a href="#">Comments Received&gt;&gt;</a></p>	
	<p><a href="#">Join Ballot Pools&gt;&gt;</a></p>	<p>06/24/14 – 07/23/14 (closed)</p>		
	<p>Please Send RSAW Feedback to:</p> <p><a href="mailto:RSAWfeedback@nerc.net">RSAWfeedback@nerc.net</a></p>	<p>07/10/14 - 08/07/14</p>		
<p><b><u>UFLS</u></b></p> <p>Revised SAR <b>(1)</b></p> <p>Redline of revised SAR <b>(2)</b></p> <p>SAR Unofficial Comment Form (Word) <b>(3)</b></p>	<p>Comment Period</p> <p><a href="#">Info &gt;&gt; <b>(4)</b></a></p> <p><a href="#">Submit Comments &gt;&gt;</a></p>	<p>05/23/14 - 06/23/14 (closed)</p>	<p><a href="#">Comments Received&gt;&gt;</a> <b>(5)</b></p>	
<p><b><u>UVLS</u></b></p> <p>PRC-010-1</p> <p>Implementation Plan</p> <p><b>Supporting Materials:</b> Unofficial Comment Form (Word)</p> <p>Standard Authorization Request</p> <p>Mapping Document</p>	<p>Comment Period</p> <p><a href="#">Info&gt;&gt;</a></p> <p><a href="#">Submit Comments&gt;&gt;</a></p>	<p>03/17/14 - 04/16/14 (closed)</p>	<p><a href="#">Comments Received&gt;&gt;</a></p>	<p><a href="#">Consideration of Comments&gt;&gt;</a></p>

<p>VRF/VSL Justification</p> <p>UVLS Project Coordination Plan</p> <p>PRC-010-1 FAQ</p>				
<p><b><u>UVLS</u></b></p> <p>Revised SAR</p> <p><b>Supporting Materials:</b></p> <p>Draft Standard</p> <p>Unofficial Comment Form (Word)</p>	<p>Comment Period</p> <p><a href="#">Info&gt;&gt;</a></p>	<p>09/10/13 - 10/09/13 (closed)</p>	<p><a href="#">Comments Received&gt;&gt;</a></p>	<p>PRC-010-1 FAQ/Consideration of Comments</p>



		<a href="#">Submit Comments&gt;&gt;</a>		
<b><u>UVLS</u></b> <b>Supporting Materials:</b> Nomination Form (Word)	Nomination Period <a href="#">Info&gt;&gt;</a> <a href="#">Submit Nomination&gt;&gt;</a>	03/21/13 - 04/19/13 (closed)		
<b><u>UVLS</u></b> Draft SAR Version 1	Comment Period <a href="#">Submit Comments&gt;&gt;</a> <a href="#">Info&gt;&gt;</a>	01/20/10 - 02/19/10 (closed)	<a href="#">Comments Received&gt;&gt;</a>	
<b>Supporting Materials:</b> Comment Form (Word) Nomination Form (Word)	Nomination Period <a href="#">Submit Nomination&gt;&gt;</a> <a href="#">Info&gt;&gt;</a>	01/20/10 - 02/03/10 (closed)		

## Standards Authorization Request Form

When completed, please email this form to:  
[sarcomm@nerc.com](mailto:sarcomm@nerc.com)

NERC welcomes suggestions to improve the reliability of the bulk power system through improved reliability standards. Please use this form to submit your request to propose a new or a revision to a NERC Reliability Standard.

### Request to propose a new or a revision to a Reliability Standard

Title of Proposed Standard:	Undervoltage Load Shedding (UVLS) Underfrequency Load Shedding (UFLS)
Date Submitted:	Revised SAR posted for informal comment September 2013, March 2014 and May 23, 2014

### SAR Requester Information

Name:	Undervoltage Load Shedding Standard Drafting Team (UVLSSDT) Underfrequency Load Shedding Standard Drafting Team (UFLS SDT)		
Organization:			
Telephone:	404-823-1132 404-446-2581	E-mail:	<a href="mailto:Erika.Chanzas@nerc.net">Erika.Chanzas@nerc.net</a> <a href="mailto:Lacey.Ourso@nerc.net">Lacey.Ourso@nerc.net</a>

### SAR Type (Check as many as applicable)

<input type="checkbox"/> New Standard	<input checked="" type="checkbox"/> Withdrawal of existing Standard
<input checked="" type="checkbox"/> Revision to existing Standard	<input type="checkbox"/> Urgent Action

### SAR Information

#### Industry Need (What is the industry problem this request is trying to solve?):

#### Undervoltage Load Shedding

A need for clear and comprehensive requirements for the application and coordination of undervoltage loading shedding (UVLS) as an option to mitigate or address a number of different voltage control concerns, as evidenced by the following:

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- **Of the events analyzed by NERC over the last 10 years, voltage issues have continued to contribute to disturbances.**
- **NERC SPCS Report to the Planning Committee: Technical Review of UVLS-Related Standards: PRC-010-0, PRC-020-1, PRC-021-1, and PRC-022-1 (December 2010):** *“Specifically include a requirement for assessment of coordination between UVLS programs and all other protection systems, generator protection and control systems (including generator low voltage ride-through performance), UFLS systems, and other UVLS systems.”*
- **FERC Order No. 693, Paragraph 1509:** *“...the Commission directs the ERO to develop a modification to PRC-010-0 through the Reliability Standards development process that requires that an integrated and coordinated approach be included in all protection systems on the Bulk-Power System, including generators and transmission lines, generators’ low voltage ride through capabilities, and UFLS and UVLS programs.”*
- **August 14 Blackout: Causes and Recommendations, Blackout Recommendation 21:** *“[NERC should] determine the goals and principles needed to establish an integrated approach to relay protection for generators and transmission lines and the use of under-frequency and under-voltage load shedding (UFLS and UVLS) programs. An integrated approach is needed to ensure that at the local and regional level these interactive components provide an appropriate balance of risks and benefits in terms of protecting specific assets and facilitating overall grid survival.”*

**Underfrequency Load Shedding**

Address the outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

**Purpose or Goal (How does this request propose to address the problem described above?):****Undervoltage Load Shedding**

- 1) Establish a results-based standard with requirements that ensure an integrated approach to the design, evaluation, and reliable operation of applicable UVLS programs.

## SAR Information

- 2) Ensure coordination with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, Special Protection Systems (SPSs), and other UVLS programs.

**Underfrequency Load Shedding**

This SAR proposes to revise PRC-006-1 to address an outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the SDT should address the directive from FERC Order No. 763 Paragraph 48, which provides, in part, “Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard.”

**Identify the objectives of the proposed standard’s requirements (What specific reliability deliverables are required to achieve the goal?):****Undervoltage Load Shedding**

- Address the FERC directive in Order No. 693, Paragraph 1509 to modify PRC-010-0 to require an integrated approach to all protection systems.
- Replace the applicability to and involvement of the Regional Reliability Organization (RRO) in PRC-020-1 and PRC-021-1.
- Consolidate the UVLS-related standards into one comprehensive standard (similar to the construct of FERC-approved PRC-006-1– Automatic Underfrequency Load Shedding).
- Clearly identify and separate centrally-controlled undervoltage-based load shedding due to the reliability requirements needed for this type of load shedding as compared to other UVLS programs.

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- Create a single, results-based standard that addresses current reliability issues associated with UVLS programs.

**Underfrequency Load Shedding**

The objective is to revise PRC-006-1 to address the directive included in FERC Order No. 763 and to provide for clear, unambiguous design and documentation requirements for automatic underfrequency load shedding programs that arrest declining frequency and assist recovery of frequency following system events leading to frequency degradation.

**Brief Description (Provide a paragraph that describes the scope of this standard action.)****Undervoltage Load Shedding**

PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1, and PRC-022-1 and be revised to PRC-010-1, which will provide specific requirements for the design, evaluation, and coordinated operation of the UVLS programs to which the standard is applicable. The revised standard will be accompanied by a recommendation to retire PRC-010-0, PRC-020-1, PRC-021-1, and PRC-022-1.

**Underfrequency Load Shedding**

PRC-006-1 should be revised to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

**Detailed Description (Provide a description of the proposed project with sufficient details for the standard drafting team to execute the SAR. Also provide a justification for the development or revision of the standard, including an assessment of the reliability and market interface impacts of implementing or not implementing the standard action.)****Undervoltage Load Shedding**

The four existing NERC UVLS standards will be consolidated to create one comprehensive standard, which will reduce the total number of standards and eliminate PRC-020-1 and PRC-021-1's applicability to and involvement of the RRO. PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1,

## SAR Information

and PRC-022-1, and the existing requirements and measures will be revised to establish a results-based standard that clearly defines the responsibilities of applicable entities to:

- Pursue an integrated and coordinated approach to the design, evaluation, and reliable operation of UVLS programs to which the standard is applicable.
- Ensure the coordination of these UVLS programs with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, SPSs, and other UVLS programs.
- Perform periodic program assessment and performance analysis.
- Establish proper and meaningful database requirements for these UVLS programs.

The revised standard **WILL**:

- Establish continent-wide requirements applicable to entities responsible for the design and implementation of the UVLS programs to which the standard is applicable.
- Address requirements for these programs after the need for UVLS has been determined by the appropriate planning studies.
- Be developed with due consideration to any necessary coordinating changes with other standards or standards projects to meet its design.

The revised standard **WILL NOT**:

- Require a UVLS program.
- Apply to centrally-controlled undervoltage-based load shedding programs (see Related SARs section below).
- Apply to the Generator Owner or Generator Operator; Generator Owner data reporting necessary for UVLS coordination is addressed in PRC-024-1.
- Include the previously applicable Load-Serving Entity since this function does not own physical assets. If a Load-Serving Entity is also registered as a Distribution Provider, the entity will be included under that applicable function.
- Include the previously applicable Transmission Operator because the requirements are more accurately applicable to asset owners (Transmission Owner and Distribution Provider).

No market interface impacts are anticipated.

### **Underfrequency Load Shedding**

The SDT shall revise PRC-006-1 to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

Reliability Functions

The Standard will Apply to the Following Functions (Check each one that applies.)

<input type="checkbox"/>	Regional Reliability Organization	Conducts the regional activities related to planning and operations, and coordinates activities of Responsible Entities to secure the reliability of the Bulk Electric System within the region and adjacent regions.
<input type="checkbox"/>	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
<input type="checkbox"/>	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
<input type="checkbox"/>	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
<input checked="" type="checkbox"/>	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
<input type="checkbox"/>	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
<input checked="" type="checkbox"/>	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
<input type="checkbox"/>	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
<input checked="" type="checkbox"/>	Transmission Owner	Owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
<input checked="" type="checkbox"/>	Distribution Provider	Delivers electrical energy to the End-use customer.
<input type="checkbox"/>	Generator Owner	Owns and maintains generation facilities.
<input type="checkbox"/>	Generator Operator	Operates generation unit(s) to provide real and reactive power.

Reliability Functions	
<input type="checkbox"/> Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
<input type="checkbox"/> Market Operator	Interface point for reliability functions with commercial functions.
<input type="checkbox"/> Load-Serving Entity	Secures energy and transmission service (and reliability-related services) to serve the End-use Customer.

Reliability and Market Interface Principles	
Applicable Reliability Principles (Check all that apply).	
<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input checked="" type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input checked="" type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber attacks.
Does the proposed Standard comply with all of the following Market Interface Principles?	
	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes



Reliability and Market Interface Principles

<p>4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.</p>	<p>Yes</p>
---	------------

Related Standards

Standard No.	Explanation
TPL-001-4	Development of PRC-010-1 is based on implementation of FERC-approved TPL-001-4.
EOP-003-2	Project 2009-03 Emergency Operations (proposed EOP-011-1) will retire EOP-003-2, and Requirements R2, R4, and R7 will be moved to Project 2008-02 UVLS (proposed PRC-010-1). The UVLSSDT will address these overlapping requirements as part of the revision and mapping process.
PRC-004-2.1a	The UVLSSDT will consider if PRC-004 is the more appropriate standard to address UVLS Misoperations and will coordinate with Project 2010-05.1 Protection Systems (Misoperations) (proposed PRC-004-3).
PRC-005-2 and other standards as identified	The UVLSSDT will evaluate the use of references to UVLS with respect to any proposed defined terms by PRC-010-1 and will coordinate with Project 2007-17.3 Protection System Maintenance and Testing (Sudden Pressure Relays) (proposed PRC-005-4) and other standards or standard development projects as necessary.

Related SARs

Project	Explanation
Project 2010-05.2 Protection Systems (Special Protection Systems)	The UVLSSDT is recommending that Project 2010-05.2 Protection Systems (Special Protection Systems) adjust the definition of Special Protection System to include centrally-controlled undervoltage-based load shedding.

Regional Variances	
Region	Explanation
ERCOT	None
FRCC	None
MRO	None
NPCC	PRC-006-NPCC-1
RFC	None
SERC	PRC-006-SERC-02
SPP	None
WECC	None

## Standards Authorization Request Form

When completed, please email this form to:  
[sarcomm@nerc.com](mailto:sarcomm@nerc.com)

NERC welcomes suggestions to improve the reliability of the bulk power system through improved reliability standards. Please use this form to submit your request to propose a new or a revision to a NERC Reliability Standard.

### Request to propose a new or a revision to a Reliability Standard

Title of Proposed Standard:	Undervoltage Load Shedding (UVLS) <b>Underfrequency Load Shedding (UFLS)</b>
Date Submitted:	Revised SAR posted for informal comment September 2013, March 2014 <b>and May 23, 2014</b>

### SAR Requester Information

Name:	Undervoltage Load Shedding Standard Drafting Team (UVLSSDT) <b>Underfrequency Load Shedding Standard Drafting Team (UFLS SDT)</b>		
Organization:			
Telephone:	404-823-1132 <b>404-446-2581</b>	E-mail:	<a href="mailto:Erika.Chanzas@nerc.net">Erika.Chanzas@nerc.net</a> <a href="mailto:Lacey.Ourso@nerc.net">Lacey.Ourso@nerc.net</a>

### SAR Type (Check as many as applicable)

<input type="checkbox"/> New Standard	<input checked="" type="checkbox"/> Withdrawal of existing Standard
<input checked="" type="checkbox"/> Revision to existing Standard	<input type="checkbox"/> Urgent Action

### SAR Information

#### Industry Need (What is the industry problem this request is trying to solve?):

#### Undervoltage Load Shedding

A need for clear and comprehensive requirements for the application and coordination of undervoltage loading shedding (UVLS) as an option to mitigate or address a number of different voltage control concerns, as evidenced by the following:

## SAR Information

- **Of the events analyzed by NERC over the last 10 years, voltage issues have continued to contribute to disturbances.**
- **NERC SPCS Report to the Planning Committee: Technical Review of UVLS-Related Standards: PRC-010-0, PRC-020-1, PRC-021-1, and PRC-022-1 (December 2010):** *“Specifically include a requirement for assessment of coordination between UVLS programs and all other protection systems, generator protection and control systems (including generator low voltage ride-through performance), UFLS systems, and other UVLS systems.”*
- **FERC Order No. 693, Paragraph 1509:** *“...the Commission directs the ERO to develop a modification to PRC-010-0 through the Reliability Standards development process that requires that an integrated and coordinated approach be included in all protection systems on the Bulk-Power System, including generators and transmission lines, generators’ low voltage ride through capabilities, and UFLS and UVLS programs.”*
- **August 14 Blackout: Causes and Recommendations, Blackout Recommendation 21:** *“[NERC should] determine the goals and principles needed to establish an integrated approach to relay protection for generators and transmission lines and the use of under-frequency and under-voltage load shedding (UFLS and UVLS) programs. An integrated approach is needed to ensure that at the local and regional level these interactive components provide an appropriate balance of risks and benefits in terms of protecting specific assets and facilitating overall grid survival.”*

**Underfrequency Load Shedding**

Address the outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

**Purpose or Goal (How does this request propose to address the problem described above?):****Undervoltage Load Shedding**

- 1) Establish a results-based standard with requirements that ensure an integrated approach to the design, evaluation, and reliable operation of applicable UVLS programs.

## SAR Information

- 2) Ensure coordination with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, Special Protection Systems (SPSs), and other UVLS programs.

**Underfrequency Load Shedding**

This SAR proposes to revise PRC-006-1 to address an outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the SDT should address the directive from FERC Order No. 763 Paragraph 48, which provides, in part, “Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard.”

**Identify the objectives of the proposed standard’s requirements (What specific reliability deliverables are required to achieve the goal?):**

**Undervoltage Load Shedding**

- Address the FERC directive in Order No. 693, Paragraph 1509 to modify PRC-010-0 to require an integrated approach to all protection systems.
- Replace the applicability to and involvement of the Regional Reliability Organization (RRO) in PRC-020-1 and PRC-021-1.
- Consolidate the UVLS-related standards into one comprehensive standard (similar to the construct of FERC-approved PRC-006-1– Automatic Underfrequency Load Shedding).
- Clearly identify and separate centrally-controlled undervoltage-based load shedding due to the reliability requirements needed for this type of load shedding as compared to other UVLS programs.

## SAR Information

- Create a single, results-based standard that addresses current reliability issues associated with UVLS programs.

**Underfrequency Load Shedding**

The objective is to revise PRC-006-1 to address the directive included in FERC Order No. 763 and to provide for clear, unambiguous design and documentation requirements for automatic underfrequency load shedding programs that arrest declining frequency and assist recovery of frequency following system events leading to frequency degradation.

**Brief Description (Provide a paragraph that describes the scope of this standard action.)****Undervoltage Load Shedding**

PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1, and PRC-022-1 and be revised to PRC-010-1, which will provide specific requirements for the design, evaluation, and coordinated operation of the UVLS programs to which the standard is applicable. The revised standard will be accompanied by a recommendation to retire PRC-010-0, PRC-020-1, PRC-021-1, and PRC-022-1.

**Underfrequency Load Shedding**

PRC-006-1 should be revised to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

**Detailed Description (Provide a description of the proposed project with sufficient details for the standard drafting team to execute the SAR. Also provide a justification for the development or revision of the standard, including an assessment of the reliability and market interface impacts of implementing or not implementing the standard action.)****Undervoltage Load Shedding**

The four existing NERC UVLS standards will be consolidated to create one comprehensive standard, which will reduce the total number of standards and eliminate PRC-020-1 and PRC-021-1's applicability to and involvement of the RRO. PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1,

## SAR Information

and PRC-022-1, and the existing requirements and measures will be revised to establish a results-based standard that clearly defines the responsibilities of applicable entities to:

- Pursue an integrated and coordinated approach to the design, evaluation, and reliable operation of UVLS programs to which the standard is applicable.
- Ensure the coordination of these UVLS programs with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, SPSs, and other UVLS programs.
- Perform periodic program assessment and performance analysis.
- Establish proper and meaningful database requirements for these UVLS programs.

The revised standard **WILL**:

- Establish continent-wide requirements applicable to entities responsible for the design and implementation of the UVLS programs to which the standard is applicable.
- Address requirements for these programs after the need for UVLS has been determined by the appropriate planning studies.
- Be developed with due consideration to any necessary coordinating changes with other standards or standards projects to meet its design.

The revised standard **WILL NOT**:

- Require a UVLS program.
- Apply to centrally-controlled undervoltage-based load shedding programs (see Related SARs section below).
- Apply to the Generator Owner or Generator Operator; Generator Owner data reporting necessary for UVLS coordination is addressed in PRC-024-1.
- Include the previously applicable Load-Serving Entity since this function does not own physical assets. If a Load-Serving Entity is also registered as a Distribution Provider, the entity will be included under that applicable function.
- Include the previously applicable Transmission Operator because the requirements are more accurately applicable to asset owners (Transmission Owner and Distribution Provider).

No market interface impacts are anticipated.

### Underfrequency Load Shedding

The SDT shall revise PRC-006-1 to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

Reliability Functions

The Standard will Apply to the Following Functions (Check each one that applies.)

<input type="checkbox"/>	Regional Reliability Organization	Conducts the regional activities related to planning and operations, and coordinates activities of Responsible Entities to secure the reliability of the Bulk Electric System within the region and adjacent regions.
<input type="checkbox"/>	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
<input type="checkbox"/>	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
<input type="checkbox"/>	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
<input checked="" type="checkbox"/>	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
<input type="checkbox"/>	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
<input checked="" type="checkbox"/>	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
<input type="checkbox"/>	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
<input checked="" type="checkbox"/>	Transmission Owner	Owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
<input checked="" type="checkbox"/>	Distribution Provider	Delivers electrical energy to the End-use customer.
<input type="checkbox"/>	Generator Owner	Owns and maintains generation facilities.
<input type="checkbox"/>	Generator Operator	Operates generation unit(s) to provide real and reactive power.



Reliability Functions	
<input type="checkbox"/> Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
<input type="checkbox"/> Market Operator	Interface point for reliability functions with commercial functions.
<input type="checkbox"/> Load-Serving Entity	Secures energy and transmission service (and reliability-related services) to serve the End-use Customer.

Reliability and Market Interface Principles	
Applicable Reliability Principles (Check all that apply).	
<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input checked="" type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input checked="" type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber attacks.
Does the proposed Standard comply with all of the following Market Interface Principles?	
	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes

Reliability and Market Interface Principles

<p>4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.</p>	<p>Yes</p>
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Related Standards

Standard No.	Explanation
TPL-001-4	Development of PRC-010-1 is based on implementation of FERC-approved TPL-001-4.
EOP-003-2	Project 2009-03 Emergency Operations (proposed EOP-011-1) will retire EOP-003-2, and Requirements R2, R4, and R7 will be moved to Project 2008-02 UVLS (proposed PRC-010-1). The UVLSSDT will address these overlapping requirements as part of the revision and mapping process.
PRC-004-2.1a	The UVLSSDT will consider if PRC-004 is the more appropriate standard to address UVLS Misoperations and will coordinate with Project 2010-05.1 Protection Systems (Misoperations) (proposed PRC-004-3).
PRC-005-2 and other standards as identified	The UVLSSDT will evaluate the use of references to UVLS with respect to any proposed defined terms by PRC-010-1 and will coordinate with Project 2007-17.3 Protection System Maintenance and Testing (Sudden Pressure Relays) (proposed PRC-005-4) and other standards or standard development projects as necessary.

Related SARs

Project	Explanation
Project 2010-05.2 Protection Systems (Special Protection Systems)	The UVLSSDT is recommending that Project 2010-05.2 Protection Systems (Special Protection Systems) adjust the definition of Special Protection System to include centrally-controlled undervoltage-based load shedding.

Regional Variances	
Region	Explanation
ERCOT	None
FRCC	None
MRO	None
NPCC	PRC-006-NPCC-1
RFC	None
SERC	PRC-006-SERC-02
SPP	None
WECC	None

# Unofficial Standard Authorization Request (SAR) Comment Form

Project 2008-02– Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS)

Revised SAR (dated May 23, 2014)

Please **DO NOT** use this form for submitting comments. Please use the [electronic form](#) to submit comments on the revised SAR. The completed electronic comment form must be submitted **by 8:00 p.m., EST on Monday, June 23, 2014.**

If you have questions regarding the UFLS project, please contact Lacey Ourso by [email](#) or by telephone at 404-446-2581.

The Project 2008-02 Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) project page may be accessed by clicking [here](#).

## **Background information regarding the UFLS project**

### **Purpose:**

The purpose of the UFLS project is to address an outstanding FERC directive and review [PRC-006-1](#) to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the Standard Drafting Team (SDT) will revise PRC-006-1 to address the directive included in [FERC Order No. 763](#) and to provide for clear, unambiguous design and documentation requirements for automatic UFLS programs.

### **Background:**

The UFLS work will be done in concert with the current efforts underway by the UVLS standard drafting team in order to ensure overall consistency and alignment for these protection systems programs. The revised SAR was posted on May 23, 2014 for a 30-day informal comment period. This 30-day informal comment period seeks stakeholder feedback *only* with regard to the revised portion of the SAR relating to the UFLS work. All properly completed electronic comment forms should be submitted to NERC **by 8:00 p.m., EST on Monday, June 23, 2014.**

Please enter comments in simple text format; bullets, numbers, and special formatting will not be retained.

**Questions:**

1. With regard to the *revised* portion of the SAR, do you have any questions or comments relating to the scope of the SAR? Please limit your comments to address only the revised portion of the SAR regarding the UFLS work.

Yes

No

Comments:

2. Do you support the revised SAR and the direction of the proposed revisions to address the directive included in FERC Order No. 763?

Yes

No

Comments:

3. Do you support the revised SAR and the review of PRC-006-1 to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel)?

Yes

No

Comments:

# Standards Announcement

## Project 2008-02 Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS)

### Revised SAR posted for Informal Comment Period through June 23, 2014

[Link to SAR Informal Comment Form](#)

[Link to Revised SAR](#)

[Link to project page](#)

A revised Standard Authorization Request (SAR) for Project 2008-02 Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) is being posted for a 30-day informal comment period. This 30-day informal comment period seeks stakeholder feedback *only* with regard to the revised portion of the SAR. Please use the [electronic form](#) to submit comments on the revised SAR. The completed electronic comment form must be submitted **by 8:00 p.m., EST on June 23, 2014**.

#### **Background**

The purpose of the UFLS project is to address outstanding FERC directive(s) and review [PRC-006-1](#) to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the SDT will revise PRC-006-1 to address the directive included in [FERC Order No. 763](#) and to provide for clear, unambiguous design and documentation requirements for automatic UFLS programs. The UFLS work will be done in concert with the current efforts underway by the UVLS standard drafting team in order to ensure overall consistency and alignment for these protection systems programs. The revised SAR was posted on May 23, 2014 for a 30-day informal comment period. All completed comment forms should be submitted to NERC **by 8:00 p.m., EST on June 23, 2014**.

#### **Instructions for Commenting**

A 30-day informal comment period is open through **8:00 p.m., EST on June 23, 2014**. Please use the [electronic form](#) to submit comments. If you experience any difficulties in using the electronic form, please contact [Wendy Muller](#). Also, an offline copy of the informal comment form is posted on the [project page](#).

**Standards Development Process**

The [NERC Standards Process Manual](#) contains the procedures that govern the standards development process. The success of the NERC standards development process depends upon stakeholder participation. We extend our thanks to all of those who participate.

For more information or assistance, please contact [Lacey Ourso](#).

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Suite 600, North Tower  
Atlanta, GA 30326  
404-446-2560 | [www.nerc.com](http://www.nerc.com)

**RELIABILITY | ACCOUNTABILITY**

**Individual or group. (27 Responses)**  
**Name (14 Responses)**  
**Organization (14 Responses)**  
**Group Name (13 Responses)**  
**Lead Contact (13 Responses)**

**IF YOU WISH TO EXPRESS SUPPORT FOR ANOTHER ENTITY'S COMMENTS WITHOUT ENTERING ANY ADDITIONAL COMMENTS, YOU MAY DO SO HERE. (2 Responses)**

**Comments (27 Responses)**  
**Question 1 (24 Responses)**  
**Question 1 Comments (25 Responses)**  
**Question 2 (23 Responses)**  
**Question 2 Comments (25 Responses)**  
**Question 3 (23 Responses)**  
**Question 3 Comments (25 Responses)**

Individual
Steve Alexanderson
Central Lincoln
No
No
The revised SAR incorrectly states there are no regional variances for WECC. Unless the SAR includes removal of the variance already granted to the regions in PRC-006-1, the SAR should include these existing variances. And if any of these variances are to be removed, the SAR should state so explicitly.
Individual
Mark Wilson
Independent Electricity System Operator
Yes
In the Related Standards table (P.8 of the SAR), the part that addresses PRC-004-2.a remains unchanged. It states that: "The UVLSSDT will consider if PRC-004 is the more appropriate standard to address UVLS Misoperations and will coordinate with Project 2010-05.1 Protection Systems (Misoperations) (proposed PRC-004-3). While we concur this is an appropriate approach, with the SAR now expanded to include underfrequency load shedding, we believe this part needs to be expanded as well. We make this proposal following receiving a response from the Project 2010-05.1 Protection System Misoperations standard drafting team (PSMSDT) to our comment on the draft PRC-004-3 in which question the basis for including UFLS but excluding UVLS in the PRC-004-3 standard's Applicability Section. The PSMSDT's response below: [UVLS has not been included in the proposed standard's Applicability because Misoperations of UVLS relays are being addressed under Project 2008-02 – Undervoltage Load Shedding when modifying Reliability Standard PRC-022-1 – Under-Voltage Load Shedding Program Performance.] We do not find this rationale sufficient to justify the inclusion of UFLS but exclusion of UVLS since both need to be assessed and treated under the same light. Now that the SAR for Project 2008-02 is expanded, we suggest the UVLSSDT and the UFLSSDT to coordinate with the PSMSDT to achieve a consistent approach to addressing Misoperations of UFLS and UVLS.
Yes
Yes



Group
Duke Energy
Colby Bellville
No
Yes
Duke Energy supports the revised SAR, and the proposal to revise PRC-006-1 based on the outstanding FERC directive. We would like to remind the SDT of current regional standards, such as PRC-006-SERC-01, that depending on the revised language, could result in a conflict with currently enforceable regional standards.
Yes
Individual
Andrew Z. Pusztai
American Transmission Company, LLC
No
Yes
Yes
Group
MRO NERC Standards Review Forum
Joe DePoorter
Yes
The NSRF request that the SAR have the following item added, per FERC Order 763, section 11 which states; "Accordingly, we grant clarification that Order No. 763 did not preclude some degree of overlap between automatic and manual load shedding programs, provided there is sufficient non-overlapping load available for manual shedding to achieve the reliability objective of EOP-003-2". This clarification needs to be addressed in the proposed Standard.
No
The NSRF can support the SAR if the comments in question 1 are contained within the SAR.
Yes
Individual
Thomas Foltz
American Electric Power
Yes
In reference to potential changes to PRC-006-1, exactly what is meant by the phrase "steady state modifications" ?
No
As currently written, the SAR lacks specificity in its direction and intent. FERC Order 763, which approved PRC-006-1 (UFLS standard), appears to direct NERC to modify PRC-006-1 and explicitly state that a PC's "schedule for application" referenced in R9 would apply not only to the implementation of whatever UFLS plan a PC would devise under R3, but also to any corrective adjustments to that plan a PC might identify under R11 and R12. Assuming we understand FERC's

request correctly, we recommend adding the following text to page 3 of the SAR: "Specifically, PRC-006-1 will be modified to make it clear that a PC's "schedule for application" referenced in R9 would apply not only to the implementation of whatever UFLS plan a PC would devise under R3, but also to any corrective adjustments to that plan a PC might identify under R11 and R12."

No

Though we agree with modifying PRC-006-1 to meet FERC's concerns, we do not support the current SAR for the reasons expressed above.

Group

Northeast Power Coordinating Council

Guy Zito

No

Yes

Yes

Individual

David Thorne

Pepco Holdings Inc

No

Yes

Yes

Individual

Chris Mattson

Tacoma Power

Yes

In the context of this revised SAR, what is meant by "steady state modifications"? Additionally, which specific directive in FERC Order No. 763 will be addressed by revising PRC-006-1?

Individual

Si Truc PHAN

Hydro-Quebec TransEnergie

Yes

Since this SAR proposes a revision of PRC-006-1 to determine if any steady state modifications are appropriate, Hydro-Québec respectfully requests to include a revision of the Regional Variance and Attachment 1A for the Québec Interconnection. The Quebec Interconnection (QI) has much less inertia than other Interconnections. This implies a greater variation of frequency for all kinds of contingencies. The curve of Attachment 1A (Québec) doesn't take that into account for the time frame following the 30 second mark. It is requested that the steady state condition would allow a larger frequency gap than other Interconnections, as the QI has already a larger gap allowed at short term (between 56 Hz and 63 Hz) than other interconnection (from 58 Hz to 61,8 Hz). Also, it is requested that the time to attain the steady state, which is 60 seconds for other Interconnections (Attachment 1), would be at least or even longer for the Quebec Interconnection, instead of the

actual 30 seconds value of Attachment 1A. Those proposed changes are necessary to limit the amount and frequency of load shedding for different contingencies. Also, since some contingencies on the QI imply an oscillation mode of low frequency (about 0.05 Hz), the 30 second mark is too short for the transient mode. The proposed changes do not affect the reliability of the QI, but help to fit the unique characteristics of the system.

Yes

Group

Southern Company: Southern Company Services, Inc.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing

Wayne Johnson

No

Yes

Yes

Group

ACES Standards Collaborators

Ben Engelby

Yes

We would like to see the SAR better clarify the proposed modifications to the PC schedule in PRC-006 R9. This is the applicable requirement that was raised in FERC Order No. 763, which had explicit directions to make the language clear in the requirement itself. The SAR should be responsive to this directive and explain the propose action to PRC-006.

Yes

We support the drafting team's proposal to address both UFLS and UVLS in the same project.

Yes

We support the revised SAR and the review of PRC-006-1 to determine if any steady state modifications are appropriate. This is an appropriate revision based on the FERC directive.

Group

SPP Standards Review Group

Robert Rhodes

No

Yes

Yes

Individual

Chris Scanlon

Exelon Companies

No

Yes
Yes
Individual
John Pearson
ISO New England
Agree
ISO RTO Council Standards Review Committee (SRC)
Group
Dominion
Louis Slade
Yes
Yes
Dominion suggests that the requirements of PRC-011-0 also be considered for possible inclusion into the revised version of PRC-010.
Yes
Group
ISO RTO Council Standards Review Committee
Greg Campoli
Yes
We thank and appreciate the SAR team's consideration and accommodation of our comments from the prior posting: "Some PCs design their system to avoid the need for UVLS and therefore do not have a UVLS program. The standard needs to address the situation when the TP/PC/TOP does not have a UVLS program but the UVLS entity has their own UVLS schemes. The concepts contained within PRC-010-0 R1 should be incorporated within the new standard to ensure that individual UVLS entity schemes that are developed outside or in lieu of a TP/PC/TOP program are coordinated with their TP/PC/TOP." We believe these two bullets address our concern: The revised standard WILL: • Address requirements for these programs after the need for UVLS has been determined by the appropriate planning studies. The revised standard WILL NOT: • Require a UVLS program. We further ask the team to consider situations where UFLS schemes may also not be required due to similar design considerations.
Yes
Yes
We support consideration of the Paragraph 81 review, however, the SDT must note in its proposed standard where addressing a P81 consideration may not have been included due to scope limitations.
Group
Bonneville Power Administration
Andrea Jessup
No
Yes

Yes
Individual
Gul Khan
Oncor Electric Delivery LLC
No
Yes
Yes
Individual
Trevor Schultz
Idaho Power Company
Yes
Yes
Individual
Michelle D'Antuono
Ingleside Cogeneration LP
No
No
Although Ingleside Cogeneration LP("ICLP") is not immediately affected by FERC's directive to tighten the requirements related to the implementation of a Corrective Action Plan, we believe that a cautious approach is in order. Our reading of Order 763 indicates that the Commission is understandably eager to eliminate UFLS reliability gaps in a high priority manner, but is aware that some corrections cannot be implemented due to limitations in capital and maintenance budgets. We would like to see an expectation set in the SAR that the project team investigate a means to capture the sense of urgency of the situation without mandating a maximum time frame that allows no flexibility regardless of any extraordinary circumstances. Otherwise, ICLP can easily see that once a zero-tolerance precedent has been set, it will naturally be applied to every type of corrective plan – including those applicable to us as a GO/GOP.
No
ICLP has no issue with the Paragraph 81 retirements that were proposed by the IERP. We agree with their findings that the requirements in question were redundant or overly administrative in nature. However, the IERP included a recommendation called for Generator Owners to be subject to PRC-006-1's Underfrequency Load Shedding requirements. This seems to be a misunderstanding on the part of the IERP that PRC-024-1 already mandates frequency ride-through settings at generation Facilities which ensure that units are not disconnected from the BES before load is shed. (Generators have a stabilizing influence on system frequency, and it is desirable to keep them online as long as possible during a disturbance, Fault, or abnormal operating condition.) Since PRC-024-1 has already been approved by FERC, we believe that the SAR should contain a statement indicating that this IERP recommendation has already been fulfilled. We see no benefit in including the GO as an applicable entity under PRC-006-1 as well.
Group

PacifiCorp
Sandra Shaffer
Yes
The definition of "UFLS" entity should be clarified: --to clearly specify whether "any entity responsible for the ownership, operation, or control of UFLS equipment" includes non-registered entities --If the definition of "UFLS" entity includes only registered entities, who takes responsibility for the UFLS assignment gaps caused by entities not registered/or recently deregistered? --How will this be impacted by risk-based registry initiative and revisions to the Registry Criteria? --PRC-006-1 R9 needs to be clarified with respect to roles of the entities and to address gaps in the "Coordinated Plan" caused by entities not registered/or recently deregistered. --If UFLS and UVLS responsibilities apply to BES, does that include facilities that are owned/operated by non-registered entities that have not filed/obtained formal NERC Exclusions/Exceptions? Who determines the facilities that are included and where is the information available?
Yes
The definition of "UFLS" entity should be clarified: --to clearly specify whether "any entity responsible for the ownership, operation, or control of UFLS equipment" includes non-registered entities --If the definition of "UFLS" entity includes only registered entities, who takes responsibility for the UFLS assignment gaps caused by entities not registered/or recently deregistered? --How will this be impacted by risk-based registry initiative and revisions to the Registry Criteria? --PRC-006-1 R9 needs to be clarified with respect to roles of the entities and to address gaps in the "Coordinated Plan" caused by entities not registered/or recently deregistered. --If UFLS and UVLS responsibilities apply to BES, does that include facilities that are owned/operated by non-registered entities that have not filed/obtained formal NERC Exclusions/Exceptions? Who determines the facilities that are included and where is the information available?
Yes
Individual
Dennis Chastain
Tennessee Valley Authority
No
Yes
We agree with the direction to re-open this standard in order to address FERC's directive. FERC's concern is perhaps better understood by referencing paragraphs 42-43 of Order No. 763. Within this context, FERC is questioning the total period of time it will take following a UFLS triggering event to conduct a post-event assessment (per R11, up to one year after the event) and then, if the assessment identifies UFLS program deficiencies, determine what program adjustments are necessary (per R12, up to two years after the event), and then issue program changes (PC) and implement those changes in the field (UFLS entity). The timing expectations for the last two stages of this process are not clearly addressed; however we agree with NERC that requirement R9 addresses the expectation for a UFLS entity to provide automatic tripping "...in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s)...". Requirement R9 allows the PC a degree of flexibility in determining what the implementation schedule should be, and this must be done in consultation with the UFLS entity(s) per requirement R14.
Yes
Group
DTE Electric
Kathleen Black

No
Yes
Yes
Group
Alliant Energy - Compliance
Larry Heckert
No
Yes
Yes
Individual
Venona Greaff
Occidental Chemical Corporation
Agree
Ingleside Cogeneration, LP
Group
Associated Electric Cooperative, Inc. - JRO00088
Phil Hart
No
Yes
Yes

### Standard Development Timeline

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### Development Steps Completed

1. The Standards Committee (SC) authorized posting of the revised Standards Authorization Request (SAR) for informal comment on May 16, 2014.
2. The revised SAR was posted for informal comment from May 23, 2014 through June 23, 2014.
3. A draft of PRC-006-2 was posted for a 45-day formal comment period and ballot on August 22, 2014. The ten day initial ballot is from September 29, 2014 to October 8, 2014.

#### Description of Current Draft

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive issued in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with a 10-day ballot period	August 22, 2014
10-day Final Ballot	September 2014
Present to NERC Board of Trustees for Approval	November 2014

#### Effective Dates

PRC-006-2 shall become effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.



**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.

### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Glossary of Terms used in Reliability Standards (Glossary) are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

N/A

*When this standard has received ballot approval, the rationale boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**
2. **Number:** PRC-006-2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. **Effective Date:**
  - 5.1. This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

**B. Requirements and Measures**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
- 2.2.** 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, and
- 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer

## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
- Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
- Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.
- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*

- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. [*VRF: Lower*][*Time Horizon: Long-term Planning*]
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. [*VRF: High*][*Time Horizon: Long-term Planning*]
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

**Rationale for Requirement R9:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. [*VRF: High*][*Time Horizon: Long-term Planning*]

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

**R13.** Each 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

### Rationale for Requirement R10:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)



islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, shall 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 following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following *[VRF: Lower][Time Horizon: Long-term Planning]*:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

**R15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]

**15.1.** For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

**15.2.** For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

**M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

**Rationale for Requirement R15:**

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

**C. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Enforcement Authority**

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

**1.2. Evidence Retention**

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, R14, and R15, Measures M1, M2, M3, M4, M5, M12, M14, and M15 as well as any evidence necessary to show compliance since the last compliance audit.

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- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

### **1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

### **1.4. Additional Compliance Information**

None

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
<b>R3</b>	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, 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

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R4</b>	<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>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>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>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 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 determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<b>R5</b>	N/A	N/A	N/A	<p>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</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	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>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to	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	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	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	support maintenance of each Planning Coordinator’s UFLS database.	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.	Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.	Planning Coordinator’s UFLS database.  OR  The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.
<b>R9</b>	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 implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	The Transmission Owner provided less than 100% but more than (and including) 95% automatic switching of	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks,



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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>
<p><b>R11</b></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 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.</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 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.</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 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 an islanding event resulting in system frequency</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 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 an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program,</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>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>	<p>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 an 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>
<b>R12</b>	N/A	<p>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.</p>	<p>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.</p>	<p>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.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				deficiencies were identified per Requirement R11, failed to conduct and document a UFLS design assessment to consider the identified deficiencies.
<b>R13</b>	N/A	N/A	N/A	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
<b>R14</b>	N/A	N/A	N/A	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				response to comments whether changes were made or reasons why changes were not made to the items in Parts 14.1 through 14.3.
<b>R15</b>	N/A	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>OR</p> <p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				frame for development by a period greater than 2 months.

**E. Regional Variances**

**E.A. Regional Variance for the Quebec Interconnection**

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**E.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*

**E.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

**E.A.4.** Each Planning Coordinator shall 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 E.A.3 for each island identified in Requirement

R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment 2A, and

**E.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>EA3</b>	N/A	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<b>EA4</b>	N/A	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS</p>



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3

**E.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**E.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.E.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

**E.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**E.B.2.1.** Those islands selected by applying the criteria in Requirement E.B.1, and

**E.B.2.2.** 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.

**M.E.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

**EB.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**E.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60

seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**E.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**E.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**E.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M.E.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

**E.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that

trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

**E.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**E.B.11.1.** The performance of the UFLS equipment,

**E.B.11.2** The effectiveness of the UFLS program

**M.E.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

**E.B.12.** Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M.E.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>E.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<p><b>E.B.4</b></p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
<b>E.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.  OR	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation.  OR



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.</p>	<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
<b>E.B.12</b>	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies</p>

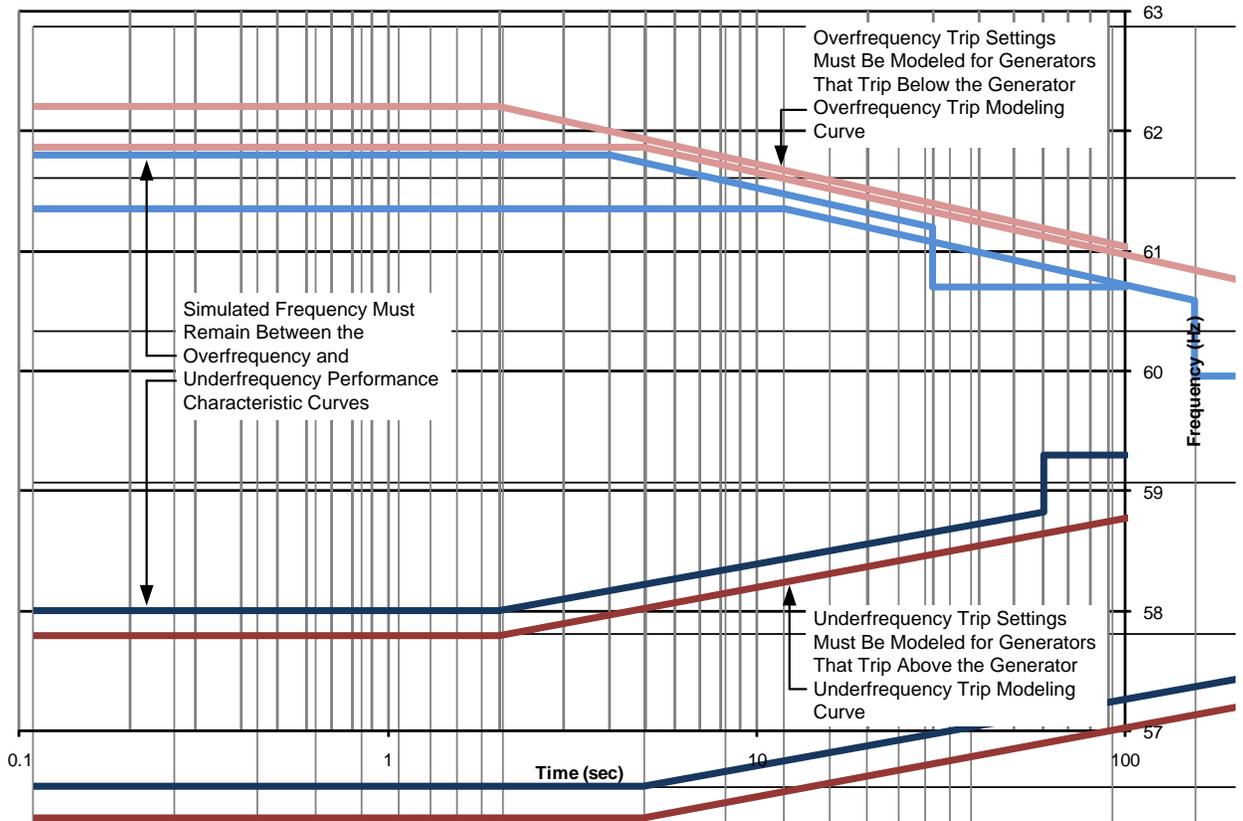
**Associated Documents**

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	

## PRC-006-2 – Attachment 1

### Underfrequency Load Shedding Program Design Performance and Modeling Curves for Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- ⚠⚠⚠⚠ Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- ⚠⚠⚠⚠ Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- ⚠⚠⚠⚠ Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- ⚠⚠⚠⚠ Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

#### Curve Definitions

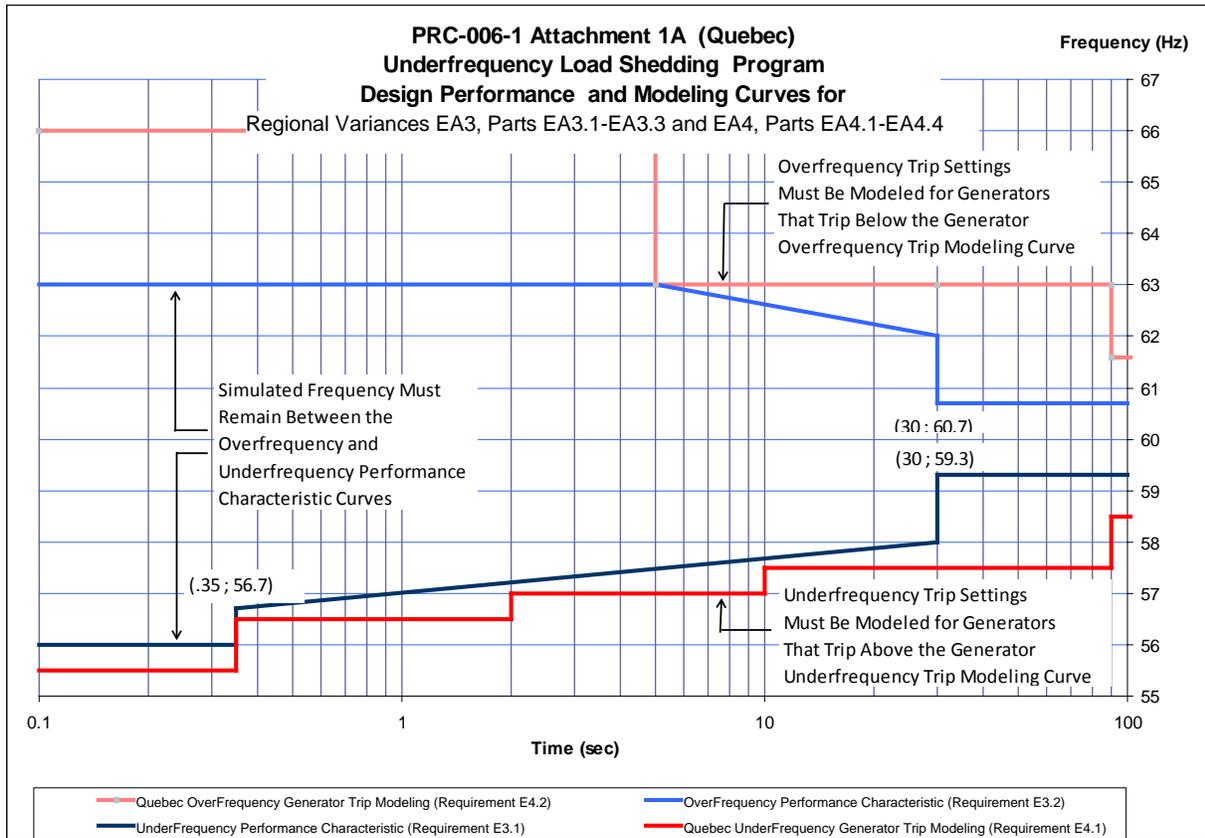
Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2$ s	$t > 2$ s	$t \leq 4$ s	$4$ s $< t \leq 30$ s	$t > 30$ s
$f = 62.2$ Hz	$f = -0.686\log(t) + 62.41$ Hz	$f = 61.8$ Hz	$f = -0.686\log(t) + 62.21$ Hz	$f = 60.7$ Hz

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic
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## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575\log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575\log(t) +$ 57.83 Hz	$f = 59.3$ Hz



### Standard Development Timeline

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### Development Steps Completed

1. The Standards Committee (SC) authorized posting of the revised Standards Authorization Request (SAR) for informal comment on May 16, 2014.
2. The revised SAR was posted for informal comment from May 23, 2014 through June 23, 2014.
3. A draft of PRC-006-2 was posted for a 45-day formal comment period and ballot on August 22, 2014. The ten day initial ballot is from September 26, 2014 to October 6, 2014.

#### Description of Current Draft

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive issued in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with a 10-day ballot period	August 22, 2014
10-day Final Ballot	September 2014
Present to NERC Board of Trustees for Approval	November 2014

#### Effective Dates

PRC-006-2 shall become effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

**Version History**

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2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.



### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Glossary of Terms used in Reliability Standards (Glossary) are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

N/A

*When this standard has received ballot approval, the rationale boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**
2. **Number:** PRC-006-2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. **Effective Date:**
  - 5.1. This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

**B. Requirements and Measures**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
- 2.2.** 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, and
- 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
- Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
- Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.
- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*

- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. [*VRF: Lower*][*Time Horizon: Long-term Planning*]
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation application, including any Corrective Action Plan,- as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. [*VRF: High*][*Time Horizon: Long-term Planning*]
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation application, including any Corrective Action Plan, per Requirement R9.

### Rationale for Requirement R9:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R10.** Each Transmission Owner shall 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 implementation-application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation-application, including any Corrective Action Plan, per Requirement R10.

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

### Rationale for Requirement R10:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R13.** Each 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, shall 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 following: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following [*VRF: Lower*][*Time Horizon: Long-term Planning*]:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.



R15. Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]

15.1. For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

15.2. For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

M15. Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

Rationale for Requirement R15:

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

**C. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Enforcement Authority**

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

**1.2. Evidence Retention**

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, ~~and~~ R14, and R15, Measures M1, M2, M3, M4,

M5, M12, ~~and M14~~, and M15 as well as any evidence necessary to show compliance since the last compliance audit.

- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

**1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

**1.4. Additional Compliance Information**

None

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
<b>R3</b>	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, 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

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R4</b>	<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>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>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>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 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 determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<b>R5</b>	N/A	N/A	N/A	<p>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</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	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>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to	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	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	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

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	support maintenance of each Planning Coordinator’s UFLS database.	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.	Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.	Planning Coordinator’s UFLS database.  OR  The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.
<b>R9</b>	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 <u>implementation application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.	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 <u>implementation-application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.	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 <u>implementation application, including any Corrective Action Plan, as</u> -determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for <u>implementation application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	The Transmission Owner provided less than 100% but more than (and including)	The Transmission Owner provided less than 95% but more than (and including)	The Transmission Owner provided less than 90% but more than (and including) 85%	The Transmission Owner provided less than 85% automatic switching of its

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>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 <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>90% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>
<p><b>R11</b></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 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.</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 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.</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 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 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 an islanding event resulting in system frequency</p>



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an 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>	<p>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 an 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>
<b>R12</b>	N/A	<p>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.</p>	<p>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</p>	<p>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.</p> <p>OR</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			to 26 months of event actuation.	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>R13</b>	N/A	N/A	N/A	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
<b>R14</b>	N/A	N/A	N/A	The Planning Coordinator failed to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>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>
<p><b><u>R15</u></b></p>	<p><u>N/A</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</u></p> <p><u>OR</u></p> <p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS</u></p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<u>entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</u>

**E. Regional Variances**

**E.A. Regional Variance for the Quebec Interconnection**

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**E.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*

**E.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

**E.A.4.** Each Planning Coordinator shall 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 E.A.3 for each island identified in Requirement

R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment 2A, and

**E.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>EA3</b>	N/A	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<b>EA4</b>	N/A	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3



**E.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**E.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.E.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

**E.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**E.B.2.1.** Those islands selected by applying the criteria in Requirement E.B.1, and

**E.B.2.2.** 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.

**M.E.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

**EB.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**E.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60

seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**E.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**E.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**E.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M.E.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

**E.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that

trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

**E.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**E.B.11.1.** The performance of the UFLS equipment,

**E.B.11.2** The effectiveness of the UFLS program

**M.E.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

**E.B.12.** Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M.E.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>E.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<p><b>E.B.4</b></p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
<b>E.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.  OR	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation.  OR

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.</p>	<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as</p>



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
<b>E.B.12</b>	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies</p>

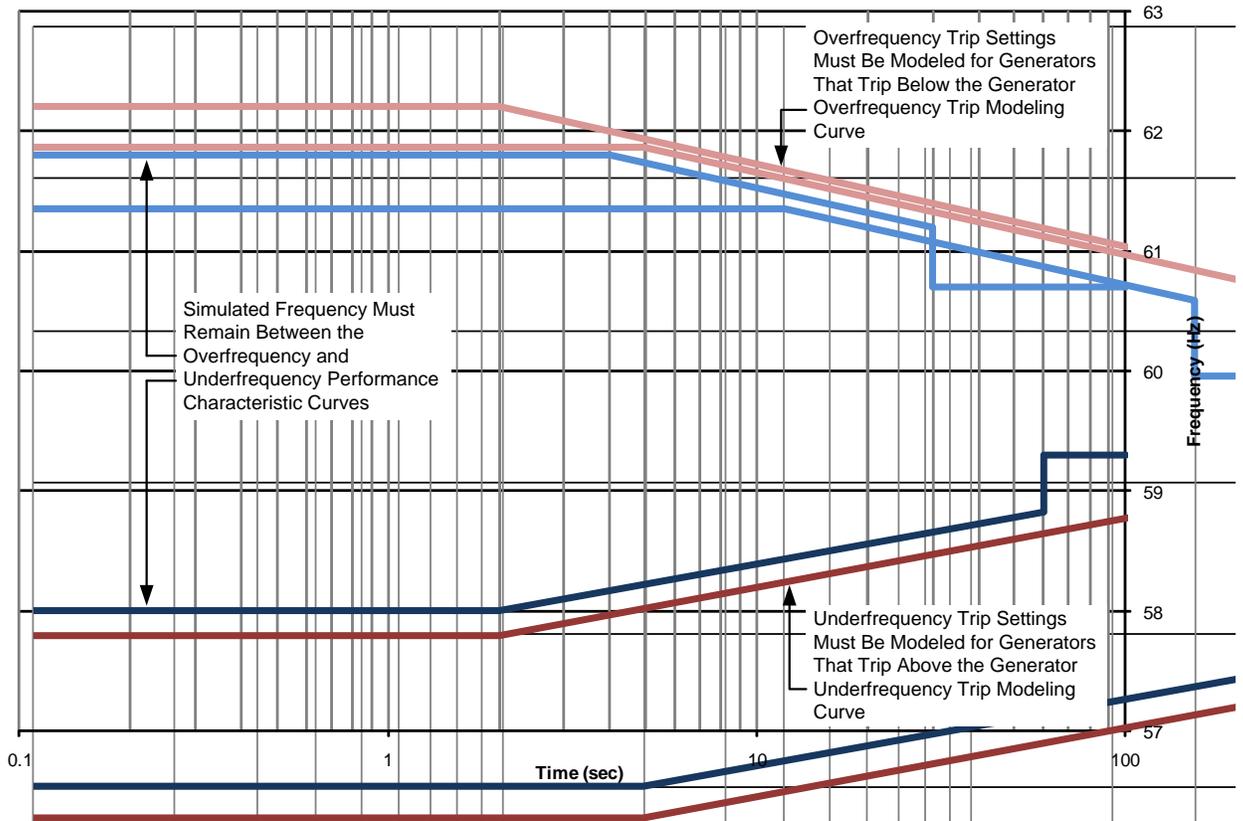
**Associated Documents**

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
<u>2</u>	<u>TBD</u>	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	

## PRC-006-2 – Attachment 1

### Underfrequency Load Shedding Program Design Performance and Modeling Curves for Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- ⚠⚠⚠⚠ Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- ⚠⚠⚠⚠ Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- ⚠⚠⚠⚠ Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- ⚠⚠⚠⚠ Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

#### Curve Definitions

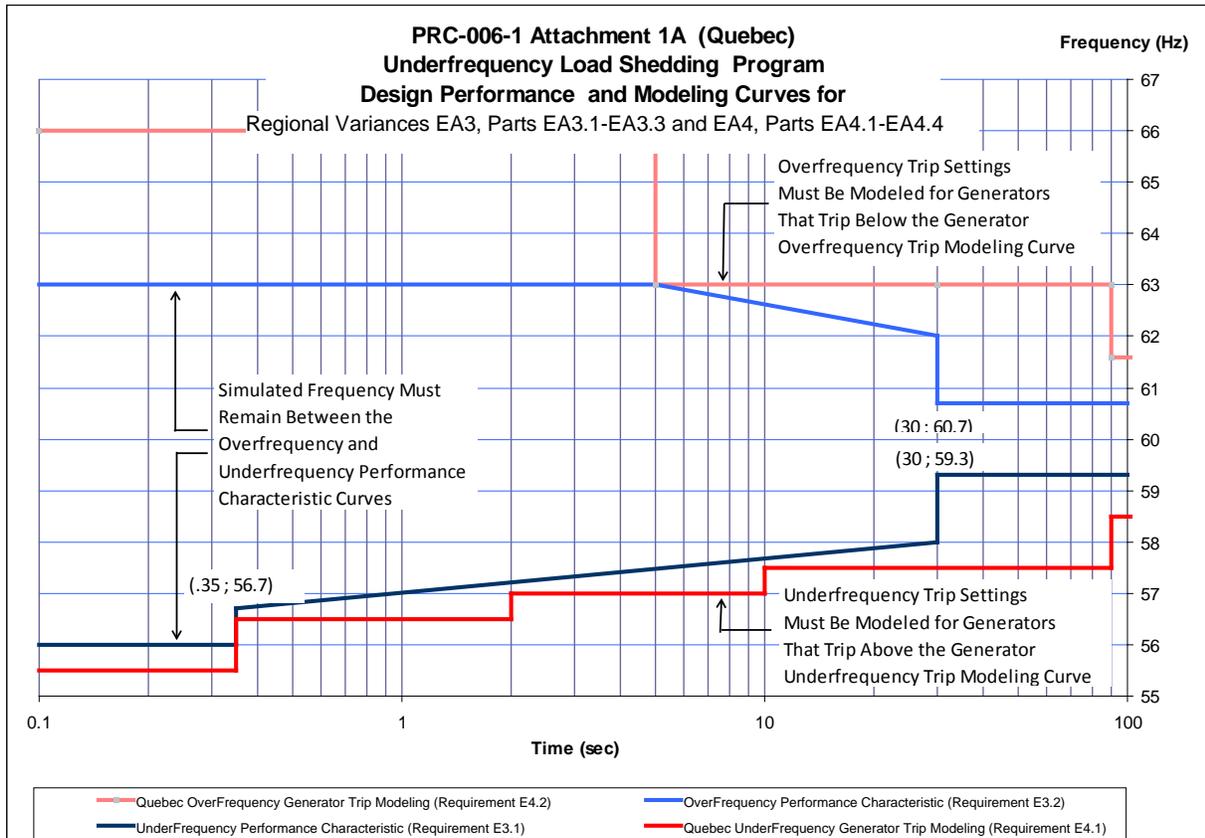
Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic

## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575\log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575\log(t) +$ 57.83 Hz	$f = 59.3$ Hz



## Implementation Plan

### Project 2008-02: Underfrequency Load Shedding (UFLS)

#### Requested Approval

- PRC-006-2: Automatic Underfrequency Load Shedding

#### Requested Retirement

- PRC-006-1: Automatic Underfrequency Load Shedding

#### Prerequisite Approvals

- None

#### Revisions to Defined Terms in the NERC Glossary

- None

#### Applicable Entities

- Planning Coordinators
- UFLS entities 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 one or more of the following:
  - Transmission Owners
  - Distribution Providers
- Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators

#### Effective Date

This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

#### Retirement of Existing PRC-006-1

PRC-006-1 shall be retired at midnight of the day immediately prior to the Effective Date of PRC-006-2.

# Unofficial Comment Form

## Project 2008-02: Underfrequency Load Shedding (UFLS)

Please **DO NOT** use this form for submitting comments. Please use the [electronic form](#) to submit comments on the Standard. The electronic comment form must be completed by **8 p.m. Eastern Wednesday, October 8, 2014**.

If you have questions please contact Lacey Ourso, NERC Standards Developer by [email](#) or by telephone at 404-446-2581.

The Project 2008-02 Underfrequency Load Shedding project page may be accessed by clicking [here](#).

### Background Information

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (2012). In Order No. 763, FERC raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator assessment. As a result of this lack of clarity, FERC directed NERC to make this requirement explicit in future versions of the standard.

In May 2014, the NERC Standards Committee authorized posting the revised SAR for informal comment. The limited scope of the revised SAR authorized the UFLS standard drafting team to address the outstanding FERC directive and review PRC-006-1 to determine what actions, if any, should be taken in response to the Paragraph 81 and Independent Expert Review Project recommendations.

In accordance with the limited scope of the SAR, the Project 2008-02 UFLS standard drafting team addressed the FERC directive by adding one new requirement (Requirement R15) and modifying two existing requirements (Requirements R9 and R10). Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the Planning Coordinator shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities. A "Corrective Action Plan" is defined in the NERC Glossary of Terms as, "a list of actions and an associated timetable for implementation to remedy a specific problem." The Corrective Action Plan developed by the Planning Coordinator will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the Planning Coordinator as a result of an assessment. The time allotted by the Planning Coordinator for making corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changing

in budgeting cycles. Additionally, for Requirements R9 and R10, the standard drafting team added the “Corrective Action Plan” language to ensure that any Corrective Action Plan developed by the Planning Coordinator under Requirement R15 will be implemented by the UFLS entity and/or Transmission Owner as part of the UFLS program.

Also, the drafting team reviewed five requirements contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81 and Independent Expert Review Project recommendations. Specifically, the UFLS team reviewed Requirements R6, R7, R8, R10 and R14. The team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired. The team drafted a justification document outlining the basis for its conclusion that the requirements should not be retired. This document is posted on the *Project 2008-02* project page.

### **Initial 45-day Formal Comment Period**

This posting is soliciting formal comment. The electronic comment form must be completed by 8 p.m. Eastern Monday, October 6, 2014.

*\*Please use the [electronic comment form](#) to submit your final comments to NERC.*

Please enter comments in simple text format, as bullets, numbers, and **special formatting will not be retained** (even if it appears to transfer formatting when copying from the unofficial Word version of the form into the official electronic comment form). If you enter extra carriage returns, bullets, automated numbering, symbols, bolding, italics, or any other formatting, that formatting will not be retained when you submit your comments.

- Separate discrete comments by idea, e.g., preface with (1), (2), etc.
- Use brackets [] to call attention to suggested inserted or deleted text.
- Insert a “check” mark in the appropriate boxes by double-clicking the gray areas.
- **Do not use** formatting such as extra carriage returns, bullets, automated numbering, bolding, or italics.
- **Please do not repeat other entity’s comments.** Select the appropriate item to support another entity’s comments. An opportunity to enter additional or exception comments will be available.
- If supporting other’s comments, be sure the other party submits comments.



**Questions:**

1. In response to the FERC directive, the SDT proposes to add one new requirement (Requirement R15) and modify two existing requirements (Requirements R9 and R10). Specifically, the following revisions are proposed:

R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for **implementation application, including any Corrective Action Plan**, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets.

*[VRF: High][Time Horizon: Long-term Planning]*

R10. Each Transmission Owner shall 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 **implementation application, including any Corrective Action Plan**, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*

**R15. Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. *[VRF: High][Time Horizon: Long-term Planning]***

**15.1 For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.**

**15.2 For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.**

Do you agree with the proposed revisions in response to the FERC directive? If not, please provide the basis for your disagreement with the proposed revisions along with your suggested language changes.

Yes

No

Comments:

2. Do you agree with implementation period of the proposed standard? If not, what do you believe the implementation period should be and why?

Yes

No

Comments:

3. The UFLS drafting team reviewed five requirements (Requirements R6, R7, R8, R10 and R14) contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81 and Independent Expert Review Project recommendations. The team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired. The team drafted a [justification document](#) outlining the basis for its conclusion that the requirements should not be retired, which can be found on the project page.

Do you agree with the drafting team conclusions that the requirements should *not* be retired? If not, please identify the specific conclusions that you do not agree with, and the basis for your disagreement.

Yes

No

Comments:

4. If you have any other comments or concerns on the proposed standard (**related to an issue that falls within the limited scope of the SAR**), please provide them here:

Comments:

# UFLS Standard Drafting Team Response to Paragraph 81 and Independent Expert Review Project Recommendations for PRC-006-1

## Project 2008-02: Underfrequency Load Shedding (UFLS)

### Part I. Executive Summary

As part of this project, the UFLS standard drafting team (SDT) reviewed five requirements contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81<sup>1</sup> and Independent Expert Review Project (IERP)<sup>2</sup> recommendations. Specifically, the UFLS team reviewed Requirements R6, R7, R8, R10 and R14. For the reasons outlined below, the team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired.

Part II addresses Requirements R7 and R8, which were recommended for retirement as a part of Phase 2 of the Paragraph 81 work. Part III addresses Requirements R6, R10 and R14, which were recommended for retirement by the IERP.

### Part II. Paragraph 81 Recommendations (Requirements R7 and R8)

#### A. PRC-006-1, Requirement R7:

“Each Planning Coordinator shall 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.”

#### Paragraph 81 Recommendation for Requirement R7

The Paragraph 81 team found that Requirement R7 *does* support NERC Reliability Principle No. 3.<sup>3</sup> However, it was recommended as a Phase 2 candidate for retirement because, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.”

#### UFLS Drafting Team Conclusion Regarding Requirement R7

The UFLS drafting team concluded that Requirement R7 should not be retired because it serves a purpose in support of the reliability of the Bulk-Power System (BPS). Before specifically addressing Requirement R7, it is important to outline the entire framework of PRC-006-1, within which R7 is applied. The PRC-006-1 standard establishes common performance characteristics that all UFLS programs must meet. It does

<sup>1</sup> Project 2013-02: Paragraph 81 [[Link to Paragraph 81 project page](#)]

<sup>2</sup> [Link to Independent Expert Review Project Final Report](#)

<sup>3</sup> Reliability Principle No. 3: Information necessary for the planning operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably. [Link to NERC Reliability Principles.](#)

not set mandatory continent-wide UFLS program parameters, such as setting program specific load shedding frequency thresholds, step sizes, and time delays.<sup>4</sup> As outlined by the *Project 2007-1-Underfrequency Load Shedding* drafting team, this is because prescribing specific 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.<sup>5</sup> 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.<sup>6</sup> The *Project 2007-1* 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.<sup>7</sup> In light of these observations, the *Project 2007-1* 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.<sup>8</sup>

Given the approach of establishing common performance characteristics, PRC-006-1 contains requirements to ensure that the Planning Coordinators and UFLS entities support the exchange of information necessary to design and assess performance of UFLS programs. This is achieved through Requirements R6 through R8, which establish requirements to maintain a UFLS database and share data necessary to maintain that database.<sup>9</sup> Under Requirement R6, 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. 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.<sup>10</sup> 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 UFLS database.

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<sup>4</sup> See, *Petition of the North American Electric Reliability Corporation for Approval of Proposed New Reliability Standards and Implementation Plans related to Underfrequency Load-Shedding*, Docket No. RM11-20-000 (March 31, 2011) at 8. (“NERC Petition”)

<sup>5</sup> See, NERC Petition, at 8.

For a full history of Project 2007-1 Underfrequency Load Shedding, click here for the project page: [Link to project page](#)

<sup>6</sup> See, NERC Petition, at 8.

<sup>7</sup> See, NERC Petition, at 24.

<sup>8</sup> See, NERC Petition, at 24.

<sup>9</sup> See, NERC Petition, at 17.

<sup>10</sup> See, NERC Petition, at 17.

As outlined above, because PRC-006-1 does not mandate a continent-wide UFLS program, it is essential that the various PCs coordinate and exchange data regarding their UFLS programs. It is important to point out that the P81 team found that Requirement R7 *does* support a reliability objective, and is based on the reliability principle that the information is necessary for the planning operation of the BPS and should be made available to those entities responsible for reliable system operation.<sup>11</sup> The UFLS SDT agrees. Notably, in reviewing Requirement R7, the P81 team determined that, “there should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters,” *not* that the sharing of data among PCs is unnecessary or fails to support reliability. The requirement simply clarifies what is expected of the PCs and the time frame for action. For these reasons, the UFLS SDT believes that Requirement R7 should not be retired.

**B. PRC-006-1, Requirement R8:**

“Each UFLS entity shall 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.”

**Paragraph 81 Recommendation for Requirement R8**

The P81 team found that Requirement R8 *does* support NERC Reliability Principle No. 3.<sup>12</sup> However, the P81 team identified it as a candidate for Phase 2 retirement because, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.” Additionally, the P81 team noted that Requirement R8 should be applicable to Generator Owners in order to address a reliability gap. Specifically, “[G]enerator Owners need to be required to provide appropriate machine trip points and other data for analysis and coordination done under this standard.”

**UFLS Drafting Team Conclusion Regarding Requirement R8**

The UFLS drafting team concluded that Requirement R8 should not be retired because it serves a purpose in support of the reliability of the BPS. Additionally, the team determined the standard should not be amended to apply to Generator Owners.

Requirement R8 should not be retired

Requirement R8 should not be retired because it serves a purpose in support of reliability. Under Requirement R8, each UFLS entity provides 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.<sup>13</sup> 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. As outlined above, PCs must

<sup>11</sup> See, Reliability Principle No. 3, above.

<sup>12</sup> See, Reliability Principle No. 3, above.

<sup>13</sup> NERC Petition, at 17, 25.

collect data and maintain the UFLS database with the information necessary design and assess performance of UFLS programs. Without Requirement R8, the PCs would not be provided with the UFLS data from the UFLS entities, and thus would not have the data necessary to conduct their design and performance assessments. Also, the SDT notes that the P81 recommendation to revise the applicability to include the Generator Owner contradicts the recommendation to retire Requirement R8. For these reasons, the UFLS SDT team believes Requirement R8 should not be retired.

Requirement R8 should not be revised to add applicability to Generator Owners

Requirement R8 should not be revised to add applicability to Generator Owners because it would create a redundancy, add unnecessary complexity, and possibly cause potential double violations of the standards. As outlined above, PRC-006-1 Requirement R3 establishes common performance characteristics that a PC's UFLS program must be designed to achieve. The performance characteristics specified (in R3.1 and R3.2) were coordinated with the 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 and generator trip settings.<sup>14</sup> Additionally, PRC-024-1 Requirement R4 requires that Generator Owners provide trip settings to the Planning Coordinator or Transmission Planner within 60 calendar days of a written request. For these reasons, the requirement should not be revised to add applicability to Generator Owners.

## Part III. IERP Recommendations (Requirements R6, R10 and R14)

### A. PRC-006-1, Requirement R6:

“Each Planning Coordinator shall 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. [VRF: Lower][Time Horizon: Long-term Planning].”

### IERP Recommendation for Requirement R6

The IERP recommended Requirement R6 for retirement on the grounds that it is administrative in nature and does not support a reliability objective. The IERP believed that, “[i]t is the actual study that provides for reliability.”

### UFLS Drafting Team Conclusion Regarding Requirement R6

Requirement R6 should not be retired because it serves a purpose in support of reliability. 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. This requirement assigns

<sup>14</sup> See, NERC Petition, at 14-15, 70-71, 79-80.

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 Requirement R11; and, where identified islands include portions of two or more PC areas, the data can be shared with other PCs as needed to conduct an assessment for their respective areas. For these reasons, the UFLS SDT team believes Requirement R6 should not be retired.

**B. PRC-006-1, Requirement R10:**

“Each Transmission Owner shall 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. [*VRF: High*][*Time Horizon: Long-term Planning*]”

**IERP Recommendation for Requirement R10**

The IERP recommended Requirement R10 for retirement on the grounds that it is more appropriate as a Guideline, because accountability is met under the TPL and VAR Reliability Standards. However, the IERP found that Requirement R10 *does* support Reliability Principle Nos. 1 and 4.<sup>15</sup>

**UFLS Drafting Team Conclusion Regarding Requirement R10**

The UFLS drafting team concluded that Requirement R10 should not be retired because it would create a gap causing a risk to reliability. Requirement R10 requires that each Transmission Owner provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control overvoltage 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.<sup>16</sup> Requirement R10 was added to address control of overvoltage conditions during underfrequency events (*e.g.*, the Western Interconnection has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event).

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<sup>15</sup> [Link to NERC Reliability Principles](#)

Reliability Principle No. 1: Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Reliability Principle No. 4: Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

<sup>16</sup> NERC Petition, at 17-18.

The IERP recommended retirement on the basis that accountability for controlling voltage is met under the TPL and VAR standards; however, the IERP did not point to any specific standard or requirement in support of that position. The UFLS SDT reviewed the existing TPL and VAR standards and determined that the specific actions required under Requirement R10 – specifically the switching of devices by Transmission Owners – is not covered elsewhere in the TPL or VAR standards. While the TPL and VAR families of standards address similar issues, Transmission Owners are not included as applicable entities under either family of standards, and Transmission Owners therefore are not compelled to provide automatic switching on their equipment or adherence to a schedule of application determined by the Planning Coordinator. For these reasons, the UFLS SDT team believes Requirement R10 should not be retired.

### C. PRC-006-1, Requirement R14

“Each Planning Coordinator shall 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 following [VRF: Lower][Time Horizon: Long-term Planning]:

- 14.1. UFLS program, including a schedule for implementation
- 14.2. UFLS design assessment
- 14.3. Format and schedule of UFLS data submittal”

### IERP Recommendation for Requirement R14

The IERP recommended Requirement R14 for retirement on the grounds that it is administrative in nature and does not support a reliability objective.

### UFLS Drafting Team Conclusion Regarding Requirement R14

The UFLS drafting team concluded that Requirement R14 should not be retired because it serves a purpose in support of reliability. Requirement R14 requires that the Planning Coordinator 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, including a schedule for implementation (R14.1) and the UFLS design assessment (R14.2). In its written response, the PC is to indicate whether changes will be made to the UFLS program as a result of the comments; or, if no changes will be made, the reason why. This requirement was added by the *Project 2007-1* drafting team 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.<sup>17</sup> The *Project 2007-1* drafting team considered the role of the Planning Coordinator and the coordination activities that the Planning Coordinator performs to meet its obligations. The team agreed that it would be beneficial to involve explicitly the UFLS entities and the Transmission Owners in

<sup>17</sup> NERC Petition, at 19-20, 78.



the process of defining the UFLS program and the schedule for implementation because these entities may provide information based on practical implementation experience that improves the overall effectiveness of the UFLS program. Additionally, Requirement R14 provides 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).<sup>18</sup> For these reasons, the UFLS SDT team believes Requirement R14 should not be retired.

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<sup>18</sup> NERC Petition, at 27.

# Violation Risk Factor and Violation Severity Level Justifications for Requirement R15 of PRC-006-2 Project 2008-02: Underfrequency Load Shedding (UFLS)

This document provides the Standard Drafting Team (SDT) justification for assignment of the violation risk factor (VRF) and violation severity levels (VSLs) for the proposed PRC-006-2 Requirement R15.<sup>1</sup>

For all NERC Reliability Standards, each requirement is assigned a VRF and a set of one or more VSL. These elements support the determination of an initial value range for the Base Penalty Amount regarding violations of requirements in FERC-approved Reliability Standards, as defined in the Electric Reliability Organization (ERO) Sanction Guidelines.

## **Part I. Violation Risk Factor (VRF) Justification**

The SDT applied the following NERC criteria and FERC Guidelines when proposing the VRF for Requirement R15 of PRC-006-2:

### **NERC VRF Criteria**

**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.

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<sup>1</sup> The VRFs for Requirements R9 and R10 were not changed. The VSLs for Requirements R9 and R10 were updated to reflect the revisions to the language of the requirement. Specifically, the “Corrective Action Plan” language was added; also, the word “application” was replaced with “implementation” to achieve consistency of terminology throughout the standard. Otherwise, the VSLs were not changed.

**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.

## **FERC Violation Risk Factor (VRF) Guidelines**

### **FERC VRF 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) where violations could severely affect the reliability of the Bulk-Power System:

- 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.

**FERC VRF Guideline (2) – Consistency within a Reliability Standard**

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

**FERC VRF 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.

**FERC VRF 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.

**FERC VRF 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.

**Proposed VRF for Requirement R15: High**

VRF Justification for PRC-006-2 Requirement R15	
Proposed VRF for Requirement R15	High
Discussion of NERC VRF Criteria	<p>A VRF of High is consistent with the NERC VRF Guidelines. Failure to develop a Corrective Action Plan to address identified deficiencies in the UFLS program could place the Bulk Electric System at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p> <p>Requirement R15 applies to a circumstance in which a PC has conducted a design assessment (under Requirement R4, R5 or R12) and determined that its UFLS program fails to meet the performance characteristics mandated by Requirement R3. In brief, Requirement R3 requires that each PC develop a UFLS program for UFLS entities within its area that meets certain predefined performance characteristics in simulations of underfrequency conditions resulting from an imbalance of up to 25 percent within the identified island. Requirement R3 also requires the PC to develop a schedule for implementation by the UFLS entities. Requirement R3 is assigned a High VRF because if violated, it could directly cause or contribute to bulk electric system failure (blackout), or could place the bulk electric system at an unacceptable risk of failure, and could hinder restoration to a normal condition.<sup>2</sup></p> <p>Under Requirement R15, if the PC identifies that the UFLS program is deficient and fails to meet the mandatory performance characteristics identified in Requirement R3, the PC must</p>

<sup>2</sup> See, *Petition of the North American Electric Reliability Corporation for Approval of Proposed New Reliability Standards and Implementation Plans related to Underfrequency Load-Shedding*, Docket No. RM11-20-000 (March 31, 2011) (“NERC Petition”).

	<p>develop a Corrective Action Plan and schedule for implementation by the UFLS entities. The Corrective Action Plan will provide a list of actions and an associated timetable for implementation to remedy the specific problem or deficiency that was identified in the UFLS program.</p> <p>Requirement R15 only applies when a UFLS program fails to meet the performance characteristics identified in Requirement R3. Because the Corrective Action Plan required under Requirement R15 is developed as a result of a deficient UFLS program, and for the purpose of implementing corrective action to remedy the identified deficiency, it should have the same violation risk factor assignment as the requirement for the Planning Coordinator to develop a UFLS program that meets the specified performance characteristics. Therefore, because Requirement R3 has a High VRF, Requirement R15 should also be assigned a High VRF.</p>
<p>Discussion of FERC VRF Guideline 1: Consistency with Blackout Report:</p>	<p>Not applicable to this requirement.</p>
<p>Discussion of FERC VRF Guideline 2: Consistency within a Reliability Standard</p>	<p>There is no inconsistency between sub-Requirement and main Requirement VRF assignments because NERC no longer assigns VRFs to sub-Requirements in Reliability Standards.</p>
<p>Discussion of FERC VRF Guideline 3: Consistency among Reliability Standards</p>	<p>There are no comparable standards that address similar reliability goals to that of the UFLS standard. However, it is important to note that the PRC-006 standard was constructed such that there are a number of requirements contained in the standard that are related, affect and/or are conditions precedent to the application of Requirement R15. Because of this construct, these requirements are helpful to consider in determining the proper VRF assignment for Requirement R15. Specifically,</p> <ul style="list-style-type: none"> <li>• <b>Requirement R3 – High VRF</b> – Identifies the specific performance characteristics that each PC’s UFLS program must meet.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Requirement R4 – High VRF</b> – Requires each PC to conduct a design assessment at least once every five years to determine whether the UFLS program meets the performance characteristics of Requirement R3.</li> <li>• <b>Requirement R5 – High VRF</b> – Requires each PC to coordinate its design assessment with other PCs, when the PC area is part of the same island identified by another PC.</li> <li>• <b>Requirement R9 – High VRF</b> – Requires each PC to provide automatic tripping of load in accordance with the PC’s UFLS program, including any Corrective Action Plan.</li> <li>• <b>Requirement R10 – High VRF</b> – Requires each Transmission Owner to provide automatic switching of certain identified devices if required by the PC’s UFLS program, including any Corrective Action Plan.</li> <li>• <b>Requirement R12 – Medium VRF</b> – Requires each PC that identifies deficiencies through an islanding event assessment conducted under Requirement R11, to conduct a design assessment of the UFLS program.</li> </ul> <p>Because the vast majority of these requirements have a High VRF and in order to achieve consistency and treat similar requirements contained within PRC-006 in a like manner, Requirement R15 is assigned a High VRF.</p>
<p>Discussion of FERC VRF Guideline 4: Consistency with NERC Definitions of VRFs</p>	<p>See “NERC VRF Discussion” above.</p>
<p>Discussion of FERC VRF Guideline 5: Treatment of Requirements that Co-mingle More Than One Obligation</p>	<p>Requirement R15 does not co-mingle more than one obligation.</p>

**Part II. Violation Severity Level (VSL) Justification**

**NERC VSL Criteria**

Violation Severity Levels (VSLs) define the degree to which compliance with a requirement was not achieved. Each requirement must have at least one VSL. While it is preferable to have four VSLs for each requirement, some requirements do not have multiple “degrees” of noncompliant performance and may have only one, two, or three VSLs. Violation severity levels are based on the NERC overarching criteria shown in the table below:

Lower VSL	Moderate VSL	High VSL	Severe VSL
The performance or product measured almost meets the full intent of the requirement.	The performance or product measured meets the majority of the intent of the requirement.	The performance or product measured does not meet the majority of the intent of the requirement, but does meet some of the intent.	The performance or product measured does not substantively meet the intent of the requirement.

**FERC VSL Guidelines<sup>3</sup>**

**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.**

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<sup>3</sup> Order on Violation Severity Levels Proposed by the Electric Reliability Organization, 123 FERC ¶ 61,284 (2008)(“VSL Order”), order on rehearing and clarification, 125 FERC ¶ 61,212(2008).



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 provides that assessing penalties on a per violation per day basis is the “default” for penalty calculations.

**Proposed VSLs for Requirement R15**

Lower VSL	Moderate VSL	High VSL	Severe VSL
N/A	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.	The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.  OR

			<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</p>
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**VSL Justifications for PRC-006-2 Requirement R15**

<p><b>NERC VSL Guidelines</b></p>	<p>Consistent with the NERC VSL Guidelines, the VSLs describe the degree of noncompliant performance in an incremental manner (moderate, high and severe).</p>
<p><b>FERC VSL Guideline 1:</b> Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance</p>	<p>The current levels of compliance are not lowered by the proposed VSLs.</p>

<p><b>FERC VSL Guideline 2:</b> Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties</p> <p><u>Guideline 2a:</u> The single VSL assignment category for “Binary” Requirements is not consistent</p> <p><u>Guideline 2b:</u> VSL Assignments that contain ambiguous language</p>	<p>The proposed VSL is written to ensure uniformity and consistency in the determination of penalties.</p> <p><u>Guideline 2a:</u> The VSL is not written in a binary (pass/fail) manner; instead the VSL has an incremental time-based approach for assigning the level of violation severity.</p> <p><u>Guideline 2b:</u> The VSL assignments contain clear and unambiguous language.</p>
<p><b>FERC VSL Guideline 3:</b> Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement</p>	<p>The language of the VSL directly mirrors the language in the corresponding Requirement R15.</p>
<p><b>FERC VSL Guideline 4:</b> Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations</p>	<p>The proposed VSLs are not based on a cumulative number of violations.</p>

# Consideration of FERC Directive

## Project 2008-02: Underfrequency Load Shedding (UFLS)

FERC Directive	Consideration of Directive
<p><b>FERC Order No. 763, Paragraph 48:</b><sup>1</sup></p> <p>In response to the Commission’s concern that Reliability Standard PRC-006-1 does not specify how soon after an event would an entity need to implement corrections in response to any deficiencies identified in the event assessment under Requirement R11 of PRC-006-1, NERC stated in its comments that:</p> <p style="padding-left: 40px;">The amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, as specified in Requirement R9 of PRC-006-1. The time allotted for corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changes in budgeting cycles.</p> <p>Requirement R9 of PRC-006-1 states:</p> <p style="padding-left: 40px;">R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for</p>	<p>Requirement R15 of proposed PRC-006-2 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the Planning Coordinator shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities. A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” The Corrective Action Plan developed by the Planning Coordinator will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the Planning Coordinator as a result of an assessment. The time allotted by the Planning Coordinator for making corrections will depend on the extent of the deficiencies identified. The</p>

<sup>1</sup> Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards, 139 FERC ¶ 61,098 (May 7, 2012). [[Link to FERC Order No. 763](#)]

FERC Directive	Consideration of Directive
<p>application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. <i>[VRF: High][Time Horizon: Long-term Planning]</i></p> <p>Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard. Within 30 days of the effective date of this Final Rule, NERC is directed to submit a compliance filing indicating how it plans to comply with this directive and a deadline for compliance.</p>	<p>schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changing in budgeting cycles.<sup>2</sup></p> <p>Additionally, for Requirements R9 and R10, the standard drafting team added the “Corrective Action Plan” language to ensure that any Corrective Action Plan developed by the Planning Coordinator under Requirement R15 will be implemented by the UFLS entity and/or Transmission Owner as part of the UFLS program.</p>

<sup>2</sup> See, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (May 7, 2012), citing, *Comments of NERC in Response to Notice of Proposed Rulemaking*, Docket No. RM-11-20-000, at 8 (December 23, 2011).

# DRAFT Reliability Standard Audit Worksheet<sup>1</sup>

## PRC-006-2 – Automatic Underfrequency Load Shedding

*This section to be completed by the Compliance Enforcement Authority.*

**Audit ID:** Audit ID if available; or REG-NCRnnnnn-YYYYMMDD  
**Registered Entity:** Registered name of entity being audited  
**NCR Number:** NCRnnnnn  
**Compliance Enforcement Authority:** Region or NERC performing audit  
**Compliance Assessment Date(s)<sup>2</sup>:** Month DD, YYYY, to Month DD, YYYY  
**Compliance Monitoring Method:** [On-site Audit | Off-site Audit | Spot Check]  
**Names of Auditors:** Supplied by CEA

### Applicability of Requirements

	BA	DP	GO	GOP	IA	LSE	PA	PSE	RC	RP	RSG	TO	TOP	TP	TSP
R1							X								
R2							X								
R3							X								
R4							X								
R5							X								
R6							X								
R7							X								
R8		X*										X*			
R9		X*										X*			
R10												X*			
R11							X								
R12							X								
R13							X								
R14							X								

<sup>1</sup> NERC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate NERC’s and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The NERC RSAW language is written to specific versions of each NERC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that NERC has elected to use to assess compliance with the requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. NERC’s Reliability Standards can be found on NERC’s website. Additionally, NERC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status.

The NERC RSAW language contained within this document provides a non-exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and NERC and the Regional Entity using this RSAW reserves the right to request additional evidence from the registered entity that is not included in this RSAW. Additionally, this RSAW includes excerpts from FERC Orders and other regulatory references. The FERC Order cites are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail.

<sup>2</sup> Compliance Assessment Date(s): The date(s) the actual compliance assessment (on-site audit, off-site spot check, etc.) occurs.

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	BA	DP	GO	GOP	IA	LSE	PA	PSE	RC	RP	RSG	TO	TOP	TP	TSP
<b>R15</b>							X								

\* UFLS entities 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 one or more of the following: Transmission Owners, Distribution Providers, Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.

**Legend:**

Text with blue background:	Fixed text – do not edit
Text entry area with Green background:	Entity-supplied information
Text entry area with white background:	Auditor-supplied information

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**Findings**

(This section to be completed by the Compliance Enforcement Authority)

Req.	Finding	Summary and Documentation	Functions Monitored
R1			
R2			
R3			
R4			
R5			
R6			
R7			
R8			
R9			
R10			
R11			
R12			
R13			
R14			
R15			

Req.	Areas of Concern
R1	
R2	
R3	
R4	
R5	
R6	
R7	
R8	
R9	
R10	
R11	
R12	
R13	
R14	
R15	

Req.	Recommendations
R1	
R2	
R3	
R4	
R5	
R6	



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R7	
R8	
R9	
R10	
R11	
R12	
R13	
R14	
R15	

Req.	Positive Observations
R1	
R2	
R3	
R4	
R5	
R6	
R7	
R8	
R9	
R10	
R11	
R12	
R13	
R14	
R15	



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**R1 Supporting Evidence and Documentation**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands.
  
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested<sup>i</sup>:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
The documents and criteria used to select portions of the BES that may form islands.
A list of historical events used to select portions of the BES that may form islands.
The system studies used to select portions of the BES that may form islands.

**Registered Entity Evidence (Required):**

<b>The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.</b>					
File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R1**

***This section to be completed by the Compliance Enforcement Authority***

Review the evidence to verify the entity has:
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**R2 Supporting Evidence and Documentation**

- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including:
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
  - 2.2.** 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, and
  - 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator’s area resides. If a Planning Coordinator’s area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.

**Registered Entity Response (Required):**

**Question:** Does the Planning Coordinators area reside in multiple Regional Entity areas? If yes, provide a list of the Regional Entity areas. Did the PCs adjust island boundaries to differ from Regional Entity area boundaries? If yes, was it by mutual consent with the identified Regional Entities?       Yes     No

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
A list of identified islands used as a basis for your UFLS Program.
A list of the islands selected by applying the criteria in Requirement R1.
A list of the 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.
Identify the single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator’s area resides.
Reports, memorandums, e-mails, or other documentation supporting identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.

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**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R2**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Identified one or more islands to serve as a basis for designing its UFLS program. It shall include:
	(Part 2.1) Islands selected by applying the criteria in R1, and
	(Part 2.2) 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, and
	(Part 2.3) A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
	Responded to the applicability Questions for the second part of R2.3 and provided evidence of compliance if the response was yes.
	Identified all Regional Entities that are part of an island if the Planning Coordinator's area resides in multiple Regional Entity areas.
	Adjusted island boundaries to differ from Regional Entity area boundaries by mutual consent between Regional Entities and the PC where necessary, for the sole purpose of producing contiguous regional islands more suitable for simulation.

**Note to Auditor:**

Evidence may include, but is not limited to, reports, memorandums, e-mails, or other documentation supporting its identification of an island(s).

The WECC Interconnection has a Regional Variance that replaces R2 in its entirety.

**Auditor Notes:**

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**R3 Supporting Evidence and Documentation**

- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
  - 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
  - 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
    - Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
    - Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
    - Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.
- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Evidence such as reports, memorandums, e-mails, program plans, or other documentation of your UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3 .

**Registered Entity Evidence (Required):**



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The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R3**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario as described in R3.
	(Part 3.1) Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
	(Part 3.2) Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
	(Part 3.3) Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:
	<ul style="list-style-type: none"> <li>Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES</li> </ul>
	<ul style="list-style-type: none"> <li>Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES</li> </ul>
	<ul style="list-style-type: none"> <li>Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating</li> </ul>
	Provided notification and a schedule for implementation by identified UFLS entities within the PC's area for R3.

**Note to Auditor:**

Request a list of UFLS entities within the PC area to verify notification.

Evidence may include, but is not limited to, reports, memorandums, emails, program plans.

The Quebec and WECC Interconnections have Regional Variances that replace R3 in its entirety.

**Auditor Notes:**

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**R4 Supporting Evidence and Documentation**

- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following:
- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
  - 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.
- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Dated evidence such as reports, dynamic simulation models and results, or other dated documentation of

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your UFLS design assessment that demonstrates the simulation modeled each requirement in R4, Parts 4.1 through 4.7, and that the assessment(s) were performed at least once every five years.

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R4**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Conducted and documented 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 R3 for each island identified in Requirement R2. Verify the simulation modeled each of the following:
	(Part 4.1) Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
	(Part 4.2) Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
	(Part 4.3) Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.
	(Part 4.4) Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
	(Part 4.5) Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.
	(Part 4.6) Overfrequency trip settings of any facility consisting of one or more units connected to the



**R5 Supporting Evidence and Documentation**

**R5.** Each 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, shall 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 one of the following:

- Develop 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
- Conduct 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
- Conduct 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 the ERO.

**M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.

**Registered Entity Response (Required):**

**Question:** Does the PC area or portions of its area, also include the area or portions of the area of another PC?

Yes  No

If yes, provide a list of these Planning Coordinators.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design

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assessment, letters that include recommendations, or other dated documentation demonstrating that entity coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of areas are also part of the same identified island per Requirement R5.

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R5**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of areas are also part of the same identified island through one of the following:
	<ul style="list-style-type: none"> <li>Developed a common UFLS program design and schedule for implementation per Requirement R3 among the Planning Coordinators, or</li> </ul>
	<ul style="list-style-type: none"> <li>Conducted a joint UFLS design assessment per Requirement R4 among the Planning Coordinators, or</li> </ul>
	<ul style="list-style-type: none"> <li>Conducted an independent UFLS design assessment per Requirement R4 for the identified island, and in the event the UFLS design assessment failed to meet R3, identified modifications to the UFLS program(s) to meet R3 and reported the modifications as recommendations to the other Planning Coordinators and the ERO.</li> </ul>

**Note to Auditor:**

If the entity area or portions of its area do not include the area or portions of the area of another Planning Coordinator, no further compliance assessment is necessary.

Evidence may include, but is not limited to, joint UFLS program design documents, reports describing a joint UFLS program assessment or letters that include recommendations.

The WECC Interconnection has a Regional Variance that replaces R5 in its entirety.

**Auditor Notes:**

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**R6 Supporting Evidence and Documentation**

**R6.** Each Planning Coordinator shall 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.

**M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that a UFLS database containing data necessary to model your UFLS program for use in event analyses and assessments was maintained for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R6**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Maintained a UFLS database to model its UFLS program for use in event analyses and assessments of the UFLS program.
	A database that includes model data sufficient to be effective when the entity is performing an event analysis or assessment of the UFLS program.
	Documentation demonstrating the database was maintained at least once each calendar year but with no more than 15 months between maintenance activities.
<b>Note to Auditor:</b> Examples of “model data sufficient to be effective” can be subjective depending on the size and scope of the Planning Coordinator’s area. Potential examples may include model data specified in the R4 sub-requirements.  Evidence may include, but is not limited to data requests or data input forms associated with a UFLS database.	

**Auditor Notes:**

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**R7 Supporting Evidence and Documentation**

**R7.** Each Planning Coordinator shall 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.

**M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e- mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.

**Registered Entity Response (Required):**

**Question:** Did the entity receive a request to provide its UFLS database to other Planning Coordinators within its Interconnection?       Yes    No

If yes, provide a list of requests.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested<sup>i</sup>:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Dated evidence such as letters, memorandums, e- mails or other dated documentation that entity provided its UFLS database containing data necessary to model its UFLS program to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**

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**Compliance Assessment Approach Specific to PRC-006-2, R7**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
<input type="checkbox"/>	Dated request(s) received from other PCs within its Interconnection.
<input type="checkbox"/>	Dated response(s) providing the requested UFLS database.
<input type="checkbox"/>	Provided a response within 30 calendar days of the request.
<b>Note to Auditor:</b> If the entity did not receive a request to provide its UFLS database to other Planning Coordinators within its Interconnection, no further compliance assessment is necessary.	

**Auditor Notes:**

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**R8 Supporting Evidence and Documentation**

- R8.** Each UFLS entity shall 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.
  
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested<sup>1</sup>:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that entity provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the Planning Coordinator’s UFLS database.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R8**

***This section to be completed by the Compliance Enforcement Authority***

Review the evidence to verify the entity has:
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	The format and schedule specified by the Planning Coordinator to receive data to support maintenance of the PC’s UFLS database.
	Dated documentation the data was provided to the Planning Coordinator in the format specified and in accordance with the established schedule.
	Notified the Planning Coordinator of no changes to its data since its last submission.
<b>Note to Auditor:</b> A UFLS entity is an entity responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. UFLS entities shall be identified in R3.  R6 requires the Planning Coordinator to maintain its UFLS database at least once each calendar year, but no more than 15 months. It is anticipated, but not required, that the schedule established by the Planning Coordinator to receive data from a UFLS entity would be consistent with R6.  If the UFLS entity states it notified the Planning Coordinator of no changes to its data since its last submission verify the Planning Coordinator’s “format and schedule” allows for this type of submission.	

**Auditor Notes:**

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**R9 Supporting Evidence and Documentation**

- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets.
  
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, by the Planning Coordinator(s) in each Planning Coordinator area in which the entity owns assets.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R9**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Documentation of the UFLS program design and schedule for implementation, including any Corrective Action Plan as determined by the Planning Coordinator(s).
	Dated documentation the entity provided automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by the associated Planning Coordinator.
<b>Note to Auditor:</b> A UFLS entity is an entity responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Evidence may include, but is not limited to, spreadsheets summarizing feeder load and UFLS relay settings.	

**Auditor Notes:**

<p style="text-align: center; font-size: 48px; opacity: 0.2; transform: rotate(-30deg);">DRAFT</p>
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**R10 Supporting Evidence and Documentation**

- R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.
  
- M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.

**Registered Entity Response (Required):**

**Question:** Is the entity required by the UFLS programs of the Planning Coordinators in which it owns transmission, to provide automatic switching to control over-voltage resulting from underfrequency load shedding?  Yes  No

If Yes, provide details, statement if Corrective Action Plans were included, and evidence of compliance. If No, how was this ascertained?

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which you own transmission.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

**DRAFT NERC Reliability Standard Audit Worksheet**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R10**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	UFLS programs and schedules for implementation requirements for the entity to provide automatic switching to control over-voltage as a result of underfrequency load shedding, including any Corrective Action Plans.
	Documentation the entity provided the specified automatic switching of existing capacitor banks, transmission lines, and reactors to control over-voltage as a result of underfrequency load shedding.
<p><b>Note to Auditor:</b>                  Evidence may include, but is not limited to, relays settings or tripping logic.                  If the entity is not required by the Planning Coordinator’s UFLS programs to provide automatic switching to control over-voltage resulting from underfrequency load shedding, no further compliance assessment is necessary.</p>	

**Auditor Notes:**

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**R11 Supporting Evidence and Documentation**

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate:

- 11.1** The performance of the UFLS equipment,
- 11.2** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**Registered Entity Response (Required):**

**Question:** Did the entity experience a BES islanding event that resulted in system frequency excursions below the initializing set points of the UFLS program?  Yes  No

If yes, provide evidence of the assessment of the event.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Dated evidence such as reports, data gathered from an historical event, or other dated documentation to show a BES islanding event assessment was conducted, within one year of the event, to assess the performance of the UFLS equipment and the effectiveness of the UFLS program.

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**DRAFT NERC Reliability Standard Audit Worksheet**


**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R11**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Reviewed the dated BES islanding event report, description or other documentation to understand the event.
	Reviewed the entity's dated assessment of the event and verify the assessment was completed within one year of the event.
	(Part 11.1) Ensured the assessment included an evaluation of the performance of the UFLS equipment
	(Part 11.2) Ensured the assessment included an evaluation of the effectiveness of the UFLS program.

**Note to Auditor:**

If the entity did not experience a BES islanding event that resulted in system frequency excursions below initializing set points of the UFLS program, no further compliance assessment is necessary. Requirement R11 specifies the assessment must be completed within "one year" of the event. A period of one year is considered to be 365 days from the date of the event.

The WECC Interconnection has a Regional Variance that replaces R11 in its entirety.

**Auditor Notes:**

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**R12 Supporting Evidence and Documentation**

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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.

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

**Registered Entity Response (Required):**

**Question:** Did the entity experience a BES islanding event that resulted in system frequency excursions below the initializing set points of the UFLS program?  Yes  No

**Question:** If yes, did the assessment conducted under Requirement R11 identify any UFLS program deficiencies?  Yes  No

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**  
 Dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that entity conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in the UFLS equipment and effectiveness performance assessment.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**DRAFT NERC Reliability Standard Audit Worksheet**

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**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R12**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	The dated BES islanding event report, description or other documentation to understand the event.
	The dated assessment of the effectiveness of the program and performance of the UFLS equipment for the event conducted under R11.
	The dated UFLS design assessment considering the identified deficiencies within two years of the event.

**Note to Auditor:**

If the entity did not experience a BES islanding event that resulted in system frequency excursions below initializing set points of the UFLS program, or, conducted an assessment of the effectiveness of the program and equipment but did not identify deficiencies, no further compliance assessment is necessary. Requirement R12 specifies that the design assessment must be completed within “two years” of the event. A period of “two years” is considered to be 730 days from the date of the event.

The WECC Interconnection has a Regional Variance that replaces R12 in its entirety.

**Auditor Notes:**

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**R13 Supporting Evidence and Documentation**

**R13.** Each 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, shall 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 following: Conduct 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

- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**Registered Entity Response (Required):**

**Question:** Did the entity experience a BES islanding event that also included the areas or portions of areas of other Planning Coordinators in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program?  Yes  No

If yes, provide evidence of assessment of the event.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

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**Evidence Requested:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating entity coordinated the event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R13**

*This section to be completed by the Compliance Enforcement Authority*

*Review the evidence to verify the entity has:*

Dated documentation that it coordinated the event assessment conducted under Requirement R11, with all other Planning Coordinators whose areas or portions of areas were also included in the same event. The event assessment must be by one of the following methods:

- Joint event assessment per Requirement R11 among the Planning Coordinators, or
- Conducted independent assessment per R11 that reaches conclusions and recommendations consistent with those of the other Planning Coordinators assessment, or
- Conducted independent assessment per Requirement R11 that fails to reach conclusions and recommendations consistent with those of the other Planning Coordinators assessment, identify differences in the assessment processes resulting in inconsistent conclusions and recommendations and report the differences to all involved Planning Coordinators and ERO.

**Note to Auditor:**



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If the entity did not experience an event as described in R13, no further compliance assessment is necessary.

Evidence of coordination of event assessment may include, but is not limited to, joint assessment reports or independent assessment reports with letters stating likely reasons for differences in conclusions and recommendations.

The WECC Interconnection has a Regional Variance that replaces R13 in its entirety.

**Auditor Notes:**

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**R14 Supporting Evidence and Documentation**

**R14.** Each Planning Coordinator shall 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 following:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** 14.3.Format and schedule of UFLS data submittal.

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

**Registered Entity Response (Required):**

**Question:** Did the entity have a comment period related to proposed changes to any of the elements listed in R14.1, R14.2 or R14.3?  Yes  No

**Question:** If yes, did the entity receive written comments from applicable UFLS entities and Transmission Owner(s) following the comment period?  Yes  No

**Question:** If yes, did the entity provide a written response to the written comments of each applicable UFLS entity and Transmission Owner(s) indicating whether the changes will be made or the reasons why changes will not be made prior to finalizing the changes?  Yes  No

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested<sup>1</sup>:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

Dated evidence of responses, such as e-mails and letters, to written comments submitted by UFLS entities and Transmission Owners within entity's Planning Coordinator area following a comment period and before finalizing entity's UFLS program indicating whether changes will be made or reasons why changes will not be made.

**DRAFT NERC Reliability Standard Audit Worksheet**

**Registered Entity Evidence (Required):**

The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R14**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Reviewed all dated and written comments received by the Planning Coordinator from each applicable UFLS entity and Transmission Owner regarding:
	(Part 14.1) UFLS program, including a schedule for implementation
	(Part 14.2) UFLS design assessment
	(Part 14.3) Format and schedule of UFLS data submittal
	Provided each comment received with a dated and written response indicating whether the change will be made or the reasons why the change will not be made.
	Provided all written responses prior to finalizing the Planning Coordinator's UFLS program.

**Note to Auditor:**

If the entity did not have a comment period or did not receive written comments during a comment period, no further compliance assessment is necessary.

**Auditor Notes:**

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**R15 Supporting Evidence and Documentation**

- R15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.
- 15.1.** For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.
- 15.2.** For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12
- M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

**Registered Entity Response (Required):**

**Question:** Did the entity’s design assessment (performed under Requirements R4, R5 or R12) determine the UFLS program did not meet the performance characteristics of Requirement R3 during the compliance monitoring period?     Yes     No

If Yes, provide details and evidence of compliance as indicated below. If No, provide evidence that no deficiencies were identified as a result of the design assessment?

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested<sup>1</sup>:**

**Provide the following evidence, or other evidence to demonstrate compliance.**

A dated Corrective Action Plan and a schedule for implementation by the UFLS entities within your area that was developed within the time frame identified in Part 15.1 or 15.2.

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

**DRAFT NERC Reliability Standard Audit Worksheet**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to PRC-006-2, R15**

*This section to be completed by the Compliance Enforcement Authority*

Review the evidence to verify the entity has:	
	Dated Corrective Action Plan(s).
	Dated schedule for implementation for each Corrective Action Plan by UFLS entities.
	(Part 15.1.) Verify any Corrective Action Plan developed from design assessments performed under Requirement R4 or R5 were developed within the five-year timeframe identified in Requirement R4.
	(Part 15.2.) Verify any Corrective Action Plan developed from design assessments performed under Requirement R12 were developed within the two-year timeframe identified in Requirement R12.
<b>Note to Auditor:</b>	

**Auditor Notes:**

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**Additional Information:**

**Reliability Standard**

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard.

**Sampling Methodology**

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard, if applicable.

**Regulatory Language**

To be inserted by NERC Legal prior to posting of this RSAW associated with the enforceable date of this Reliability Standard.

**Selected Glossary Terms**

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard, if applicable.

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**DRAFT** NERC Reliability Standard Audit Worksheet

**Revision History for RSAW**

Version	Date	Reviewers	Revision Description
1	09/09/2014	NERC Compliance, NERC Standards, RSAWTF - Requirement R15	New Document

<sup>i</sup> Items in the Evidence Requested section are suggested evidence that may, but will not necessarily, demonstrate compliance. These items are not mandatory and other forms and types of evidence may be submitted at the entity's discretion.

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# Standards Announcement **Reminder**

## Project 2008-02 Underfrequency Load Shedding (UFLS)

Initial Ballot Now Open through October 8, 2014

### [Now Available](#)

An initial ballot for **PRC-006-2 – Automatic Underfrequency Load Shedding** and non-binding poll of the associated Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs) are open through **8 p.m. Eastern on Wednesday, October 8, 2014.**

Background information for this project can be found on the [project page](#).

### **Instructions for Balloting**

Members of the ballot pools associated with this project may log in and submit their vote for the standard and associated VRFs and VSLs by clicking [here](#).

### **Next Steps**

The ballot results will be announced and posted on the project page. The drafting team will consider all comments received during the formal comment period and, if needed, make revisions to the standard and post it for an additional ballot. If the comments do not show the need for significant revisions, the standard will proceed to a final ballot.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#)  
Standards Developer, or at 404.446.2581.*

North American Electric Reliability Corporation

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# Standards Announcement

## Project 2008-02 Underfrequency Load Shedding (UFLS)

Formal Comment Period Open August 21, 2014 through October 8, 2014

### Now Available

A formal comment period for **PRC-006-2 – Automatic Underfrequency Load Shedding** is open through **8 p.m. Eastern on Wednesday, October 8, 2014**. Background information for this project can be found on the [Project 2008-02 project page](#).

If you have questions please contact [Lacey Ourso](#) via email or by telephone at (404) 446-2581.

Please note that two separate standards, PRC-010-1 – Undervoltage Load Shedding and PRC-006-2 – Underfrequency Load Shedding, are being developed in Project 2008-02. The UFLS work is being undertaken in concert with the efforts of the UVLS standard drafting team in order to ensure overall consistency and alignment for these protection systems programs. The two standards are on different timelines, and **this posting is only for PRC-006-2**. PRC-010-1 completed an initial ballot in August and will be posted again for either a final ballot or additional comment period and ballot in early September. Additional background information for this project can be found on the [project page](#).

### **Instructions for Joining Ballot Pools**

Ballot pools are currently being formed. Registered Ballot Body members must join the ballot pools to be eligible to cast ballots. Registered Ballot Body members may join the ballot pools at the following page: [Join Ballot Pool](#).

During the pre-ballot window, members of the ballot pools may communicate with one another by using their “ballot pool list servers.” (Once the balloting begins, ballot pool members are prohibited from using the ballot pool list servers.) The list servers for this project are:

[bp-2008-02\\_PRC-006-2\\_in@nerc.com](mailto:bp-2008-02_PRC-006-2_in@nerc.com)

[bp-2008-02\\_UFLS\\_NBP\\_in@nerc.com](mailto:bp-2008-02_UFLS_NBP_in@nerc.com)

### **Instructions for Commenting**

Please use the [electronic form](#) to submit comments on the standard. If you experience any difficulties in using the electronic form, please contact [Wendy Muller](#). An off-line, unofficial copy of the comment form is posted on the [project page](#).

### Next Steps

A ballot pool will be formed from August 21, 2014 through September 22, 2014. An initial ballot and non-binding poll of the associated Violation Risk Factor and Violation Severity Levels will be conducted **September 29 through October 8, 2014**.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#)  
Standards Developer, or at 404.446.2581.*

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# Standards Announcement

## Project 2008-02 Underfrequency Load Shedding (UFLS)

Formal Comment Period Open August 21, 2014 through October 8, 2014

### Now Available

A formal comment period for **PRC-006-2 – Automatic Underfrequency Load Shedding** is open through **8 p.m. Eastern on Wednesday, October 8, 2014**. Background information for this project can be found on the [Project 2008-02 project page](#).

If you have questions please contact [Lacey Ourso](#) via email or by telephone at (404) 446-2581.

Please note that two separate standards, PRC-010-1 – Undervoltage Load Shedding and PRC-006-2 – Underfrequency Load Shedding, are being developed in Project 2008-02. The UFLS work is being undertaken in concert with the efforts of the UVLS standard drafting team in order to ensure overall consistency and alignment for these protection systems programs. The two standards are on different timelines, and **this posting is only for PRC-006-2**. PRC-010-1 completed an initial ballot in August and will be posted again for either a final ballot or additional comment period and ballot in early September. Additional background information for this project can be found on the [project page](#).

### **Instructions for Joining Ballot Pools**

Ballot pools are currently being formed. Registered Ballot Body members must join the ballot pools to be eligible to cast ballots. Registered Ballot Body members may join the ballot pools at the following page: [Join Ballot Pool](#).

During the pre-ballot window, members of the ballot pools may communicate with one another by using their “ballot pool list servers.” (Once the balloting begins, ballot pool members are prohibited from using the ballot pool list servers.) The list servers for this project are:

[bp-2008-02\\_PRC-006-2\\_in@nerc.com](mailto:bp-2008-02_PRC-006-2_in@nerc.com)

[bp-2008-02\\_UFLS\\_NBP\\_in@nerc.com](mailto:bp-2008-02_UFLS_NBP_in@nerc.com)

### **Instructions for Commenting**

Please use the [electronic form](#) to submit comments on the standard. If you experience any difficulties in using the electronic form, please contact [Wendy Muller](#). An off-line, unofficial copy of the comment form is posted on the [project page](#).

### Next Steps

A ballot pool will be formed from August 21, 2014 through September 22, 2014. An initial ballot and non-binding poll of the associated Violation Risk Factor and Violation Severity Levels will be conducted **September 29 through October 8, 2014**.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#)  
Standards Developer, or at 404.446.2581.*

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# Standards Announcement

## Project 2008-02 Underfrequency Load Shedding (UFLS) PRC-006-2

### Initial Ballot and Non-Binding Poll Results

#### [Now Available](#)

An initial ballot for **PRC-006-2 – Automatic Underfrequency Load Shedding** and non-binding poll of the associated Violation Risk Factors and Violation Severity Levels concluded at **8 p.m. Eastern on Wednesday, October 8, 2014.**

The standard achieved a quorum and received sufficient affirmative votes for approval. Voting statistics are listed below, and the [Ballot Results](#) page provides a link to the detailed results for the ballot.

Ballot	Non-Binding Poll
Quorum /Approval	Quorum/Supportive Opinions
84.82% / 84.05%	81.74% / 89.72%

Background information for this project can be found on the [project page](#).

#### Next Steps

The drafting team will consider all comments received during the formal comment period and, if needed, make revisions to the standard and post it for an additional ballot. If the comments do not show the need for significant revisions, the standard will proceed to a final ballot.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#).*

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Ballot Results	
<b>Ballot Name:</b>	Project 2008-02 UFLS PRC-006-2_in
<b>Ballot Period:</b>	9/29/2014 - 10/8/2014
<b>Ballot Type:</b>	Initial
<b>Total # Votes:</b>	313
<b>Total Ballot Pool:</b>	369
<b>Quorum:</b>	<b>84.82 % The Quorum has been reached</b>
<b>Weighted Segment Vote:</b>	84.05 %
<b>Ballot Results:</b>	<b>The ballot has closed</b>

Summary of Ballot Results										
Segment	Ballot Pool	Segment Weight	Affirmative		Negative		Negative Vote without a Comment	Abstain	No Vote	
			# Votes	Fraction	# Votes	Fraction				
1 - Segment 1	102	1	62	0.861	10	0.139	0	8	22	
2 - Segment 2	9	0.8	5	0.5	3	0.3	0	0	1	
3 - Segment 3	85	1	61	0.91	6	0.09	1	8	9	
4 - Segment 4	28	1	21	0.84	4	0.16	0	0	3	
5 - Segment 5	75	1	50	0.847	9	0.153	0	6	10	
6 - Segment 6	54	1	36	0.878	5	0.122	0	3	10	
7 - Segment 7	0	0	0	0	0	0	0	0	0	
8 - Segment 8	4	0.4	3	0.3	1	0.1	0	0	0	
9 - Segment 9	4	0.3	3	0.3	0	0	0	0	1	

10 - Segment 10	8	0.8	7	0.7	1	0.1	0	0	0
<b>Totals</b>	<b>369</b>	<b>7.3</b>	<b>248</b>	<b>6.136</b>	<b>39</b>	<b>1.164</b>	<b>1</b>	<b>25</b>	<b>56</b>

Individual Ballot Pool Results				
Segment	Organization	Member	Ballot	NERC Notes
1	Ameren Services	Eric Scott	Negative	SUPPORTS THIRD PARTY COMMENTS - (Ameren)
1	American Electric Power	Paul B Johnson	Negative	SUPPORTS THIRD PARTY COMMENTS - (Tom FOltz - AEP)
1	American Transmission Company, LLC	Andrew Z Pusztai	Affirmative	
1	Arizona Public Service Co.	Brian Cole		
1	Associated Electric Cooperative, Inc.	John Bussman	Affirmative	
1	ATCO Electric	Glen Sutton	Abstain	
1	Austin Energy	James Armke	Affirmative	
1	Avista Utilities	Heather Rosentrater		
1	Balancing Authority of Northern California	Kevin Smith	Affirmative	
1	Baltimore Gas & Electric Company	Christopher J Scanlon	Affirmative	
1	Basin Electric Power Cooperative	David Rudolph	Affirmative	
1	BC Hydro and Power Authority	Patricia Robertson	Abstain	
1	Beaches Energy Services	Don Cuevas	Affirmative	
1	Black Hills Corp	Wes Wingen	Affirmative	
1	Bonneville Power Administration	Donald S. Watkins	Affirmative	
1	Brazos Electric Power Cooperative, Inc.	Tony Kroskey		
1	Bryan Texas Utilities	John C Fontenot	Affirmative	
1	CenterPoint Energy Houston Electric, LLC	John Brockhan	Affirmative	
1	Central Electric Power Cooperative	Michael B Bax		
1	Central Iowa Power Cooperative	Kevin J Lyons	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
1	Central Maine Power Company	Joseph Turano Jr.		
1	City of Tallahassee	Daniel S Langston	Negative	COMMENT RECEIVED
1	Clark Public Utilities	Jack Stamper	Affirmative	
1	Cleco Corporation	John Lindsey	Affirmative	
1	Colorado Springs Utilities	Shawna Speer	Affirmative	
1	Consolidated Edison Co. of New York	Christopher L de Graffenried	Affirmative	
1	CPS Energy	Glenn Pressler	Affirmative	
1	Dairyland Power Coop.	Robert W. Roddy		
1	Dayton Power & Light Co.	Hertzel Shamash	Affirmative	
1	Dominion Virginia Power	Larry Nash	Affirmative	
1	Duke Energy Carolina	Doug E Hills	Affirmative	
1	Entergy Transmission	Oliver A Burke		
1	FirstEnergy Corp.	William J Smith	Affirmative	
1	Florida Keys Electric Cooperative Assoc.	Dennis Minton		
1	Florida Power & Light Co.	Mike O'Neil	Affirmative	
1	Gainesville Regional Utilities	Richard Bachmeier	Affirmative	
1	Georgia Transmission Corporation	Jason Snodgrass	Affirmative	
1	Great River Energy	Gordon Pietsch	Affirmative	
1	Hoosier Energy Rural Electric Cooperative, Inc.	Bob Solomon		
1	Hydro One Networks, Inc.	Muhammed Ali	Abstain	
1	Hydro-Quebec TransEnergie	Martin Boisvert	Affirmative	
1	Idaho Power Company	Molly Devine	Affirmative	
1	International Transmission Company Holdings Corp	Michael Moltane	Affirmative	
1	JDRJC Associates	Jim D Cyrulewski	Abstain	



1	JEA	Ted E Hobson	Affirmative	
1	KAMO Electric Cooperative	Walter Kenyon	Affirmative	
1	Kansas City Power & Light Co.	Daniel Gibson	Affirmative	
1	Lakeland Electric	Larry E Watt	Negative	SUPPORTS THIRD PARTY COMMENTS - (FMPA)
1	Lincoln Electric System	Doug Bantam		
1	Long Island Power Authority	Robert Ganley	Affirmative	
1	Los Angeles Department of Water & Power	faranak sarbaz		
1	Lower Colorado River Authority	Martyn Turner	Affirmative	
1	M & A Electric Power Cooperative	William Price	Affirmative	
1	MEAG Power	Danny Dees	Affirmative	
1	MidAmerican Energy Co.	Terry Harbour	Affirmative	
1	Minnkota Power Coop. Inc.	Daniel L Inman	Affirmative	
1	Muscatine Power & Water	Andrew J Kurriger		
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey	Affirmative	
1	National Grid USA	Michael Jones	Affirmative	
1	NB Power Corporation	Alan MacNaughton	Abstain	
1	Nebraska Public Power District	Jamison Cawley	Affirmative	
1	New York Power Authority	Bruce Metruck	Affirmative	
1	Northeast Missouri Electric Power Cooperative	Kevin White	Affirmative	
1	Northeast Utilities	William Temple		
1	Northern Indiana Public Service Co.	Julaine Dyke	Affirmative	
1	Oklahoma Gas and Electric Co.	Terri Pyle	Affirmative	
1	Omaha Public Power District	Doug Peterchuck	Affirmative	
1	Oncor Electric Delivery	Jen Fiegel		
1	Otter Tail Power Company	Daryl Hanson		
1	Pacific Gas and Electric Company	Bangalore Vijayraghavan		
1	Platte River Power Authority	John C. Collins	Affirmative	
1	Portland General Electric Co.	John T Walker	Affirmative	
1	Potomac Electric Power Co.	David Thorne	Affirmative	
1	PPL Electric Utilities Corp.	Brenda L Truhe	Abstain	
1	Public Service Company of New Mexico	Laurie Williams		
1	Public Service Electric and Gas Co.	Kenneth D. Brown	Affirmative	
1	Public Utility District No. 1 of Okanogan County	Dale Dunckel		
1	Puget Sound Energy, Inc.	Denise M Lietz	Affirmative	
1	Rochester Gas and Electric Corp.	John C. Allen	Affirmative	
1	Sacramento Municipal Utility District	Tim Kelley	Affirmative	
1	Seattle City Light	Pawel Krupa	Affirmative	
1	Seminole Electric Cooperative, Inc.	Glenn Spurlock	Affirmative	
1	Sho-Me Power Electric Cooperative	Denise Stevens	Affirmative	
1	Snohomish County PUD No. 1	Long T Duong	Affirmative	
1	South Carolina Electric & Gas Co.	Tom Hanzlik	Abstain	
1	South Carolina Public Service Authority	Shawn T Abrams	Abstain	
1	South Texas Electric Cooperative	Renee Davidson		
1	Southern California Edison Company	Steven Mavis	Affirmative	
1	Southern Company Services, Inc.	Robert A. Schaffeld	Affirmative	
1	Southern Illinois Power Coop.	William Hutchison	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
1	Southern Indiana Gas and Electric Co.	Lynnae Wilson	Affirmative	
1	Southwest Transmission Cooperative, Inc.	John Shaver	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
1	Sunflower Electric Power Corporation	Noman Lee Williams	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
1	Tacoma Power	John Merrell	Negative	COMMENT RECEIVED
1	Tennessee Valley Authority	Howell D Scott	Affirmative	
1	Tri-State Generation & Transmission Association, Inc.	Tracy Sliman	Affirmative	

1	U.S. Bureau of Reclamation	Richard T Jackson		
1	United Illuminating Co.	Jonathan Appelbaum	Affirmative	
1	Westar Energy	Allen Klassen	Affirmative	
1	Western Area Power Administration	Steven Johnson		
1	Wolverine Power Supply Coop., Inc.	Michelle Clements		
1	Xcel Energy, Inc.	Gregory L Pieper	Negative	SUPPORTS THIRD PARTY COMMENTS - (Amy Casuscelli, Xcel Energy)
2	BC Hydro	Venkataramakrishnan Vinnakota		
2	California ISO	Rich Vine	Affirmative	
2	Electric Reliability Council of Texas, Inc.	Cheryl Moseley	Affirmative	
2	Independent Electricity System Operator	Leonard Kula	Affirmative	
2	ISO New England, Inc.	Matthew F Goldberg	Negative	COMMENT RECEIVED
2	MISO	Marie Knox	Affirmative	
2	New York Independent System Operator	Gregory Campoli	Negative	SUPPORTS THIRD PARTY COMMENTS - (IRC/SRC and NPCC/RSC)
2	PJM Interconnection, L.L.C.	stephanie monzon	Affirmative	
2	Southwest Power Pool, Inc.	Charles H. Yeung	Negative	COMMENT RECEIVED
3	AEP	Michael E Deloach	Negative	SUPPORTS THIRD PARTY COMMENTS - (Thomas Foltz - American Electric Power)
3	Alabama Power Company	Robert S Moore	Affirmative	
3	Ameren Corp.	David J Jendras	Negative	COMMENT RECEIVED
3	APS	Sarah Kist	Affirmative	
3	Associated Electric Cooperative, Inc.	Todd Bennett	Affirmative	
3	Atlantic City Electric Company	NICOLE BUCKMAN	Affirmative	
3	Avista Corp.	Scott J Kinney	Abstain	
3	Basin Electric Power Cooperative	Jeremy Voll	Affirmative	
3	BC Hydro and Power Authority	Pat G. Harrington	Abstain	
3	Beaches Energy Services	Steven Lancaster	Affirmative	
3	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
3	Central Electric Power Cooperative	Adam M Weber	Affirmative	
3	Central Lincoln PUD	Steve Alexanderson	Affirmative	
3	City of Anaheim Public Utilities Department	Dennis M Schmidt		
3	City of Austin dba Austin Energy	Andrew Gallo	Affirmative	
3	City of Bartow, Florida	Matt Culverhouse	Affirmative	
3	City of Clewiston	Lynne Mila	Affirmative	
3	City of Farmington	Linda R Jacobson	Abstain	
3	City of Garland	Ronnie C Hoeinghaus	Abstain	
3	City of Green Cove Springs	Mark Schultz	Affirmative	
3	City of Homestead	Orestes J Garcia	Affirmative	
3	City of Leesburg	Chris Adkins	Affirmative	
3	City of Redding	Bill Hughes	Affirmative	
3	City of Tallahassee	Bill R Fowler	Negative	COMMENT RECEIVED
3	Colorado Springs Utilities	Jean Mueller	Negative	NO COMMENT RECEIVED - (Kaleb Brimhall, CSU)
3	ComEd	John Bee	Affirmative	
3	Consolidated Edison Co. of New York	Peter T Yost	Affirmative	
				COMMENT

3	Cowlitz County PUD	Russell A Noble	Negative	RECEIVED
3	CPS Energy	Jose Escamilla		
3	Delmarva Power & Light Co.	Michael R. Mayer	Affirmative	
3	Dominion Resources, Inc.	Connie B Lowe	Affirmative	
3	DTE Electric	Kent Kujala	Affirmative	
3	FirstEnergy Corp.	Richard S Hoag	Affirmative	
3	Florida Keys Electric Cooperative	Tom B Anthony	Affirmative	
3	Florida Municipal Power Agency	Joe McKinney	Affirmative	
3	Florida Power & Light Co.	Summer C. Esquerre		
3	Florida Power Corporation	Lee Schuster	Affirmative	
3	Fort Pierce Utilities Authority	Thomas Parker		
3	Gainesville Regional Utilities	Kenneth Simmons	Affirmative	
3	Great River Energy	Brian Glover	Affirmative	
3	Hydro One Networks, Inc.	Ayesha Sabouba	Abstain	
3	JEA	Garry Baker		
3	KAMO Electric Cooperative	Theodore J Hilmes		
3	Kansas City Power & Light Co.	Joshua D Bach	Affirmative	
3	Kissimmee Utility Authority	Gregory D Woessner		
3	Lakeland Electric	Mace D Hunter	Affirmative	
3	Lincoln Electric System	Jason Fortik	Abstain	
3	Los Angeles Department of Water & Power	Mike Anctil	Affirmative	
3	Louisville Gas and Electric Co.	Charles A. Freibert	Abstain	
3	M & A Electric Power Cooperative	Stephen D Pogue	Affirmative	
3	Modesto Irrigation District	Jack W Savage	Affirmative	
3	Muscatine Power & Water	Jenn Stover	Affirmative	
3	National Grid USA	Brian E Shanahan	Affirmative	
3	Nebraska Public Power District	Tony Eddleman		
3	New York Power Authority	David R Rivera	Affirmative	
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann	Affirmative	
3	Northern Indiana Public Service Co.	Ramon J Barany	Affirmative	
3	NW Electric Power Cooperative, Inc.	David McDowell	Affirmative	
3	Ocala Utility Services	Randy Hahn	Affirmative	
3	Oklahoma Gas and Electric Co.	Donald Hargrove	Affirmative	
3	Omaha Public Power District	Blaine R. Dinwiddie	Affirmative	
3	Orlando Utilities Commission	Ballard K Mutters	Affirmative	
3	Owensboro Municipal Utilities	Thomas T Lyons	Affirmative	
3	Pacific Gas and Electric Company	John H Hagen	Affirmative	
3	Platte River Power Authority	Terry L Baker	Affirmative	
3	PNM Resources	Michael Mertz		
3	Portland General Electric Co.	Thomas G Ward	Affirmative	
3	Potomac Electric Power Co.	Mark Yerger	Affirmative	
3	Public Service Electric and Gas Co.	Jeffrey Mueller	Affirmative	
3	Puget Sound Energy, Inc.	Andrea Basinski	Affirmative	
3	Sacramento Municipal Utility District	James Leigh-Kendall	Affirmative	
3	Salt River Project	John T. Underhill	Affirmative	
3	Santee Cooper	James M Poston	Abstain	
3	Seattle City Light	Dana Wheelock	Affirmative	
3	Seminole Electric Cooperative, Inc.	James R Frauen	Affirmative	
3	Sho-Me Power Electric Cooperative	Jeff L Neas	Affirmative	
3	Snohomish County PUD No. 1	Mark Oens	Affirmative	
3	South Carolina Electric & Gas Co.	Hubert C Young	Affirmative	
3	Southern California Edison Company	Lujuanna Medina	Affirmative	
3	Tacoma Power	Marc Donaldson	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
3	Tennessee Valley Authority	Ian S Grant	Affirmative	
3	Tri-State Generation & Transmission Association, Inc.	Janelle Marriott	Affirmative	
3	Westar Energy	Bo Jones	Affirmative	
3	Wisconsin Electric Power Marketing	James R Keller	Affirmative	
3	Xcel Energy, Inc.	Michael Ibold	Negative	SUPPORTS THIRD PARTY COMMENTS - (Xcel Energy)

4	Alliant Energy Corp. Services, Inc.	Kenneth Goldsmith	Affirmative	
4	Blue Ridge Power Agency	Duane S Dahlquist	Negative	SUPPORTS THIRD PARTY COMMENTS - (Support comments of FMPA)
4	Central Lincoln PUD	Shamus J Gamache	Affirmative	
4	City of Austin dba Austin Energy	Reza Ebrahimian	Affirmative	
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle	Affirmative	
4	City of Redding	Nicholas Zettel	Affirmative	
4	City Utilities of Springfield, Missouri	John Allen	Affirmative	
4	Consumers Energy Company	Tracy Goble		
4	Cowlitz County PUD	Rick Syring	Negative	SUPPORTS THIRD PARTY COMMENTS - (Russell Noble)
4	DTE Electric	Daniel Herring	Affirmative	
4	Flathead Electric Cooperative	Russ Schneider	Negative	COMMENT RECEIVED
4	Florida Municipal Power Agency	Carol Chinn	Affirmative	
4	Georgia System Operations Corporation	Guy Andrews	Affirmative	
4	Herb Schrayshuen	Herb Schrayshuen	Affirmative	
4	Illinois Municipal Electric Agency	Bob C. Thomas	Affirmative	
4	Integrus Energy Group, Inc.	Christopher Plante		
4	Keys Energy Services	Stan T Rzad	Affirmative	
4	Madison Gas and Electric Co.	Joseph DePoorter	Affirmative	
4	Ohio Edison Company	Douglas Hohlbaugh	Affirmative	
4	Oklahoma Municipal Power Authority	Ashley Stringer	Affirmative	
4	Public Utility District No. 1 of Snohomish County	John D Martinsen	Affirmative	
4	Sacramento Municipal Utility District	Mike Ramirez	Affirmative	
4	Seattle City Light	Hao Li	Affirmative	
4	Seminole Electric Cooperative, Inc.	Steven R Wallace	Affirmative	
4	South Mississippi Electric Power Association	Steve McElhaney		
4	Tacoma Public Utilities	Keith Morisette	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
4	Utility Services, Inc.	Brian Evans-Mongeon	Affirmative	
4	Wisconsin Energy Corp.	Anthony P Jankowski	Affirmative	
5	Amerenue	Sam Dwyer	Negative	SUPPORTS THIRD PARTY COMMENTS - (Ameren comments)
5	American Electric Power	Thomas Foltz	Negative	COMMENT RECEIVED
5	Arizona Public Service Co.	Scott Takinen	Affirmative	
5	Associated Electric Cooperative, Inc.	Matthew Pacobit	Affirmative	
5	Avista Corp.	Steve Wenke		
5	Basin Electric Power Cooperative	Mike Kraft	Affirmative	
5	BC Hydro and Power Authority	Clement Ma	Abstain	
5	Boise-Kuna Irrigation District/dba Lucky peak power plant project	Mike D Kukla	Affirmative	
5	Bonneville Power Administration	Francis J. Halpin	Affirmative	
5	Brazos Electric Power Cooperative, Inc.	Shari Heino	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
5	Calpine Corporation	Hamid Zakery	Affirmative	
5	Choctaw Generation Limited Partnership, LLLP	Rob Watson		
5	City and County of San Francisco	Daniel Mason	Affirmative	
5	City of Austin dba Austin Energy	Jeanie Doty	Affirmative	
5	City of Redding	Paul A. Cummings	Affirmative	

5	City of Tallahassee	Karen Webb	Negative	COMMENT RECEIVED
5	Colorado Springs Utilities	Kaleb Brimhall	Affirmative	
5	Con Edison Company of New York	Brian O'Boyle	Affirmative	
5	Consumers Energy Company	David C Greyerbiehl	Affirmative	
5	Cowlitz County PUD	Bob Essex	Negative	SUPPORTS THIRD PARTY COMMENTS - (Cowlitz PUD - Russ Noble)
5	Dominion Resources, Inc.	Mike Garton	Affirmative	
5	DTE Electric	Mark Stefaniak	Affirmative	
5	Duke Energy	Dale Q Goodwine	Affirmative	
5	Dynegy Inc.	Dan Roethemeyer	Abstain	
5	Electric Power Supply Association	John R Cashin		
5	Entergy Services, Inc.	Tracey Stubbs		
5	Exelon Nuclear	Mark F Draper	Affirmative	
5	First Wind	John Robertson	Affirmative	
5	FirstEnergy Solutions	Kenneth Dresner	Affirmative	
5	Florida Municipal Power Agency	David Schumann	Affirmative	
5	Great River Energy	Preston L Walsh	Affirmative	
5	Hydro-Québec Production	Roger Dufresne	Affirmative	
5	Independence Power & Light Dept.	James Nail	Affirmative	
5	JEA	John J Babik	Affirmative	
5	Kansas City Power & Light Co.	Brett Holland	Affirmative	
5	Kissimmee Utility Authority	Mike Blough	Affirmative	
5	Lakeland Electric	James M Howard	Negative	SUPPORTS THIRD PARTY COMMENTS - (Florida Municipal Power Agency)
5	Lincoln Electric System	Dennis Florom	Abstain	
5	Los Angeles Department of Water & Power	Kenneth Silver		
5	Lower Colorado River Authority	Dixie Wells	Affirmative	
5	Massachusetts Municipal Wholesale Electric Company	David Gordon	Abstain	
5	Muscatine Power & Water	Mike Avesing		
5	Nebraska Public Power District	Don Schmit	Affirmative	
5	New York Power Authority	Wayne Sipperly	Affirmative	
5	NextEra Energy	Allen D Schriver	Affirmative	
5	North Carolina Electric Membership Corp.	Jeffrey S Brame	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
5	Northern Indiana Public Service Co.	Michael D Melvin	Affirmative	
5	Oglethorpe Power Corporation	Bernard Johnson	Affirmative	
5	Oklahoma Gas and Electric Co.	Henry L Staples	Affirmative	
5	Omaha Public Power District	Mahmood Z. Safi	Affirmative	
5	Pacific Gas and Electric Company	Alex Chua	Affirmative	
5	Platte River Power Authority	Christopher R Wood	Affirmative	
5	Portland General Electric Co.	Matt E. Jastram	Affirmative	
5	PPL Generation LLC	Annette M Bannon	Abstain	
5	PSEG Fossil LLC	Tim Kucey	Affirmative	
5	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		
5	Puget Sound Energy, Inc.	Lynda Kupfer	Affirmative	
5	Sacramento Municipal Utility District	Susan Gill-Zobitz	Affirmative	
5	Salt River Project	William Alkema	Affirmative	
5	Santee Cooper	Lewis P Pierce	Abstain	
5	Seattle City Light	Michael J. Haynes	Affirmative	
5	Seminole Electric Cooperative, Inc.	Brenda K. Atkins	Affirmative	
5	Snohomish County PUD No. 1	Sam Nietfeld	Affirmative	
5	South Carolina Electric & Gas Co.	Edward Magic		
5	Southern California Edison Company	joseph mccawley	Affirmative	
5	Southern Company Generation	William D Shultz	Affirmative	

5	Southern Indiana Gas and Electric Co.	Rob Collins	Affirmative	
5	Tacoma Power	Chris Mattson	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
5	Tampa Electric Co.	RJames Rocha	Affirmative	
5	Tennessee Valley Authority	Brandy B Spraker	Affirmative	
5	Tri-State Generation & Transmission Association, Inc.	Mark Stein		
5	Westar Energy	Bryan Taggart	Affirmative	
5	Wisconsin Electric Power Co.	Linda Horn	Affirmative	
5	Wisconsin Public Service Corp.	Scott E Johnson		
5	Xcel Energy, Inc.	Mark A Castagneri	Negative	COMMENT RECEIVED
6	AEP Marketing	Edward P. Cox	Negative	SUPPORTS THIRD PARTY COMMENTS - (Tom Foltz - AEP)
6	Ameren Missouri	Robert Quinlivan	Negative	SUPPORTS THIRD PARTY COMMENTS - (Ameren)
6	APS	Randy A. Young	Affirmative	
6	Associated Electric Cooperative, Inc.	Brian Ackermann	Affirmative	
6	Bonneville Power Administration	Brenda S. Anderson	Affirmative	
6	City of Austin dba Austin Energy	Lisa Martin	Affirmative	
6	City of Redding	Marvin Briggs	Affirmative	
6	Cleco Power LLC	Robert Hirschak	Affirmative	
6	Colorado Springs Utilities	Shannon Fair	Affirmative	
6	Con Edison Company of New York	David Balban	Affirmative	
6	Constellation Energy Commodities Group	David J Carlson	Affirmative	
6	Dominion Resources, Inc.	Louis S. Slade	Affirmative	
6	Duke Energy	Greg Cecil	Affirmative	
6	FirstEnergy Solutions	Kevin Querry	Affirmative	
6	Florida Municipal Power Agency	Richard L. Montgomery	Affirmative	
6	Florida Municipal Power Pool	Thomas Reedy	Affirmative	
6	Florida Power & Light Co.	Silvia P Mitchell	Affirmative	
6	Kansas City Power & Light Co.	Jessica L Klinghoffer	Affirmative	
6	Lakeland Electric	Paul Shipps	Negative	SUPPORTS THIRD PARTY COMMENTS - (FMPA)
6	Lincoln Electric System	Eric Ruskamp	Abstain	
6	Los Angeles Department of Water & Power	Brad Packer	Affirmative	
6	Lower Colorado River Authority	Michael Shaw	Affirmative	
6	Luminant Energy	Brenda Hampton		
6	Muscatine Power & Water	John Stolley		
6	New York Power Authority	Shivaz Chopra		
6	New York State Electric & Gas Corp.	Julie S King	Affirmative	
6	Northern Indiana Public Service Co.	Joseph O'Brien	Affirmative	
6	Oglethorpe Power Corporation	Donna Johnson	Affirmative	
6	Oklahoma Gas and Electric Co.	Jerry Nottmangel		
6	Omaha Public Power District	Douglas Collins	Affirmative	
6	PacifiCorp	Sandra L Shaffer	Affirmative	
6	Platte River Power Authority	Carol Ballantine	Affirmative	
6	Portland General Electric Co.	Shawn P Davis		
6	Power Generation Services, Inc.	Stephen C Knapp		
6	Powerex Corp.	Gordon Dobson-Mack		
6	PPL EnergyPlus LLC	Elizabeth Davis	Abstain	
6	PSEG Energy Resources & Trade LLC	Peter Dolan	Affirmative	
6	Sacramento Municipal Utility District	Diane Enderby	Affirmative	
6	Salt River Project	William Abraham	Affirmative	
6	Santee Cooper	Michael Brown	Abstain	
6	Seattle City Light	Dennis Sismaet	Affirmative	
6	Seminole Electric Cooperative, Inc.	Trudy S. Novak	Affirmative	

6	Snohomish County PUD No. 1	Kenn Backholm	Affirmative	
6	South Carolina Electric & Gas Co.	Matt H Bullard		
6	Southern California Edison Company	Joseph T Marone	Affirmative	
6	Southern Company Generation and Energy Marketing	John J. Ciza	Affirmative	
6	Southern Indiana Gas and Electric Co.	Brad Lisembee	Affirmative	
6	Tacoma Public Utilities	Michael C Hill	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
6	Tampa Electric Co.	Benjamin F Smith II		
6	Tennessee Valley Authority	Marjorie S. Parsons	Affirmative	
6	Westar Energy	Grant L Wilkerson	Affirmative	
6	Western Area Power Administration - UGP Marketing	Mark Messerli	Affirmative	
6	Wisconsin Public Service Corp.	David Hathaway		
6	Xcel Energy, Inc.	Peter Colussy	Negative	COMMENT RECEIVED
8		Roger C Zaklukiewicz	Affirmative	
8		David L Kiguel	Negative	COMMENT RECEIVED
8	Massachusetts Attorney General	Frederick R Plett	Affirmative	
8	Volkman Consulting, Inc.	Terry Volkman	Affirmative	
9	Central Lincoln PUD	Bruce Lovelin	Affirmative	
9	City of Vero Beach	Ginny Beigel	Affirmative	
9	Commonwealth of Massachusetts Department of Public Utilities	Donald Nelson	Affirmative	
9	New York State Public Service Commission	Diane J Barney		
10	Florida Reliability Coordinating Council	Linda C Campbell	Affirmative	
10	Midwest Reliability Organization	Russel Mountjoy	Affirmative	
10	New York State Reliability Council	Alan Adamson	Affirmative	
10	Northeast Power Coordinating Council	Guy V. Zito	Affirmative	
10	ReliabilityFirst	Anthony E Jablonski	Affirmative	
10	SERC Reliability Corporation	Joseph W Spencer	Affirmative	
10	Texas Reliability Entity, Inc.	Karin Schweitzer	Negative	COMMENT RECEIVED
10	Western Electricity Coordinating Council	Steven L. Rueckert	Affirmative	

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 Washington Office: 1325 G Street, N.W. : Suite 600 : Washington, DC 20005-3801

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## Non-Binding Poll Results

### Project 2008-2 Underfrequency Load Shedding PRC-006-2

Non-Binding Poll Results	
<b>Non-Binding Poll Name:</b>	Project 2008-02 UFLS PRC-006-2
<b>Poll Period:</b>	9/29/2014 - 10/8/2014
<b>Total # Opinions:</b>	273
<b>Total Ballot Pool:</b>	334
<b>Summary Results:</b>	81.74% of those who registered to participate provided an opinion or an abstention; 89.72% of those who provided an opinion indicated support for the VRFs and VSLs.

Individual Ballot Pool Results				
Segment	Organization	Member	Opinions	NERC Notes
1	Ameren Services	Eric Scott	Affirmative	
1	American Electric Power	Paul B Johnson	Abstain	
1	Arizona Public Service Co.	Brian Cole		
1	Associated Electric Cooperative, Inc.	John Bussman	Affirmative	
1	ATCO Electric	Glen Sutton	Abstain	
1	Austin Energy	James Armke	Affirmative	
1	Avista Utilities	Heather Rosentrater		
1	Balancing Authority of Northern California	Kevin Smith	Affirmative	
1	Baltimore Gas & Electric Company	Christopher J Scanlon		
1	Basin Electric Power Cooperative	David Rudolph	Affirmative	
1	BC Hydro and Power Authority	Patricia Robertson	Abstain	
1	Beaches Energy Services	Don Cuevas	Affirmative	
1	Bonneville Power Administration	Donald S. Watkins	Affirmative	
1	Brazos Electric Power Cooperative, Inc.	Tony Kroskey		
1	Bryan Texas Utilities	John C Fontenot	Affirmative	
1	CenterPoint Energy Houston Electric, LLC	John Brockhan	Abstain	
1	Central Electric Power Cooperative	Michael B Bax		
1	Central Iowa Power Cooperative	Kevin J Lyons	Affirmative	
1	City of Tallahassee	Daniel S Langston	Negative	COMMENT RECEIVED



1	Clark Public Utilities	Jack Stamper	Affirmative	
1	Cleco Corporation	John Lindsey	Affirmative	
1	Colorado Springs Utilities	Shawna Speer	Affirmative	
1	Consolidated Edison Co. of New York	Christopher L de Graffenried	Affirmative	
1	CPS Energy	Glenn Pressler	Affirmative	
1	Dairyland Power Coop.	Robert W. Roddy		
1	Dayton Power & Light Co.	Hertzel Shamash	Affirmative	
1	Dominion Virginia Power	Larry Nash	Abstain	
1	Duke Energy Carolina	Doug E Hils	Affirmative	
1	Entergy Transmission	Oliver A Burke		
1	FirstEnergy Corp.	William J Smith	Affirmative	
1	Florida Keys Electric Cooperative Assoc.	Dennis Minton		
1	Florida Power & Light Co.	Mike O'Neil	Affirmative	
1	Gainesville Regional Utilities	Richard Bachmeier	Affirmative	
1	Georgia Transmission Corporation	Jason Snodgrass	Affirmative	
1	Great River Energy	Gordon Pietsch	Affirmative	
1	Hoosier Energy Rural Electric Cooperative, Inc.	Bob Solomon		
1	Hydro One Networks, Inc.	Muhammed Ali	Abstain	
1	Hydro-Quebec TransEnergie	Martin Boisvert	Affirmative	
1	Idaho Power Company	Molly Devine	Affirmative	
1	International Transmission Company Holdings Corp	Michael Moltane	Abstain	
1	JDRJC Associates	Jim D Cyrulewski	Abstain	
1	JEA	Ted E Hobson	Affirmative	
1	KAMO Electric Cooperative	Walter Kenyon	Affirmative	
1	Kansas City Power & Light Co.	Daniel Gibson	Affirmative	
1	Lakeland Electric	Larry E Watt	Negative	SUPPORTS THIRD PARTY COMMENTS - (FMPA)
1	Lincoln Electric System	Doug Bantam		
1	Long Island Power Authority	Robert Ganley	Abstain	
1	Los Angeles Department of Water & Power	faranak sarbaz		
1	Lower Colorado River Authority	Martyn Turner	Affirmative	
1	M & A Electric Power Cooperative	William Price	Affirmative	
1	MEAG Power	Danny Dees	Affirmative	
1	MidAmerican Energy Co.	Terry Harbour	Affirmative	
1	Minnkota Power Coop. Inc.	Daniel L Inman	Affirmative	
1	Muscatine Power & Water	Andrew J Kurriger		
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey	Affirmative	
1	National Grid USA	Michael Jones	Affirmative	
1	Nebraska Public Power District	Jamison Cawley	Abstain	
1	New York Power Authority	Bruce Metruck	Affirmative	

1	Northeast Missouri Electric Power Cooperative	Kevin White	Affirmative	
1	Northeast Utilities	William Temple		
1	Northern Indiana Public Service Co.	Julaine Dyke	Affirmative	
1	Oklahoma Gas and Electric Co.	Terri Pyle	Affirmative	
1	Omaha Public Power District	Doug Peterchuck	Affirmative	
1	Oncor Electric Delivery	Jen Fiegel		
1	Otter Tail Power Company	Daryl Hanson		
1	Pacific Gas and Electric Company	Bangalore Vijayraghavan		
1	Platte River Power Authority	John C. Collins	Abstain	
1	Portland General Electric Co.	John T Walker	Affirmative	
1	PPL Electric Utilities Corp.	Brenda L Truhe	Abstain	
1	Public Service Company of New Mexico	Laurie Williams		
1	Public Service Electric and Gas Co.	Kenneth D. Brown	Abstain	
1	Public Utility District No. 1 of Okanogan County	Dale Dunckel		
1	Puget Sound Energy, Inc.	Denise M Lietz	Affirmative	
1	Rochester Gas and Electric Corp.	John C. Allen	Affirmative	
1	Sacramento Municipal Utility District	Tim Kelley	Affirmative	
1	Seminole Electric Cooperative, Inc.	Glenn Spurlock	Abstain	
1	Sho-Me Power Electric Cooperative	Denise Stevens	Affirmative	
1	Snohomish County PUD No. 1	Long T Duong	Affirmative	
1	South Carolina Electric & Gas Co.	Tom Hanzlik	Abstain	
1	South Carolina Public Service Authority	Shawn T Abrams	Abstain	
1	South Texas Electric Cooperative	Renee Davidson		
1	Southern California Edison Company	Steven Mavis	Affirmative	
1	Southern Company Services, Inc.	Robert A. Schaffeld	Affirmative	
1	Southern Illinois Power Coop.	William Hutchison	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
1	Southwest Transmission Cooperative, Inc.	John Shaver	Affirmative	
1	Sunflower Electric Power Corporation	Noman Lee Williams	Affirmative	
1	Tacoma Power	John Merrell	Negative	COMMENT RECEIVED
1	Tennessee Valley Authority	Howell D Scott	Abstain	
1	Tri-State Generation & Transmission Association, Inc.	Tracy Sliman	Affirmative	
1	U.S. Bureau of Reclamation	Richard T Jackson		
1	United Illuminating Co.	Jonathan Appelbaum	Affirmative	
1	Westar Energy	Allen Klassen	Affirmative	
1	Western Area Power Administration	Steven Johnson		
1	Wolverine Power Supply Coop., Inc.	Michelle Clements		
1	Xcel Energy, Inc.	Gregory L Pieper		
2	BC Hydro	Venkataramakrishnan Vinnakota		

2	California ISO	Rich Vine	Affirmative	
2	Electric Reliability Council of Texas, Inc.	Cheryl Moseley	Affirmative	
2	Independent Electricity System Operator	Leonard Kula	Affirmative	
2	ISO New England, Inc.	Matthew F Goldberg	Negative	COMMENT RECEIVED
2	MISO	Marie Knox	Affirmative	
2	New York Independent System Operator	Gregory Campoli	Abstain	
2	PJM Interconnection, L.L.C.	stephanie monzon	Affirmative	
3	AEP	Michael E Deloach	Abstain	
3	Alabama Power Company	Robert S Moore	Affirmative	
3	Ameren Corp.	David J Jendras	Affirmative	
3	APS	Sarah Kist	Affirmative	
3	Associated Electric Cooperative, Inc.	Todd Bennett	Affirmative	
3	Avista Corp.	Scott J Kinney		
3	Basin Electric Power Cooperative	Jeremy Voll	Affirmative	
3	BC Hydro and Power Authority	Pat G. Harrington	Abstain	
3	Beaches Energy Services	Steven Lancaster	Affirmative	
3	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
3	Central Electric Power Cooperative	Adam M Weber	Affirmative	
3	City of Anaheim Public Utilities Department	Dennis M Schmidt		
3	City of Austin dba Austin Energy	Andrew Gallo	Affirmative	
3	City of Bartow, Florida	Matt Culverhouse	Affirmative	
3	City of Clewiston	Lynne Mila	Affirmative	
3	City of Farmington	Linda R Jacobson	Abstain	
3	City of Green Cove Springs	Mark Schultz	Affirmative	
3	City of Homestead	Orestes J Garcia	Affirmative	
3	City of Leesburg	Chris Adkins	Affirmative	
3	City of Tallahassee	Bill R Fowler	Negative	COMMENT RECEIVED
3	Colorado Springs Utilities	Jean Mueller	Negative	SUPPORTS THIRD PARTY COMMENTS - (Kaleb Brimhall, CSU)
3	ComEd	John Bee		
3	Consolidated Edison Co. of New York	Peter T Yost	Affirmative	
3	Cowlitz County PUD	Russell A Noble	Negative	COMMENT RECEIVED
3	CPS Energy	Jose Escamilla		
3	Dominion Resources, Inc.	Connie B Lowe	Abstain	
3	DTE Electric	Kent Kujala	Affirmative	
3	FirstEnergy Corp.	Richard S Hoag	Affirmative	
3	Florida Keys Electric Cooperative	Tom B Anthony	Affirmative	
3	Florida Municipal Power Agency	Joe McKinney	Affirmative	
3	Florida Power & Light Co.	Summer C. Esquerre		
3	Florida Power Corporation	Lee Schuster	Affirmative	

3	Fort Pierce Utilities Authority	Thomas Parker		
3	Gainesville Regional Utilities	Kenneth Simmons	Affirmative	
3	Great River Energy	Brian Glover	Affirmative	
3	Hydro One Networks, Inc.	Ayesha Sabouba	Abstain	
3	JEA	Garry Baker		
3	KAMO Electric Cooperative	Theodore J Hilmes		
3	Kansas City Power & Light Co.	Joshua D Bach	Affirmative	
3	Kissimmee Utility Authority	Gregory D Woessner		
3	Lakeland Electric	Mace D Hunter	Affirmative	
3	Lincoln Electric System	Jason Fortik	Abstain	
3	Los Angeles Department of Water & Power	Mike Anctil	Abstain	
3	Louisville Gas and Electric Co.	Charles A. Freibert		
3	M & A Electric Power Cooperative	Stephen D Pogue	Affirmative	
3	Modesto Irrigation District	Jack W Savage	Affirmative	
3	Muscatine Power & Water	Jenn Stover	Affirmative	
3	National Grid USA	Brian E Shanahan	Affirmative	
3	Nebraska Public Power District	Tony Eddleman		
3	New York Power Authority	David R Rivera	Affirmative	
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann	Affirmative	
3	Northern Indiana Public Service Co.	Ramon J Barany	Abstain	
3	NW Electric Power Cooperative, Inc.	David McDowell	Affirmative	
3	Ocala Utility Services	Randy Hahn	Affirmative	
3	Oklahoma Gas and Electric Co.	Donald Hargrove	Affirmative	
3	Omaha Public Power District	Blaine R. Dinwiddie	Affirmative	
3	Orlando Utilities Commission	Ballard K Mutters	Affirmative	
3	Owensboro Municipal Utilities	Thomas T Lyons	Affirmative	
3	Pacific Gas and Electric Company	John H Hagen	Affirmative	
3	Platte River Power Authority	Terry L Baker	Abstain	
3	PNM Resources	Michael Mertz		
3	Portland General Electric Co.	Thomas G Ward	Affirmative	
3	Public Service Electric and Gas Co.	Jeffrey Mueller	Abstain	
3	Puget Sound Energy, Inc.	Andrea Basinski	Affirmative	
3	Sacramento Municipal Utility District	James Leigh-Kendall	Affirmative	
3	Salt River Project	John T. Underhill	Affirmative	
3	Santee Cooper	James M Poston	Abstain	
3	Seminole Electric Cooperative, Inc.	James R Frauen	Abstain	
3	Sho-Me Power Electric Cooperative	Jeff L Neas	Affirmative	
3	Snohomish County PUD No. 1	Mark Oens	Affirmative	
3	South Carolina Electric & Gas Co.	Hubert C Young	Affirmative	
3	Southern California Edison Company	Lujuanna Medina	Affirmative	
3	Tacoma Power	Marc Donaldson	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)

3	Tennessee Valley Authority	Ian S Grant	Abstain	
3	Tri-State Generation & Transmission Association, Inc.	Janelle Marriott	Affirmative	
3	Westar Energy	Bo Jones	Affirmative	
3	Xcel Energy, Inc.	Michael Ibold	Abstain	
4	Alliant Energy Corp. Services, Inc.	Kenneth Goldsmith	Affirmative	
4	Blue Ridge Power Agency	Duane S Dahlquist	Negative	SUPPORTS THIRD PARTY COMMENTS - (Support comments of FMPA)
4	Central Lincoln PUD	Shamus J Gamache	Abstain	
4	City of Austin dba Austin Energy	Reza Ebrahimian	Affirmative	
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle	Affirmative	
4	City Utilities of Springfield, Missouri	John Allen	Affirmative	
4	Consumers Energy Company	Tracy Goble		
4	Cowlitz County PUD	Rick Syring	Negative	SUPPORTS THIRD PARTY COMMENTS - (Russell Noble)
4	DTE Electric	Daniel Herring	Affirmative	
4	Flathead Electric Cooperative	Russ Schneider	Negative	COMMENT RECEIVED
4	Florida Municipal Power Agency	Carol Chinn	Affirmative	
4	Georgia System Operations Corporation	Guy Andrews	Affirmative	
4	Herb Schrayshuen	Herb Schrayshuen	Affirmative	
4	Illinois Municipal Electric Agency	Bob C. Thomas	Abstain	
4	Integrus Energy Group, Inc.	Christopher Plante		
4	Keys Energy Services	Stan T Rzad	Affirmative	
4	Madison Gas and Electric Co.	Joseph DePoorter	Abstain	
4	Ohio Edison Company	Douglas Hohlbaugh	Affirmative	
4	Public Utility District No. 1 of Snohomish County	John D Martinsen	Affirmative	
4	Sacramento Municipal Utility District	Mike Ramirez	Affirmative	
4	Seminole Electric Cooperative, Inc.	Steven R Wallace	Abstain	
4	South Mississippi Electric Power Association	Steve McElhaney		
4	Tacoma Public Utilities	Keith Morisette	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
4	Utility Services, Inc.	Brian Evans-Mongeon	Abstain	
4	Wisconsin Energy Corp.	Anthony P Jankowski	Affirmative	
5	Amerenue	Sam Dwyer	Affirmative	
5	American Electric Power	Thomas Foltz	Abstain	
5	Arizona Public Service Co.	Scott Takinen	Affirmative	

5	Associated Electric Cooperative, Inc.	Matthew Pacobit	Affirmative	
5	Avista Corp.	Steve Wenke		
5	Basin Electric Power Cooperative	Mike Kraft	Affirmative	
5	BC Hydro and Power Authority	Clement Ma	Abstain	
5	Boise-Kuna Irrigation District/dba Lucky peak power plant project	Mike D Kukla	Affirmative	
5	Bonneville Power Administration	Francis J. Halpin	Affirmative	
5	Brazos Electric Power Cooperative, Inc.	Shari Heino	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
5	Calpine Corporation	Hamid Zakery	Affirmative	
5	Choctaw Generation Limited Partnership, LLLP	Rob Watson		
5	City of Austin dba Austin Energy	Jeanie Doty	Affirmative	
5	City of Tallahassee	Karen Webb	Negative	COMMENT RECEIVED
5	Colorado Springs Utilities	Kaleb Brimhall	Affirmative	
5	Con Edison Company of New York	Brian O'Boyle	Affirmative	
5	Consumers Energy Company	David C Greyerbiehl	Affirmative	
5	Cowlitz County PUD	Bob Essex	Negative	SUPPORTS THIRD PARTY COMMENTS - (Cowlitz PUD - Russ Noble)
5	DTE Electric	Mark Stefaniak	Affirmative	
5	Duke Energy	Dale Q Goodwine	Affirmative	
5	Dynegy Inc.	Dan Roethemeyer	Abstain	
5	Electric Power Supply Association	John R Cashin		
5	Entergy Services, Inc.	Tracey Stubbs		
5	Exelon Nuclear	Mark F Draper		
5	First Wind	John Robertson	Affirmative	
5	FirstEnergy Solutions	Kenneth Dresner	Affirmative	
5	Florida Municipal Power Agency	David Schumann	Affirmative	
5	Great River Energy	Preston L Walsh	Affirmative	
5	Hydro-Québec Production	Roger Dufresne	Affirmative	
5	Independence Power & Light Dept.	James Nail	Affirmative	
5	JEA	John J Babik	Affirmative	
5	Kansas City Power & Light Co.	Brett Holland	Affirmative	
5	Kissimmee Utility Authority	Mike Blough	Affirmative	
5	Lincoln Electric System	Dennis Florom	Abstain	
5	Los Angeles Department of Water & Power	Kenneth Silver		
5	Lower Colorado River Authority	Dixie Wells	Affirmative	
5	Massachusetts Municipal Wholesale Electric Company	David Gordon	Abstain	
5	Muscatine Power & Water	Mike Avesing		

5	Nebraska Public Power District	Don Schmit	Abstain	
5	New York Power Authority	Wayne Sipperly	Affirmative	
5	NextEra Energy	Allen D Schriver	Affirmative	
5	North Carolina Electric Membership Corp.	Jeffrey S Brame	Negative	SUPPORTS THIRD PARTY COMMENTS - (ACES)
5	Northern Indiana Public Service Co.	Michael D Melvin	Affirmative	
5	Oglethorpe Power Corporation	Bernard Johnson		
5	Oklahoma Gas and Electric Co.	Henry L Staples	Affirmative	
5	Omaha Public Power District	Mahmood Z. Safi	Affirmative	
5	Pacific Gas and Electric Company	Alex Chua	Affirmative	
5	Platte River Power Authority	Christopher R Wood	Affirmative	
5	Portland General Electric Co.	Matt E. Jastram	Affirmative	
5	PPL Generation LLC	Annette M Bannon	Abstain	
5	PSEG Fossil LLC	Tim Kucey	Abstain	
5	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		
5	Puget Sound Energy, Inc.	Lynda Kupfer	Affirmative	
5	Sacramento Municipal Utility District	Susan Gill-Zobitz	Affirmative	
5	Salt River Project	William Alkema	Affirmative	
5	Santee Cooper	Lewis P Pierce	Abstain	
5	Seattle City Light	Michael J. Haynes	Affirmative	
5	Seminole Electric Cooperative, Inc.	Brenda K. Atkins	Abstain	
5	Snohomish County PUD No. 1	Sam Nietfeld	Affirmative	
5	South Carolina Electric & Gas Co.	Edward Magic		
5	Southern California Edison Company	joseph mccawley	Affirmative	
5	Southern Company Generation	William D Shultz	Affirmative	
5	Tacoma Power	Chris Mattson	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
5	Tampa Electric Co.	RJames Rocha	Affirmative	
5	Tennessee Valley Authority	Brandy B Spraker	Affirmative	
5	Wisconsin Public Service Corp.	Scott E Johnson		
5	Xcel Energy, Inc.	Mark A Castagneri	Negative	COMMENT RECEIVED
6	AEP Marketing	Edward P. Cox	Abstain	
6	Ameren Missouri	Robert Quinlivan	Affirmative	
6	APS	Randy A. Young	Affirmative	
6	Associated Electric Cooperative, Inc.	Brian Ackermann	Affirmative	
6	Bonneville Power Administration	Brenda S. Anderson	Affirmative	
6	City of Austin dba Austin Energy	Lisa Martin	Affirmative	
6	Cleco Power LLC	Robert Hirschak	Affirmative	
6	Colorado Springs Utilities	Shannon Fair	Affirmative	
6	Con Edison Company of New York	David Balban	Affirmative	

6	Constellation Energy Commodities Group	David J Carlson		
6	Dominion Resources, Inc.	Louis S. Slade	Abstain	
6	Duke Energy	Greg Cecil	Affirmative	
6	FirstEnergy Solutions	Kevin Querry	Affirmative	
6	Florida Municipal Power Agency	Richard L. Montgomery	Affirmative	
6	Florida Municipal Power Pool	Thomas Reedy	Affirmative	
6	Florida Power & Light Co.	Silvia P Mitchell	Affirmative	
6	Kansas City Power & Light Co.	Jessica L Klinghoffer	Affirmative	
6	Lakeland Electric	Paul Shipp	Negative	SUPPORTS THIRD PARTY COMMENTS - (FMPA)
6	Lincoln Electric System	Eric Ruskamp	Abstain	
6	Los Angeles Department of Water & Power	Brad Packer	Abstain	
6	Lower Colorado River Authority	Michael Shaw	Affirmative	
6	Luminant Energy	Brenda Hampton		
6	Muscatine Power & Water	John Stolley		
6	New York Power Authority	Shivaz Chopra		
6	New York State Electric & Gas Corp.	Julie S King	Affirmative	
6	Northern Indiana Public Service Co.	Joseph O'Brien	Affirmative	
6	Oglethorpe Power Corporation	Donna Johnson	Affirmative	
6	Oklahoma Gas and Electric Co.	Jerry Nottnagel		
6	Omaha Public Power District	Douglas Collins	Affirmative	
6	PacifiCorp	Sandra L Shaffer	Abstain	
6	Platte River Power Authority	Carol Ballantine	Abstain	
6	Portland General Electric Co.	Shawn P Davis		
6	Power Generation Services, Inc.	Stephen C Knapp		
6	Powerex Corp.	Gordon Dobson-Mack		
6	PPL EnergyPlus LLC	Elizabeth Davis	Abstain	
6	PSEG Energy Resources & Trade LLC	Peter Dolan	Abstain	
6	Sacramento Municipal Utility District	Diane Enderby	Affirmative	
6	Salt River Project	William Abraham	Affirmative	
6	Santee Cooper	Michael Brown	Abstain	
6	Seattle City Light	Dennis Sismaet	Affirmative	
6	Seminole Electric Cooperative, Inc.	Trudy S. Novak	Abstain	
6	Snohomish County PUD No. 1	Kenn Backholm	Affirmative	
6	South Carolina Electric & Gas Co.	Matt H Bullard		
6	Southern California Edison Company	Joseph T Marone	Affirmative	
6	Southern Company Generation and Energy Marketing	John J. Ciza	Affirmative	
6	Tacoma Public Utilities	Michael C Hill	Negative	SUPPORTS THIRD PARTY COMMENTS - (John Merrell)
6	Tampa Electric Co.	Benjamin F Smith II		



6	Tennessee Valley Authority	Marjorie S. Parsons	Abstain	
6	Western Area Power Administration - UGP Marketing	Mark Messerli		
8		David L Kiguel	Negative	COMMENT RECEIVED
8		Roger C Zaklukiewicz	Affirmative	
8	Massachusetts Attorney General	Frederick R Plett	Affirmative	
8	Volkman Consulting, Inc.	Terry Volkman	Affirmative	
9	City of Vero Beach	Ginny Beigel	Affirmative	
9	Commonwealth of Massachusetts Department of Public Utilities	Donald Nelson	Affirmative	
10	Florida Reliability Coordinating Council	Linda C Campbell	Affirmative	
10	Midwest Reliability Organization	Russel Mountjoy	Affirmative	
10	New York State Reliability Council	Alan Adamson	Affirmative	
10	Northeast Power Coordinating Council	Guy V. Zito	Affirmative	
10	ReliabilityFirst	Anthony E Jablonski	Affirmative	
10	SERC Reliability Corporation	Joseph W Spencer	Affirmative	
10	Texas Reliability Entity, Inc.	Karin Schweitzer	Abstain	

**Individual or group. (35 Responses)**  
**Name (24 Responses)**  
**Organization (24 Responses)**  
**Group Name (11 Responses)**  
**Lead Contact (11 Responses)**  
**Question 1 (34 Responses)**  
**Question 1 Comments (35 Responses)**  
**Question 2 (29 Responses)**  
**Question 2 Comments (35 Responses)**  
**Question 3 (30 Responses)**  
**Question 3 Comments (35 Responses)**  
**Question 4 (24 Responses)**  
**Question 4 Comments (35 Responses)**

Group
Northeast Power Coordinating Council
Guy Zito
No
UFLS entities should be included in the development of a Corrective Action Plan. Suggested wording of requirement R15: Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall, with the participation of affected UFLS entities, develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. The "...schedule for implementation..." in the above requirements is not specific, and does not appear to address the FERC Directive from Order No. 763 which raised the concern about how soon an entity would need to implement corrections. Suggest adding a definite time period.
Yes
Yes
Individual
Dan Bamber
ATCO Electric
Yes
Yes
Yes
No
Group
Arizona Public Service Company
Janet Smith
Yes
APS requests information on how the new requirement R15 will be integrated with the approved variances. Since the variances specifically address the UFLS plan as does R15, APS is unsure how the requirement will be implemented within the Western Interconnection.
Yes

Yes
No
Individual
Laurie Williams
Public Service Company of New Mexico
No
According to the rationale for the addition of R15 was to address FERC Order No. 763. FERC was cornered that the standard didn't specify when the entity would need to implement a change to correct deficiencies identified during an assessment. R15 in this draft references R3, R4, R5 and R12. PNM is concerned that WECC has a regional variance for all four of these original NERC Std requirements - E.B.3, E.B.4, and E.B.12 are similar to R3, R4, and R12 but the regional variance doesn't contain a requirement similar to R5. PNM's question is how does R15 apply to WECC entities if the referenced standards do not apply? Below is a suggested revision for R15 to allow for alignment with WECC variance. R12. Each Planning Coordinator that conducts a UFLS design assessment [remove "under Requirement R4, R5, or R12"] and determines that the UFLS program does not meet the performance characteristics [remove "in Requirement R3"], shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. 15.1 [Remove "For UFLS design assessment performed under Requirement R4 or R5,"] [T]he Corrective Action Plan shall be developed [Add- "within the time frame of the assessment."] {remove - "within the five-year time frame identified in Requirement R4."} Remove R15.2 in its entirety [remove "For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12."]
Yes
Yes
Yes
PNM HAS THE FOLLOWING COMMENT FOR PRC-010-1 THAT WE DID NOT SUBMIT DURING THE COMMENT PERIOD FOR THE SDT'S CONSIDERATION - PNM's concern is that the proposed PRC-010-1 standard requires the PC to annually update the UVLS database. PNM as a PC believes this should be the responsibility of the UVLS entity not the PC. As written, PCs would have to send a request for updates to all UVLS entities within their PC area every year rather than putting the obligation for data submittal on the UVLS entities. PNM is a smaller entity but is registered as a PC, and as such this could potentially create an administrative burden for the PC particularly if the UVLS entity is one that you have to repeatedly request information from without response. Suggested edit to address PNM's concern: R6: replace "update" with "maintain" R7: remove "and schedule" and add "at least once each calendar year" at the end of R7 following "UVLS Program databased"
Individual
Gul Khan
Oncor Electric Delivery LLC
Yes
Yes
Yes
No
Individual

David Thorne
Pepco Holdings Inc.
Yes
Yes
Yes
The requirements included in the standard under R6, R7, R8 and R14 all make sense to be logically included in this standard. The need for over voltage tripping of BES capacitor banks to cover for a possible system over correction should be determined quickly by the respective planning coordinator to allow adequate time for scheme addition or medication to support R10.
No
Group
Puget Sound Energy
Eleanor Ewry
No
While the basis for these changes is relevant, the changes are awkward and require re-wording to further clarify the intent of the requirements. For example, R9 could read something to the effect of: "Each Transmission Owner shall 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 within the schedule for implementation, taking into consideration schedules imposed by any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. The same wording could apply to R10 as well.
Yes
Yes
No
Individual
Amy Casuscelli
Xcel Energy
No
R15 is a requirement that stipulates actions if the conditions of R3 are not met. Thus, R15 would only apply if an entity were non-compliant with R3, and thus the CMEP would require an appropriate mitigation plan to correct and prevent recurrence. No requirement within the standard itself is needed to drive mitigating steps. Additionally, we suggest that the WECC variance address R15 as well, since the drivers for R15 (R3, R4, R5, R12) are not applicable to entities and it is not clear as to which requirements in the WECC variance substitute for these.
Group
MRO NERC Standards Review Forum
Joe DePoorter
Yes
Yes

Yes
No
Individual
Thomas Foltz
American Electric Power
No
It is important for the Transmission Owner to be allowed to participate in the Planning Coordinator's UFLS assessment process. R15 should be revised to allow the Transmission Owner to review, comment on, and approve of, the proposed Corrective Action Plan and related implementation requirements. AEP has chosen to vote negative on the proposed revisions, based on the concerns expressed above.
Yes
Yes
No
Individual
Mark Wilson
Independent Electricity System Operator
No
We agree with the addition of R15 but do not believe the added language "including any Corrective Action Plan" inserted to R9 and R10 is clear. Reading from the start of the main requirement, the phrase begs the question on what is it that needs to include the CAP: is it the "provide automatic tripping of Load" (in R9) or "provide automatic switching" (in R10), or is it the implementation of these switching requirement together with the CAP? We believe R9 and R10 requires the responsible entities not only to provide the necessary tripping or switching, but also to implement the CAP per the PC's implementation schedule. If that's the intent, then we offer the following suggested wording change to improve clarity: R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation and implement any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. R10. Each Transmission Owner shall 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 implementation and implement any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.
Yes
Yes
Individual
Russ Schneider
Flathead Electric Cooperative, Inc.
No
I concerned that the corrective action plan language gives too much authority to the planning coordinate to potentially create BES issues for small entities by adding UFLS requirements to local distribution facilities that are not properly in scope of these regulations. corrective action plan language should be clarified that no UFLS requirements shall be created for non-BES facilities to make them BES as subject to compliance.

No
No
Individual
Chris Scanlon
Exelon Companies
Yes
The conclusion regarding "Requirement R8 should not be retired" in the justification document, beginning on page 3, contains wording that could be considered to negatively portray UFLS entities commitment to reliability and support of the PC. Specifically as written; "Without Requirement R8, the PCs would not be provided with the UFLS data from the UFLS entities...". If in scope for the comment process, we propose that the SDT modify the justification document and revise to say that, "Requirement R8 will ensure the PC has the necessary data to conduct their design and performance assessments." We agree that the Requirements R6, R7, R8, R10 and R14 should NOT be retired, and agree with the justifications of the SDT except as aforementioned.
The background section says that a SDT consideration in developing R15 is that the PC will consider in developing a Corrective Action Plan the "time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changing in budgeting cycles". It is our understanding that the Corrective Action Plan and a schedule for implementation by the UFLS entities within its area as developed per R15 are subject to the requirement (R14) "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". This is not clear as written. We would like the SDT to address this point in the Requirement and or the Justificatuion.
Individual
Russell A. Noble
Public Utility District No. 1 of Cowlitz County, WA
Yes
Yes
No
Concerning R8, Cowlitz sees this as a fill-in-the-blank Requirement. The Requirement should not be retired, it should be modified. This Requirement should specify the specific data to be available allowing stakeholder comment; as written, the UFLS entity is possibly exposed to unreasonable Planning Coordinator data requests. Cowlitz will defer to the opinions expressed by Planning Coordinators on Requirements R6 and R7. However, concerning Requirement R6, this appears redundant to Requirement R4. It is not possible to "conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation..." if there is no "UFLS database containing data necessary to model its UFLS program." Further, R7 appears redundant to R5 as coordination is not possible without the sharing of data. Concerning R9 and R10, both of these Requirements mandate the addition or improvement of BPS facilities if "automatic tripping/switching" equipment is not installed. From the Federal Power Act, section 216: "The term 'reliability standard' means a requirement, approved by the Commission under this section, to provide for reliable operation of the bulk-power system. The term includes requirements for the operation of existing bulk-power system facilities... the design of planned additions or modifications to such facilities... ..but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity." The requirements should be revised to clarify as where automatic tripping/switching is available, and future plans for

improvements and expansion shall include consideration of UFLS Plan needs. Concerning Requirement 14, Cowlitz is not opposed.
Yes
The Standard should not refer to version 1 (e.g.: 3.1. Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1) for every reference to PRC-006-2 - Attachment 1.
Individual
John Pearson/Matt Goldberg
ISO New England
No
The UFLS entities in R9 and R10 should be responsible for determining the Corrective Action Plan for their deficiencies. The Planning Coordinator is not the correct entity for this.
Yes
No
We do not think that R10 is consistent with the purpose of PRC-006-2. The purpose statement 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." R10 is to correct for overvoltages as a result of load shedding actions taken by protective devices performing to requirements for PRC-006-2. Although this is a good practice, we agree with the IERP Report that this requirement should not be mandated within this standard. The correction of overvoltage is covered in TPL and VAR as stated by the IERP Report. Such corrections should be made regardless of what the triggering circumstance of an overvoltage condition is. To apply an additional requirement R10 to correct for overvoltage can subject entities to two similar requirements - which is another reason for P81 elimination. It would be appropriate to note in PRC-006 through an explanatory text perhaps in a Guideline or Technical document that overvoltage can results from frequency related load shedding actions and entities must be aware of the requirements in TPL and VAR are complied with. We disagree with the SDT conclusion for R14. The IERP Report has it right. R14 is administrative and does not provide a fundamental reliability need. R14 does SUPPORT the reliability need but it does not rise to the level to be a distinct requirement with a compliance measure. To address the concern raised in Project 2007-1 for ensuring UFLS entities and TO's have a role in defining the UFLS program, PRC-006 should only require that the PC performing a UFLS study request input from those entities identified in its study - which is already done in R6. It seems the intent of R14 is to ensure the study is thorough and comprehensive. This in and of itself is not a fundamental reliability need but rather should be an assumption that a credible and qualified PC will perform studies with such diligence. R6 already requires a PC to have comprehensive information in maintaining a UFLS database - essentially ensuring the same underlying purpose of R14. R6. Each Planning Coordinator shall 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. M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
No
Individual
Don Streebel
Idaho Power
Yes
We agree with the proposed revisions in response to the FERC directive.
Yes
We agree with implementation period of the proposed standard.

Yes
We agree with the drafting team conclusions that the requirements should not be retired.
No
Individual
Andrew Z. Pusztai
American Transmission Company
Yes
Yes
Yes
Individual
John Merrell
Tacoma Power
No
Requirement R15 refers to Requirements R3, R4, R5, and R12. However, these requirements are not applicable to WECC. Consideration should be given to rewording Requirement R15 or including a variance to Requirement R15 for WECC. There is some concern that Planning Coordinators under Requirement R15 may develop unrealistic CAPs. This potential issue is acknowledged in both the Consideration of FERC Directive and Response to Paragraph 81/Independent Expert Review Project Recommendations for PRC-006-1. There is no requirement for Planning Coordinators to consult with UFLS entities about the feasibility of CAPs, including the schedule for implementation. A CAP could be developed by one entity and implemented by one or more other entities. To help to successfully develop and implement a CAP, this issue should be at least addressed either as a footnote or in a Guidelines and Technical Basis section. Perhaps Requirement R14 could be modified to address this comment? Furthermore, there is no mention within the standard about the ability to modify the CAP, including the implementation schedule. Other standards, such as proposed PRC-004-3 and proposed PRC-026-1 permit modification if documented. Additionally, the Guidelines for Requirement R2 of proposed PRC-010-1 permit "deferrals or other relevant changes to the UVLS Program specifications or CAP" if documented. Such flexibility in modifying the CAP, including the implementation schedule, should be permitted by PRC-006-2 if the modifications are documented.
Yes
Yes
Yes
Why is there not a Lower VSL for Requirement R15?
Individual
Sonya Green-Sumpter
South Carolina Electric & Gas
Yes
We recommend a vote to approve the VRFs and VSLs.
Yes
Yes
No



Individual
David Jendras
Ameren
No
We request to modify the wording for R15 as follows, 'Each Planning Coordinator...shall in collaboration with the affected UFLS entity(s) develop a Corrective Action Plan...' Similarly, the wording for R9 and R10 should be modified to include the idea that the UFLS entity or Transmission Owner would collaborate with the Planning Coordinator in developing the Corrective Action Plan.
Group
SPP Standards Review Group
Robert Rhodes
No
In Requirement R15, Part 15.1, replace 'Requirement' with 'Requirements'.
Yes
(1) Although the following do not specifically fall within the limited scope of the SAR, they are errata in Measure M9 that should be addressed while the drafting team is dealing with Requirement R9. Use a lower case 'entity' when referring to UFLS entities in Measure M9. Also, capitalize 'Load' in Measure M9 to make it consistent with Requirement R9. (2) Again, this does not fall within the scope of the SAR but it is an errata that should be addressed while the standard is being revised. In the 2nd bullet under 1.2 Evidence Retention, insert 'its' between 'of' and 'UFLS'. (3) Likewise, this does not fall within the scope of the SAR but it is an errata that should be addressed while the standard is being revised. In the VSLs for Requirement R3, change 'characteristic' to characteristics'. (4) Also, hyphenate 30-, 40-, 50-calendar days and other similar usage in the VSLs for Requirements R7 and R8. (5) Include calendar in 13-calendar, 14-calendar, 15-calendar months and hyphenate in the VSLs for Requirements R11, R12 and R15. (6) We recommend that all changes made to the standard be reflected in the RSAW as well.
Group
Dominion NERC Compliance Policy
Randi Heise
Yes
Yes
No
While we agree with some of the reasons the SDT used to retain these requirements, we do agree with the IERP Recommendation that these ultimately be retired for the reasons they cited. At some point, the many requirements scattered throughout the body of reliability standards that call for the provision of data, maintenance of models and/or database(s) or coordination and cooperation as necessary to support reliability should be rolled into a very few requirements that apply to all registered entities. There should not be a need to have to include a similar requirement in each standard.
Group
Duke Energy
Colby Bellville
No

Duke Energy requests clarification from the drafting team on the applicability of R10. Does R10 only apply to Transmission Owners, or is the requirement also applicable to Distribution Providers as well? Specifically, does R10 bring in to scope the capacitor banks owned by Distribution Providers? We believe the intent of the drafting team is for R10 to solely apply to Transmission Owners, however, we offer the following suggested language revision to eliminate any possible ambiguity. "R10: Each Transmission Owner shall provide automatic switching of its Transmission capacitor banks, Transmission Lines, and Transmission reactors to control over-voltage as a result of underfrequency load shedding if required...."

Yes

No

Duke Energy does not agree with the standard drafting team in retaining R7 and R14 as enforceable requirements in this standard. R7: Duke Energy agrees with the Paragraph 81 team, and views this requirement as unnecessary, and largely administrative in nature. We feel that based on the infrequency with which requests like the one specified in R7 are made, and the likelihood of not receiving cooperation even in the event that a request was made, is so remote that it does not rise to the level of necessitating its own requirement. R14: Duke Energy feels that this requirement is purely administrative, and echoes the opinion of the Independent Expert Review Panel. We feel that simply requiring a Planning Coordinator to respond to comments made by UFLS Entities in its Planning Coordinator area, is not necessary to maintain reliability of the BES. While this requirement may be good business, and may allow for better working relationships between entities, it is not a requirement for BES reliability.

Yes

Duke Energy requests clarification from the drafting team regarding R15. Is it the drafting team's intent to require an entity to do a design assessment, and develop a corrective action plan, if warranted, in the time frames listed in 15.1 and 15.2? More specifically, does the time frame to develop a corrective action plan trigger from the date of the deficiency being found, or the date of the last assessment? As written, the language appears to require that an entity does both the design assessment and the corrective action plan within the period specified in 15.1 and 15.2.

Group

ISO RTO Council Standards Review Committee

Greg Campoli

No

Please refer to our comment on R10 in Question 3.

Yes

No

We do not think that R10 is consistent with the purpose of PRC-006-2. The purpose statement 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." R10 is to correct for overvoltages as a result of load shedding actions taken by protective devices performing to requirements for PRC-006-2. Although this is a good practice, we agree with the IERP Report that this requirement should not be mandated within this standard. The correction of overvoltage is covered in TPL and VAR as stated by the IERP Report. Such corrections should be made regardless of what the triggering circumstance of an overvoltage condition is. To apply an additional requirement R10 to correct for overvoltage can subject entities to two similar requirements - which is another reason for P81 elimination. It would be appropriate to note in PRC-006 through an explanatory text perhaps in a Guideline or Technical document that overvoltage can result from frequency related load shedding actions and entities must be aware of the requirements in TPL and VAR are complied with. We disagree with the SDT conclusion for R14. The IERP Report has it right. R14 is administrative and does not provide a fundamental reliability need. R14 does SUPPORT the reliability need but it does not rise to the level to be a distinct requirement with a compliance measure. To address the concern raised in Project 2007-1 for ensuring UFLS entities and TO's have a role in defining the UFLS program, PRC-006 should only require that the PC performing a UFLS

study request input from those entities identified in its study - which is already done in R6. It seems the intent of R14 is to ensure the study is thorough and comprehensive. This in and of itself is not a fundamental reliability need but rather should be an assumption that a credible and qualified PC will perform studies with such diligence. R6 already requires a PC to have comprehensive information in maintaining a UFLS database - essentially ensuring the same underlying purpose of R14. R6. Each Planning Coordinator shall 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. M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

Individual

Brian Evans-Mongeon

Utility Services

No

Requirements 9 and 10 are not immediately clear that the Corrective Action Plan referenced in the requirements is the same CAP developed in R15. To add clarity the following modification to the Requirements should be made: R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any changes specified in a Corrective Action Plan as developed in accordance with R15, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. R10. Each Transmission Owner shall 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 implementation, including any changes specified in a Corrective Action Plan as developed in accordance with R15, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. R15 should allow for input from the TO and UFLS Entity.

Individual

David Kiguel

David Kiguel

Yes

No

Implementation schedule of Requirements R9 and R10 should be agreed upon among involved entities. If design and construction work is required, sufficient time must be given for funding and regulatory approvals as required.

No

R6 is purely administrative in nature and meets the Paragraph 81 Criteria. The manner how the PC compiles and stores the information is up to the entity and should not be specified in the standard. R1 meets the objective ("what") and the standard should not specify how this is to be achieved. R7: For the same reason given in the comment to R6, I recommend deletion of "its UFLS database containing" in R7. Obligation to provide data is sufficient. R8: The format and schedule specified in R8 should be mutually agreed upon among the involved entities so that it's feasible and practical.

Yes

Clarification is requested about the technical justification for using a 25 % threshold in R3.

Group

ACES Standards Collaborators

Jason Marshall

Yes
These proposed revisions appear to address the FERC directive while allowing a reasonable timeframe for a UFLS entity to modify the amount of load under UFLS relay control.
Yes
Given that the UFLS program assessment requirements, R4, R5, and R12, are already effective. The approximate six to nine month implementation time frame is reasonable.
No
(1) R7 is clearly meets multiple P81 criteria (B1 – Administrative, B2 – Data Collection, B4 – Reporting). Specifically, it requires sharing data and information with a third party and provides little to no reliability benefit. The requirement does not even compel the recipient PC to use the data so how could this be viewed as anything other than administrative. (2) We disagree with the assessment for R8 and believe that this requirement clearly meets P81 criteria (B1 – Administrative, B2 – Data Collection, B4 – Reporting, and B7 – Redundant). It involves the requirement to share information with third parties which provide little to no reliability benefit. Contrary to the statement in the analysis, the PC has historically been able to get this information required in R8 and will continue to get the information because there are usually tariff or interconnection agreements that require the information and most UFLS entities understand the reliability need for the information and are willing to provide it. Furthermore, before PRC-006-1 became effective, PCs did not have any issues with receiving this data. (3) R6 also clearly meets P81 criteria. It does not compel anything that supports reliability. It does not compel the PC to have the UFLS information. It simply compels the PC to have the information in a database. How, the PC organizes the necessary UFLS information is irrelevant to reliability as long as they have the information and use it. (4) R14 also clearly meets P81 criteria. Specifically, it meets the documentation criterion in that it requires a document to be produced that provides no reliability benefit. In this requirement, the PC just has to respond to the submitter of the written comments. The reasons do not even have to be technically justified. This requirement is a “feel-good” requirement for the UFLS entities to be able to compel some response to their concerns. This is simply unneeded and the UFLS entities and PC should work together to address any concerns outside of compliance processes. This approach would be more efficient, effective and reliable.
Yes
Thank you for the opportunity to comment.
Group
Florida Municipal Power Agency
Carol Chinn
No
The language of R15 should include a reference to R13 as well, for the same reason that a reference to R5 is included. FMPA also wishes to point out that the third bullet of R5 includes the language “identify modifications to the UFLS program(s) to meet Requirement R3” –this should be changed to developing recommended Corrective Action Plans or should be left to R15 solely to make that statement. R15.2 should also include a reference to R13.
No
FMPA sees two issues with the proposed 6 month implementation. First, conducting a UFLS design study or event evaluation is a complex study that becomes an important part of a PC’s “year ahead” projection of work, and the proposed changes now require Corrective Action Plans which may require the coordination and agreement of a large number of participants to schedule and rectify issues identified prior to the date of issue of the study (e.g. within the 5 year or two year interval). If an entity is in the current year that its 5 year assessment is required, and PRC-006-1 is replaced with PRC-006-2, suddenly additional time is required to complete the study which was not anticipated. Furthermore, entities’ actual UFLS settings are only reported annually, and may be in a state of flux. FMPA believes the date should at minimum be 1 year, as a result. Secondarily and similarly, since PRC-006-1 does not require Corrective Action Plans, it is not clear what will happen if an entity is in the middle of a 2 year event study when the transition occurs. FMPA believes either the entities that are currently in the process of conducting studies should be allowed to finish under the old standard, or that an additional year should be afforded.
No

The five requirements should all be retired as recommended by the independent experts. These requirements are all either too prescriptive in nature and/or administrative in nature. This continued approach is not risk-based nor results-based for standards development.

Individual

Catherine Wesley

PJM Interconnection

Yes

Yes

Yes

No

Individual

Bill Fowler

City of Tallahassee

Yes

Yes

No

The City of Tallahassee (TAL) maintains that R10 should be retired. If the entity's UFLS program requires the automatic shedding for under frequency and then switching in response to over voltage, the entity must comply with that regardless of whether R10 is enforceable or retired. In addition, the entity is required to maintain acceptable system voltage in accordance with system operating and transmission planning standards. Regulatory duplication is not desirable

No

Individual

Scott Langston

City of Tallahassee

Yes

Yes

No

The City of Tallahassee (TAL) maintains that R10 should be retired. If the entity's UFLS program requires the automatic shedding for under frequency and then switching in response to over voltage, the entity must comply with that regardless of whether R10 is enforceable or retired. In addition, the entity is required to maintain acceptable system voltage in accordance with system operating and transmission planning standards. Regulatory duplication is not desirable.

No

Individual

Karen Webb

City of Tallahassee

Yes

Yes
No
The City of Tallahassee (TAL) maintains that R10 should be retired. If the entity's UFLS program requires the automatic shedding for under frequency and then switching in response to over voltage, the entity must comply with that regardless of whether R10 is enforceable or retired. In addition, the entity is required to maintain acceptable system voltage in accordance with system operating and transmission planning standards. Regulatory duplication is not desirable.
No
Individual
Karin Schweitzer
Texas Reliability Entity
No
Texas Reliability Entity, Inc. (Texas RE) supports the addition of "Corrective Action Plan" to Requirements R9 and R10 and agrees the modification addresses the FERC directive, in part. Further, Texas RE supports the addition of Requirement R15 but does not agree that R15.1 and R15.2 are sufficient to satisfy the FERC directive. While the proposed standard now establishes the responsibility for development of a Corrective Action Plan (CAP) and a requirement for a UFLS entity to implement the CAP, the time frames specified are too long and do not appear to meet the spirit of the FERC directive. The Planning Coordinator (PC) is allowed five years (for R4 and R5) or two years (for R12) to develop a Corrective Action Plan (CAP) for entity UFLS programs that do not meet the performance characteristics in Requirement R3. The FERC directive from Order No. 763 raised concern that the standard failed to specify how soon an entity would need to implement corrections. The concern over the timeliness of entity implementation of a CAP is not alleviated by a prolonged period for CAP development. Nor do these extended time frames adequately address risks associated with the UFLS deficiency during the time a CAP is under development. In addition, the SDT acknowledged that that it could take years for an entity to implement corrections when it stated "that time allotted by the PC will depend on the extent of deficiencies and that allowances will be necessary for inclusion of approved changing in budgeting cycles." [Source: "Consideration of FERC Directive Project 2008-02: Underfrequency Load Shedding (UFLS)".] Texas RE understands that the PC should allow time for affected UFLS entities to plan and budget for corrections directed by the PC. However, the proposed language allowing PCs to take several years to develop a CAP and potentially several more years for the UFLS entity to implement corrections. During this extended time frame the risk to the BES posed by the UFLS deficiency persists. Texas RE suggests that the PC should be required to develop the CAP in a shorter time frame and recommends the following language change: R15.1: For UFLS design assessments performed under Requirement R4 of R5, the Corrective Action Plan shall be developed within [one year of completion of the UFLS design assessment]. R15.2: For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within [one year of completion of the UFLS design assessment].
Yes
Yes
Group
Bonneville Power Administration
Andrea Jessup
Yes
Yes

Yes
Yes
BPA suggests several references to PRC-006-1 in the WECC regional variance (pp. 27-29) should be corrected to PRC-006-2, specifically in paragraphs: E.B.3.1, E.B.3.2 and E.B.4.1 thru E.B.4.6. BPA believes the new requirement, R15, should be written into the WECC regional variance. Required CAPs in R15 are contingent upon analysis done in R4, R5, or R12, and performance characteristics of R3, all of which are superseded by the regional variance in the WECC. As written it would appear PCs in the WECC would be automatically excluded from compliance with R15 of the standard. BPA believes reference to SPS should be swapped for RAS per project 2010-05.2 (SPS references in PRC-006-2 in R2.2 and E.B.2.2.)
Individual
PHAN, Si Truc
Hydro-Quebec TransEnergie
Yes
Yes
Yes
Yes
Hydro-Québec understands that the actual scope of revision is very limited. However, the issues brought by HQ's latest comments for PRC-006-2 are very limited and concerns Attachment 1A (Quebec) and some editorial changes in the Regional Variance for the Quebec Interconnection. Those portions of the standard impact only NERC members in Québec, which are very few (Hydro-Québec TransÉnergie and Hydro-Québec Production). It is a unique situation where a regional variance addresses only a portion of a NERC Region, the Québec Interconnection. So, it seems not convenient to start a new Standard Drafting Team for modifications that impact so few members. We ask if it is possible to include those modifications in the actual revision of PRC-006-2 for efficiency purposes. Those are the following: 1. Regional Variance for the Quebec Interconnection, E.A.3, change this portion to better reflect R3 : [...] including notification of and for implementation [...] (instead of [...] including a schedule for implementation [...]) 2. Regional Variance for the Quebec Interconnection, E.A.4.2, Attachment 1A (instead of 2A) 3. Attachment 1 A (Québec): the minimum system frequency curve should continue with the same slope from 30 sec to 60 sec, and, at 60 sec, it should be adjusted to 59 Hz instead of 59,3 Hz. The justification for such changes is the following: The Quebec Interconnection (QI) has much less inertia than other Interconnections. This implies a greater variation of frequency for all kinds of contingencies. The curve of Attachment 1A (Québec) doesn't take that into account for the time frame following the 30 second mark. It is requested that the steady state condition would allow a larger frequency gap than other Interconnections, as the QI has already a larger gap allowed at short term (between 56 Hz and 63 Hz) than other interconnections (from 58 Hz to 61,8 Hz). Also, it is requested that the time to attain the steady state, which is 60 seconds for other Interconnections (Attachment 1), would be at least or even longer for the Quebec Interconnection, instead of the actual 30 seconds value of Attachment 1A. Those proposed changes are necessary to limit the amount and frequency of load shedding for different contingencies. The proposed changes do not affect the reliability of the QI, but help to fit the unique characteristics of the system.

# Consideration of Comments

## Project 2008-02 Underfrequency Load Shedding (UFLS)

The Project 2008-02 Drafting Team thanks all commenters who submitted comments on the standard. These standards were posted for a 45-day public comment period from August 21, 2014 through October 8, 2014. Stakeholders were asked to provide feedback on the standards and associated documents through a special electronic comment form. There were 35 sets of comments, including comments from approximately 126 different people from approximately 84 companies representing 9 of the 10 Industry Segments as shown in the table on the following pages.

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

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact the Director of Standards, Valerie Agnew, at 404-446-2566 or at [valerie.agnew@nerc.net](mailto:valerie.agnew@nerc.net). In addition, there is a NERC Reliability Standards Appeals Process.<sup>1</sup>

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<sup>1</sup> The appeals process is in the Standard Processes Manual:  
[http://www.nerc.com/comm/SC/Documents/Appendix\\_3A\\_StandardsProcessesManual.pdf](http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf)



1. Do you agree with the proposed revisions in response to the FERC directive? If not, please provide the basis for your disagreement with the proposed revisions along with your suggested language changes..... 11
2. Do you agree with implementation period of the proposed standard? If not, what do you believe the implementation period should be and why? .....24
3. The UFLS drafting team reviewed five requirements (Requirements R6, R7, R8, R10 and R14) contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81 and Independent Expert Review Project recommendations. The team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired. The team drafted a justification document outlining the basis for its conclusion that the requirements should not be retired, which can be found on the project page. Do you agree with the drafting team conclusions that the requirements should not be retired? If not, please identify the specific conclusions that you do not agree with, and the basis for your disagreement. ....28
4. If you have any other comments or concerns on the proposed standard (related to an issue that falls within the limited scope of the SAR), please provide them here:.....41

**The Industry Segments are:**

- 1 — Transmission Owners
- 2 — RTOs, ISOs
- 3 — Load-serving Entities
- 4 — Transmission-dependent Utilities
- 5 — Electric Generators
- 6 — Electricity Brokers, Aggregators, and Marketers
- 7 — Large Electricity End Users
- 8 — Small Electricity End Users
- 9 — Federal, State, Provincial Regulatory or other Government Entities
- 10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Guy Zito	Northeast Power Coordinating Council										X
Additional Member		Additional Organization		Region	Segment Selection								
1.	Alan Adamson	New York State Reliability Council, LLC		NPCC	10								
2.	David Burke	Orange and Rockland Utilities Inc.		NPCC	3								
3.	Greg Campoli	New York Independent System Operator		NPCC	2								
4.	Sylvain Clermont	Hydro-Quebec TransEnergie		NPCC	1								
5.	Kelly Dash	Consolidated Edison Co, of New York, Inc.		NPCC	1								
6.	Gerry Dunbar	Northeast Power Coordinating Council		NPCC	10								
7.	Mike Garton	Dominion Resources Services, Inc.		NPCC	5								
8.	Kathleen Goodman	ISO - New England		NPCC	2								

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
9.	Michael Jones	National Grid	NPCC	1									
10.	Mark Kenny	Northeast Utilities	NPCC	1									
11.	Helen Lainis	Independent Electricity System Operator	NPCC	2									
12.	Alan MacNaughton	New Brunswick Power Corporation	NPCC	9									
13.	Bruce Metruck	New York Power Authority	NPCC	6									
14.	Silvia Parada Mitchell	NextEra Energy, LLC	NPCC	5									
15.	Lee Pedowicz	Northeast Power Coordinating Council	NPCC	10									
16.	Robert Pellegrini	The United Illuminating Company	NPCC	1									
17.	Si Truc Phan	Hydro-Quebec TransEnergie	NPCC	1									
18.	David Ramkalawan	Ontario Power Generation, Inc.	NPCC	5									
19.	Brian Robinson	Utility Services	NPCC	8									
20.	Ayesha Sabouba	Hydro One Networks Inc.	NPCC	1									
21.	Brian Shanahan	National Grid	NPCC	1									
22.	Wayne Sipperly	New York Power Authority	NPCC	5									
23.	Ben Wu	Orange and Rockland Utilities Inc.	NPCC	1									
24.	Peter Yost	Consolidated Edison Co. of New York, Inc.	NPCC	3									
2.	Group	Janet Smith	Arizona Public Service Company	X		X		X	X				
N/A													
3.	Group	Eleanor Ewry	Puget Sound Energy	X		X		X					
N/A													
4.	Group	Joe DePoorter	MRO NERC Standards Review Forum	X	X	X	X	X	X				
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>	<b>Segment Selection</b>								
1.	Amy Casucelli	Xcel Energy	MRO	1, 3, 5, 6									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
2.	Chuck Wicklund	Otter Tail Power Company	MRO	1, 3, 5									
3.	Dan Inman	Minnkota Power Cooperative	MRO	1, 3, 5, 6									
4.	Dave Rudolph	Basin Electric Power Cooperative	MRO	1, 3, 5, 6									
5.	Kayleigh Wilkerson	Lincoln Electric System	MRO	1, 3, 5, 6									
6.	Jodi Jensen	WAPA	MRO	1, 6									
7.	Joseph DePoorter	Madison Gas & Electric	MRO										
8.	Ken Goldsmith	Alliant Energy	MRO	4									
9.	Mahmood Safi	Omaha Public Power District	MRO	1, 3, 5, 6									
10.	Marie Knox	MISO	MRO	2									
11.	Mike Brytowski	Great River Energy	MRO	1, 3, 5, 6									
12.	Randi Nyholm	Minnesota Power	MRO	1, 5									
13.	Scott Nickels	Rochester Public Utilities	MRO	4									
14.	Terry Harbour	MidAmerican Energy	MRO	1, 3, 5, 6									
15.	Tom Breene	Wisconsin Public Service	MRO	3, 4, 5, 6									
16.	Tony Eddleman	Nebraska Public Power District	MRO	1, 3, 5									
5.	Group	Robert Rhodes	SPP Standards Review Group		X								
<b>Additional Member</b>		<b>Additional Organization</b>		<b>Region</b>	<b>Segment Selection</b>								
1.	John Allen	City Utilities of Springfield	SPP	1, 4									
2.	John Boshears	City Utilities of Springfield	SPP	1, 4									
3.	Derek Brown	Westar Energy	SPP	1, 3, 5, 6									
4.	Kevin Foflygen	City Utilities of Springfield	SPP	1, 4									
5.	Louis Guidry	Cleco Power	SPP	1, 3, 5, 6									
6.	Jonathan Hayes	Southwest Power Pool	SPP	2									

Group/Individual		Commenter	Organization	Registered Ballot Body Segment																																							
				1	2	3	4	5	6	7	8	9	10																														
7.	Robert Hirschak	Cleco Power	SPP	1, 3, 5, 6																																							
8.	Stephanie Johnson	Westar Energy	SPP	1, 3, 5, 6																																							
9.	Tara Lightner	Sunflower Electric Power Corporation	SPP	1																																							
10.	Shannon Mickens	Southwest Power Pool	SPP	2																																							
11.	James Nail	City of Independence, MO	SPP	3, 5																																							
12.	John Swigost	Basin Electric Power Cooperative	MRO	1, 3, 5, 6																																							
13.	Ellen Watkins	Sunflower Electric Power Corporation	SPP	1																																							
14.	J. Scott Williams	City Utilities of Springfield	SPP	1, 4																																							
15.	Luis Zaragoza	Sunflower Electric Power Corporation	SPP	1																																							
6.	Group	Randi Heise	Dominion NERC Compliance Policy	X		X		X	X																																		
<table border="1"> <thead> <tr> <th></th> <th>Additional Member</th> <th>Additional Organization</th> <th>Region</th> <th>Segment Selection</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Louis Slade</td> <td>Dominion</td> <td>SERC</td> <td>5, 6</td> </tr> <tr> <td>2.</td> <td>Connie Lowe</td> <td>Dominion</td> <td>RFC</td> <td>5</td> </tr> <tr> <td>3.</td> <td>Mike Garton</td> <td>Dominion</td> <td>NPCC</td> <td>5, 6</td> </tr> <tr> <td>4.</td> <td>Larry Nash</td> <td>Dominion</td> <td>SERC</td> <td>1, 3</td> </tr> <tr> <td>5.</td> <td>Randi Heise</td> <td>Dominion</td> <td>RFC</td> <td>6</td> </tr> </tbody> </table>					Additional Member	Additional Organization	Region	Segment Selection	1.	Louis Slade	Dominion	SERC	5, 6	2.	Connie Lowe	Dominion	RFC	5	3.	Mike Garton	Dominion	NPCC	5, 6	4.	Larry Nash	Dominion	SERC	1, 3	5.	Randi Heise	Dominion	RFC	6										
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2.	Connie Lowe	Dominion	RFC	5																																							
3.	Mike Garton	Dominion	NPCC	5, 6																																							
4.	Larry Nash	Dominion	SERC	1, 3																																							
5.	Randi Heise	Dominion	RFC	6																																							
7.	Group	Colby Bellville	Duke Energy	X		X		X	X																																		
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Group/Individual		Commenter		Organization		Registered Ballot Body Segment									
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2.	Lee Schuster	Duke Energy	FRCC	3											
3.	Dale Goodwine	Duke Energy	SERC	5											
4.	Greg Cecil	Duke Energy	RFC	6											
8.	Group	Greg Campoli	ISO RTO Council Standards Review Committee				X								
	<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>	<b>Segment Selection</b>											
1.	Ben Li	IESO	NPCC	2											
2.	Cheryl Moseley	ERCOT	ERCOT	2											
3.	Lori Spence	MISO	MRO	2											
4.	Matt Goldberg	ISONE	NPCC	2											
5.	Charles Yeung	SPP	SPP	2											
6.	Ben Li	IESO	NPCC	2											
7.	Ali Miremadi	CAISO	WECC	2											
9.	Group	Jason Marshall	ACES Standards Collaborators								X				
	<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>	<b>Segment Selection</b>											
1.	Bob Solomon	Hoosier Energy	RFC	1											
2.	Bill Hutchison	Southern Illinois Power Cooperative	SERC	1											
3.	Shari Heino	Brazos Electric Power Cooperative	ERCOT	1, 5											
4.	Chip Koloini	Golden Spread Electric Cooperative	SPP	3, 5											
5.	Michael Brytowski	Great River Energy	MRO	1, 3, 5, 6											
6.	Ellen Watkins	Sunflower Electric Power Cooperative	SPP	1											

Group/Individual	Commenter	Organization	Registered Ballot Body Segment																	
			1	2	3	4	5	6	7	8	9	10								
7.	Kevin Lyons	Central Iowa Power Cooperative	MRO	1																
8.	John Shaver	Arizona Electric Power Cooperative	WECC	4, 5																
9.	John Shaver	Southwest Transmission Cooperative	WECC	1																
10.	Ginger Mercier	Prairie Power	SERC	3																
11.	Scott Brame	North Carolina Electric Membership Corporation	SERC	3, 4, 5																
10.	Group	Carol Chinn	Florida Municipal Power Agency	X			X	X	X	X										
Additional Member		Additional Organization		Region	Segment Selection															
1.	Tim Beyrle	City of New Smyrna Beach	FRCC	4																
2.	Jim Howard	Lakeland Electric	FRCC	3																
3.	Greg Woessner	Kissimmee Utility Authority	FRCC	3																
4.	Lynne Mila	City of Clewiston	FRCC	3																
5.	Randy Hahn	Ocala Utility Services	FRCC	3																
6.	Don Cuevas	Beaches Energy Services	FRCC	1																
7.	Stan Rzad	Keys Energy Services	FRCC	4																
8.	Mark Schultz	City of Green Cove Springs	FRCC	3																
9.	Matt Culverhouse	City of Bartow	FRCC	3																
10.	Tom Reedy	Florida Municipal Power Pool	FRCC	6																
11.	Steven Lancaster	Beaches Energy Services	FRCC	1																
12.	Richard Bachmeier	Gainesville Regional Utilities	FRCC	1																
13.	Mike Blough	Kissimmee Utility Authority	FRCC	5																

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
11.	Group	Andrea Jessup	Bonneville Power Administration	X		X		X	X				
	<b>Additional Member</b>	<b>Additional Organization</b>	<b>Region</b>	<b>Segment Selection</b>									
1.	Greg Vassalo	Western Engineering	WECC	1									
2.	Paul Fiedler	Western Engineering	WECC	1									
12.	Individual	Dan Bamber	ATCO Electric	X									
13.	Individual	Laurie Williams	Public Service Company of New Mexico	X		X							
14.	Individual	Gul Khan	Oncor Electric Delivery LLC	X									
15.	Individual	David Thorne	Pepco Holdings Inc.	X		X							
16.	Individual	Amy Casuscelli	Xcel Energy	X		X		X	X				
17.	Individual	Thomas Foltz	American Electric Power	X		X		X	X				
18.	Individual	Mark Wilson	Independent Electricity System Operator		X								
19.	Individual	Russ Schneider	Flathead Electric Cooperative, Inc.			X	X						
20.	Individual	Chris Scanlon	Exelon Companies	X		X		X	X				
21.	Individual	Russell A. Noble	Public Utility District No. 1 of Cowlitz County, WA			X	X	X					
22.	Individual	John Pearson/Matt Goldberg	ISO New England		X								
23.	Individual	Don Streebel	Idaho Power	X									
24.	Individual	Andrew Z. Pusztai	American Transmission Company	X									
25.	Individual	John Merrell	Tacoma Power	X		X	X	X	X				
26.	Individual	Sonya Green-Sumpter	South Carolina Electric & Gas	X		X		X	X				
27.	Individual	David Jendras	Ameren	X		X		X	X				



Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
28.	Individual	Brian Evans-Mongeon	Utility Services				X						
29.	Individual	David Kiguel	David Kiguel								X		
30.	Individual	Catherine Wesley	PJM Interconnection		X								
31.	Individual	Bill Fowler	City of Tallahassee			X							
32.	Individual	Scott Langston	City of Tallahassee	X									
33.	Individual	Karen Webb	City of Tallahassee					X					
34.	Individual	Karin Schweitzer	Texas Reliability Entity										X
35.	Individual	PHAN, Si Truc	Hydro-Quebec TransEnergie	X									

1. Do you agree with the proposed revisions in response to the FERC directive? If not, please provide the basis for your disagreement with the proposed revisions along with your suggested language changes.

No.	Organization	Yes/ No	Question 1 Comment
1	Northeast Power Coordinating Council	No	<p>1. UFLS entities should be included in the development of a Corrective Action Plan. Suggested wording of requirement R15: Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall, with the participation of affected UFLS entities, develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>2. The "...schedule for implementation..." in the above requirements is not specific, and does not appear to address the FERC Directive from Order No. 763 which raised the concern about how soon an entity would need to implement corrections. Suggest adding a definite time period.</p>

**Response:**

- The SDT agrees that UFLS entities should be (and are) included in the development of the Corrective Action Plan (CAP). This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities to implement changes to the UFLS program. Under Requirement R14, *before the PC finalizes* the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the UFLS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities to provide comments regarding the proposed program before it is finalized.
- The SDT believes that the new Requirement R15 addresses the concern raised by FERC and the directive issued in Order No. 763. FERC did not direct NERC to define a specific time period to apply uniformly to all implementation schedules. To the contrary, the time allotted for corrections will depend upon the facts and circumstances of the particular deficiency identified and the UFLS program at issue. In Order No. 763, FERC stated, "In response to the Commission's concern that Reliability Standard PRC-006-1 does not specify how soon after an event would an entity need to implement corrections in response to any deficiencies identified in the event assessment under Requirement R11 of PRC-006-1, NERC stated in its comments that:  

The amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, as specified in Requirement R9 of PRC-006-1. The time allotted for corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and

No.	Organization	Yes/ No	Question 1 Comment
<p>implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changes in budgeting cycles.</p> <p>Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard...” See, FERC Order No. 763, <i>Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards</i>, 139 FERC ¶ 61,098 (May 7, 2012). <a href="#">[Link to FERC Order No. 763]</a></p>			
2	Puget Sound Energy	No	<p>While the basis for these changes is relevant, the changes are awkward and require re-wording to further clarify the intent of the requirements. For example, R9 could read something to the effect of: “Each Transmission Owner shall 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 within the schedule for implementation, taking into consideration schedules imposed by any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.” The same wording could apply to R10 as well.</p>
<p><b>Response:</b></p> <p>The SDT believes the current wording of the proposed changes to the standard achieves the intended objective of making clear in the standard that when deficiencies are identified as a result of an assessment, the PC must develop a plan to correct the deficiencies, bring the UFLS program into compliance with the performance characteristics outlined in Requirement R3, and specify how soon the entity has to implement the corrections needed to fix any deficiencies. As outlined in the previous comment response, the amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, and the time allotted for corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changes in budgeting cycles.</p>			
3	SPP Standards Review Group	No	<p>In Requirement R15, Part 15.1, replace ‘Requirement’ with ‘Requirements’.</p>
<p><b>Response:</b></p> <p>Requirement R15 provides that if deficiencies are identified as a result of a design assessment conducted under Requirement R4, Requirement R5, or Requirement R12, then the PC develops a Corrective Action Plan to remedy the identified deficiency. Because the design assessment will be conducted pursuant to one of those requirements (R4, R5, or R12), “Requirement” is intended to be singular and not plural. For these reasons, the SDT did not make changes to the standard.</p>			

No.	Organization	Yes/ No	Question 1 Comment
4	Duke Energy	No	Duke Energy requests clarification from the drafting team on the applicability of R10. Does R10 only apply to Transmission Owners, or is the requirement also applicable to Distribution Providers as well? Specifically, does R10 bring in to scope the capacitor banks owned by Distribution Providers? We believe the intent of the drafting team is for R10 to solely apply to Transmission Owners, however, we offer the following suggested language revision to eliminate any possible ambiguity. "R10: Each Transmission Owner shall provide automatic switching of its Transmission capacitor banks, Transmission Lines, and Transmission reactors to control over-voltage as a result of underfrequency load shedding if required...."
<p><b>Response:</b> In accordance with the limited scope of the SAR, the <i>Project 2008-02 UFLS</i> standard drafting team did not make any modifications to the standard other than to address the FERC directive by making explicit in the standard that if deficiencies are identified as a result of an assessment, the Planning Coordinator shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities. No changes were made to the applicability of the existing requirements. The existing Requirement R10 applies to Transmission Owners, not Distribution Providers.</p>			
5	ISO RTO Council Standards Review Committee	No	Please refer to our comment on R10 in Question 3.
<p><b>Response:</b> Please refer to the SDT response to your comment on Requirement R10 in Question 3 (below).</p>			
6	Florida Municipal Power Agency	No	<p>The language of R15 should include a reference to R13 as well, for the same reason that a reference to R5 is included.</p> <p>FMPA also wishes to point out that the third bullet of R5 includes the language "identify modifications to the UFLS program(s) to meet Requirement R3" -this should be changed to developing recommended Corrective Action Plans or should be left to R15 solely to make that statement.</p> <p>R15.2 should also include a reference to R13.</p>
<p><b>Response:</b> The SDT disagrees that Requirement R15 should reference Requirement R13. This is not necessary because Requirement R13 addresses coordination among PCs in conducting event assessments when an islanding event occurs in more than one PC area. Requirement R13 does not necessarily mean that the UFLS program fails to meet the performance characteristics of Requirement R3 (thus making a CAP necessary). On the other hand, under Requirement R5, when a PC area is part of an island identified by another PC, under bullet three (3), if a design assessment conducted under Requirement R4 identifies that the UFLS program fails to meet the performance characteristics of Requirement R3, then the program must be modified to correct the deficiencies (thus the need for the CAP).</p>			

No.	Organization	Yes/ No	Question 1 Comment
7	Public Service Company of New Mexico	No	<p>According to the rationale for the addition of R15 was to address FERC Order No. 763. FERC was concerned that the standard didn't specify when the entity would need to implement a change to correct deficiencies identified during an assessment. R15 in this draft references R3, R4, R5 and R12. PNM is concerned that WECC has a regional variance for all four of these original NERC STD requirements - E.B.3, E.B.4, and E.B.12 are similar to R3, R4, and R12 but the regional variance doesn't contain a requirement similar to R5.</p> <p>PNM's question is how does R15 apply to WECC entities if the referenced standards do not apply? Below is a suggested revision for R15 to allow for alignment with WECC variance.</p> <p>R12. Each Planning Coordinator that conducts a UFLS design assessment [remove "under Requirement R4, R5, or R12"] and determines that the UFLS program does not meet the performance characteristics [remove "in Requirement R3"], shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>15.1 [Remove "For UFLS design assessment performed under Requirement R4 or R5,"] [T]he Corrective Action Plan shall be developed [Add- "within the time frame of the assessment."] {remove - "within the five-year time frame identified in Requirement R4."}</p> <p>Remove R15.2 in its entirety [remove "For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12."]</p>
<p><b>Response:</b></p> <p>The SDT agrees that the regional variance does not contain the exact language from Requirement R5, but the PC nevertheless conducts design assessments pursuant to Requirement E.B.4 and Requirement E.B.12. The SDT understands that Requirement R15 could be applied to these WECC variance provisions without issue. Furthermore, the SDT did not revise the WECC variance because development of new or modifications to existing Regional Reliability Standards, or, in this case, an Interconnection-wide regional variance, is handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the WECC variance at issue must be developed through the WECC Regional Reliability Standards development procedure.</p>			

No.	Organization	Yes/ No	Question 1 Comment
8	Xcel Energy	No	<ol style="list-style-type: none"> <li>1. R15 is a requirement that stipulates actions if the conditions of R3 are not met. Thus, R15 would only apply if an entity were non-compliant with R3, and thus the CMEP would require an appropriate mitigation plan to correct and prevent recurrence. No requirement within the standard itself is needed to drive mitigating steps.</li> <li>2. Additionally, we suggest that the WECC variance address R15 as well, since the drivers for R15 (R3, R4, R5, R12) are not applicable to entities and it is not clear as to which requirements in the WECC variance substitute for these.</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. SDT agrees that the actions required under Requirement R15 will only be necessary in the event that the requirements of Requirement R3 are not met. However, the SDT disagrees that the CAP requirement is not needed in the standard. In Order No. 763, FERC raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator assessment. As a result of this lack of clarity, FERC directed NERC to make this requirement explicit in future versions of the standard. The standard drafting team addressed the FERC directive by adding one new requirement (Requirement R15) and modifying two existing requirements (Requirements R9 and R10). Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the Planning Coordinator shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities. A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” The Corrective Action Plan developed by the Planning Coordinator will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the Planning Coordinator as a result of as assessment. The SDT agrees that the mitigation plan developed by the PC as a result of the violation of Requirement R3 will provide a description of how the violation has been mitigated; however, this only affects the PC and how it establishes with the applicable Compliance Enforcement Authority (CEA) that it is/will correct the violation. The CAP specifies how soon the affected UFLS entities must implement the corrections necessary to fix any identified deficiencies.</li> <li>2. The SDT agrees that the regional variance does not contain the exact language from Requirement R5, but the PC nevertheless conducts design assessments pursuant to Requirement E.B.4 and Requirement E.B.12. The SDT understands that Requirement R15 could be applied to these WECC variance provisions without issue. Furthermore, the SDT did not revise the WECC variance because development of new or modifications to existing Regional Reliability Standards, or, in this case, an Interconnection-wide regional variance, is handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the WECC variance at issue must be developed through the WECC Regional Reliability Standards development procedure.</li> </ol>			

No.	Organization	Yes/ No	Question 1 Comment
9	American Electric Power	No	It is important for the Transmission Owner to be allowed to participate in the Planning Coordinator’s UFLS assessment process. R15 should be revised to allow the Transmission Owner to review, comment on, and approve of, the proposed Corrective Action Plan and related implementation requirements. AEP has chosen to vote negative on the proposed revisions, based on the concerns expressed above.
<p><b>Response:</b></p> <p>The SDT agrees that Transmission Owners should be (and are) included in the development of the CAP. This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities and Transmission Owners to implement changes to the UFLS program. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities and Transmission Owners may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the ULFS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities and Transmission Owners to provide comments regarding the proposed program before it is finalized.</p>			
10	Independent Electricity System Operator	No	<p>We agree with the addition of R15 but do not believe the added language “including any Corrective Action Plan” inserted to R9 and R10 is clear.</p> <p>Reading from the start of the main requirement, the phrase begs the question on what is it that needs to include the CAP: is it the “provide automatic tripping of Load” (in R9) or “provide automatic switching” (in R10), or is it the implementation of these switching requirement together with the CAP?</p> <p>We believe R9 and R10 requires the responsible entities not only to provide the necessary tripping or switching, but also to implement the CAP per the PC’s implementation schedule. If that’s the intent, then we offer the following suggested wording change to improve clarity:</p> <p>R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation and implement any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets.</p> <p>R10. Each Transmission Owner shall 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</p>

No.	Organization	Yes/ No	Question 1 Comment
			program and schedule for implementation and implement any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.
<p><b>Response:</b>                      The SDT believes the current wording of the proposed changes to the standard achieves the intended objective of making clear in the standard that when deficiencies are identified as a result of an assessment, the PC must develop a plan to correct the deficiencies, bring the UFLS program into compliance with the performance characteristics outlined in Requirement R3, and specify how soon the entity has to implement the corrections needed to fix any deficiencies. Under Requirement R9, UFLS entities must provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any CAP, to the extent that one exists. Similarly, for Requirement R10, Transmission Owners must 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 implementation, including any CAP, to the extent that one exists. The SDT appreciates the proposed changes suggested but because it is not believed that the proposed wording adds additional clarity, the SDT declines to adopt the proposed changes.</p>			
11	Flathead Electric Cooperative, Inc.	No	I concerned that the corrective action plan language gives too much authority to the planning coordinate to potentially create BES issues for small entities by adding UFLS requirements to local distribution facilities that are not properly in scope of these regulations. Corrective action plan language should be clarified that no UFLS requirements shall be created for non-BES facilities to make them BES as subject to compliance.
<p><b>Response:</b>                      The SDT did not modify the applicability section of the standard; nor do the new Requirement R15 and modified Requirements R9 and R10 result in the situation described above. The SDT states that the PC cannot create UFLS requirements for “non-BES facilities to make them BES as subject to compliance.” If an entity is registered as a Distribution Provider or Transmission Owner, then the requirements may apply to those registered entities, depending upon the facts and circumstances. The addition of the CAP requirement in no way changes or affects the ability of the PC to “create” requirements for non-BES facilities to make them subject to compliance.</p>			
12	ISO New England	No	The UFLS entities in R9 and R10 should be responsible for determining the Corrective Action Plan for their deficiencies. The Planning Coordinator is not the correct entity for this.
<p><b>Response:</b>                      The SDT thanks you for your comment, but believes the PC is the correct entity to develop the CAP. The PC has the responsibility under Requirement R1 to develop and document criteria to identify portions of the BES that may form islands. Under Requirement R2, the PC is required to identify the islands that serve as a basis for designing its particular UFLS program. The PC, under Requirement R3, must develop its UFLS program, including the schedule for implementation by the UFLS entities, that meets the performance characteristics set forth in the standard. Under Requirement R4, it is the PC that is required to conduct and document a UFLS program design assessment at least once every five years to determine whether the program meets the performance characteristics in Requirement R3. Requirement R5 requires the PC coordinate its UFLS design with other PCs whose areas are part of the same identified island. Under Requirement R11, when an islanding event results in frequency excursions below the set points, it is the PC that must conduct and document an assessment of</p>			



No.	Organization	Yes/ No	Question 1 Comment
<p>the event. Under Requirement R12, if the assessment identifies deficiencies in the UFLS program, it is the PC that must conduct and document a design assessment. The SDT disagrees with the commenters position and believes the PC is the proper entity to develop the CAP, which is a part of the overarching UFLS program (also developed by the PC). The PC must develop the CAP to ensure that its UFLS program meets the mandatory performance characteristics outlined in Requirement R3. There is no justification or rationale provided as support for this comment.</p> <p>Also, the SDT notes that there is an expectation that the PC will work with the UFLS entities to develop a CAP that is appropriate given the facts and circumstances of the specific case. As outlined above, under Requirement R14, UFLS entities are included in the development of the UFLS program, which, to the extent necessary, may include a Corrective Action Plan to bring the program into compliance with Requirement R3. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. The time allotted by the PC for the UFLS entities to make the necessary corrections will depend on the extent of the deficiencies identified. The schedule specified by the PC will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changes in budgeting cycles.</p>			
13	Tacoma Power	No	<ol style="list-style-type: none"> <li>1. Requirement R15 refers to Requirements R3, R4, R5, and R12. However, these requirements are not applicable to WECC. Consideration should be given to rewording Requirement R15 or including a variance to Requirement R15 for WECC.</li> <li>2. There is some concern that Planning Coordinators under Requirement R15 may develop unrealistic CAPs. This potential issue is acknowledged in both the Consideration of FERC Directive and Response to Paragraph 81/Independent Expert Review Project Recommendations for PRC-006-1. There is no requirement for Planning Coordinators to consult with UFLS entities about the feasibility of CAPs, including the schedule for implementation. A CAP could be developed by one entity and implemented by one or more other entities. To help to successfully develop and implement a CAP, this issue should be at least addressed either as a footnote or in a Guidelines and Technical Basis section. Perhaps Requirement R14 could be modified to address this comment?</li> <li>3. Furthermore, there is no mention within the standard about the ability to modify the CAP, including the implementation schedule. Other standards, such as proposed PRC-004-3 and proposed PRC-026-1 permit modification if documented. Additionally, the Guidelines for Requirement R2 of proposed PRC-010-1 permit “deferrals or other relevant changes to the UVLS Program specifications or CAP” if documented. Such flexibility in modifying the CAP, including the implementation schedule, should be permitted by PRC-006-2 if the modifications are documented.</li> </ol>

No.	Organization	Yes/ No	Question 1 Comment
<p><b>Response:</b></p>			
<ol style="list-style-type: none"> <li>The SDT understands that the regional variance does not contain the exact language from Requirement R5, but the PC nevertheless conducts design assessments pursuant to Requirement E.B.4 and Requirement E.B.12. The SDT understands that Requirement R15 could be applied to these WECC variance provisions without issue. Furthermore, the SDT did not revise the WECC variance because development of new or modifications to existing Regional Reliability Standards, or, in this case, an Interconnection-wide regional variance, is handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the WECC variance at issue must be developed through the WECC Regional Reliability Standards development procedure.</li> <li>The SDT agrees that UFLS entities should be (and are) included in the development of the CAP. This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities to implement changes to the UFLS program. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the UFLS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities to provide comments regarding the proposed program before it is finalized.</li> <li>There is no restriction on modifying or refining the CAP as need be, depending upon the particular facts and circumstances of the specific case.</li> </ol>			
14	Ameren	No	<p>We request to modify the wording for R15 as follows,                      ‘Each Planning Coordinator...shall in collaboration with the affected UFLS entity(s) develop a Corrective Action Plan...’ Similarly, the wording for R9 and R10 should be modified to include the idea that the UFLS entity or Transmission Owner would collaborate with the Planning Coordinator in developing the Corrective Action Plan.</p>
<p><b>Response:</b></p>			
<p>The SDT appreciates your comment, but declines to make the proposed modifications to the language of Requirement R15. The UFLS entities <i>are</i> included in the development of the CAP. This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities to implement changes to the</p>			

No.	Organization	Yes/ No	Question 1 Comment
<p>UFLS program. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the UFLS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities to provide comments regarding the proposed program before it is finalized.</p>			
15	Utility Services	No	<p>1. Requirements 9 and 10 are not immediately clear that the Corrective Action Plan referenced in the requirements is the same CAP developed in R15. To add clarity the following modification to the Requirements should be made:</p> <p style="padding-left: 40px;">R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any changes specified in a Corrective Action Plan as developed in accordance with R15, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets.</p> <p style="padding-left: 40px;">R10. Each Transmission Owner shall 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 implementation, including any changes specified in a Corrective Action Plan as developed in accordance with R15, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p> <p>2. R15 should allow for input from the TO and UFLS Entity.</p>
<p><b>Response:</b></p> <p>1. The SDT does not believe the proposed wording adds additional clarity but we appreciate your suggested changes.</p> <p>2. The SDT agrees that UFLS entities and Transmission Owners should be (and are) included in the development of the CAP. This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities and Transmission Owners to implement changes to the UFLS program. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities and Transmission Owners may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the</p>			

No.	Organization	Yes/ No	Question 1 Comment
<p>PC having to modify the ULFS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities and Transmission Owners to provide comments regarding the proposed program before it is finalized.</p>			
<p>16</p>	<p><b>Texas Reliability Entity</b></p>	<p>No</p>	<p>Texas Reliability Entity, Inc. (Texas RE) supports the addition of “Corrective Action Plan” to Requirements R9 and R10 and agrees the modification addresses the FERC directive, in part. Further, Texas RE supports the addition of Requirement R15 but does not agree that R15.1 and R15.2 are sufficient to satisfy the FERC directive.</p> <p>While the proposed standard now establishes the responsibility for development of a Corrective Action Plan (CAP) and a requirement for a UFLS entity to implement the CAP, the time frames specified are too long and do not appear to meet the spirit of the FERC directive. The Planning Coordinator (PC) is allowed five years (for R4 and R5) or two years (for R12) to develop a Corrective Action Plan (CAP) for entity UFLS programs that do not meet the performance characteristics in Requirement R3. The FERC directive from Order No. 763 raised concern that the standard failed to specify how soon an entity would need to implement corrections. The concern over the timeliness of entity implementation of a CAP is not alleviated by a <i>prolonged</i> period for CAP development. Nor do these <i>extended</i> time frames adequately address risks associated with the UFLS deficiency during the time a CAP is under development.</p> <p>In addition, the SDT acknowledged that that it could take years for an entity to implement corrections when it stated “that time allotted by the PC will depend on the extent of deficiencies and that allowances will be necessary for inclusion of approved changing in budgeting cycles.” [Source: “Consideration of FERC Directive Project 2008-02: Underfrequency Load Shedding (UFLS)”.] Texas RE understands that the PC should allow time for affected UFLS entities to plan and budget for corrections directed by the PC. However, the proposed language allowing PCs to take several years to develop a CAP and potentially several more years for the UFLS entity to implement corrections. During this extended time frame the risk to the BES posed by the UFLS deficiency persists. Texas RE suggests that the PC should be required to develop the CAP in a shorter time frame and recommends the following language change:</p> <p style="padding-left: 40px;">R15.1: For UFLS design assessments performed under Requirement R4 of R5, the Corrective Action Plan shall be developed within [one year of completion of the UFLS design assessment].</p> <p style="padding-left: 40px;">R15.2: For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within [one year of completion of the UFLS design assessment].</p>

No.	Organization	Yes/ No	Question 1 Comment
<p><b>Response:</b> Under Requirement R15, the PC conducts the UFLS design assessment and develops the CAP, if warranted, in the time frame listed in Part 15.1 or Part 15.2. The new Requirement R15 does not expand or lengthen the amount of time that the PC has to conduct the design assessment (whether it is conducted pursuant to Requirement R4, R5 or R12). The new requirement mandates that if a deficiency is identified as a result of a design assessment, the PC also develop a CAP within the applicable time frame to correct the identified design deficiencies. The requirement also mandates the CAP specify how long the UFLS entities have to implement the corrective action.</p>			
17	Arizona Public Service Company	Yes	APS requests information on how the new requirement R15 will be integrated with the approved variances. Since the variances specifically address the UFLS plan as does R15, APS is unsure how the requirement will be implemented within the Western Interconnection.
<p><b>Response:</b> The SDT states that although the regional variance does not contain the exact language from Requirement R5, the PC nevertheless conducts design assessments pursuant to Requirement E.B.4 and Requirement E.B.12. The SDT understands that Requirement R15 could be applied to these WECC variance provisions without issue. Furthermore, the SDT did not revise the WECC variance because development of new or modifications to existing Regional Reliability Standards, or, in this case, an Interconnection-wide regional variance, is handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the WECC variance at issue must be developed through the WECC Regional Reliability Standards development procedure.</p>			
18	MRO NERC Standards Review Forum	Yes	
19	Dominion NERC Compliance Policy	Yes	
20	ACES Standards Collaborators	Yes	These proposed revisions appear to address the FERC directive while allowing a reasonable timeframe for a UFLS entity to modify the amount of load under UFLS relay control.
<p><b>Response:</b> The SDT appreciates your comment and support for the proposed revisions.</p>			
21	Bonneville Power Administration	Yes	
22	ATCO Electric	Yes	

No.	Organization	Yes/ No	Question 1 Comment
23	Oncor Electric Delivery LLC	Yes	
24	Pepeco Holdings Inc.	Yes	
25	Public Utility District No. 1 of Cowlitz County, WA	Yes	
26	Idaho Power	Yes	We agree with the proposed revisions in response to the FERC directive.
<b>Response:</b> The SDT appreciates your comment and support for the proposed revisions.			
27	American Transmission Company	Yes	
28	South Carolina Electric & Gas	Yes	We recommend a vote to approve the VRFs and VSLs.
<b>Response:</b> The SDT appreciates your comment and support for the proposed revisions.			
29	David Kiguel	Yes	
30	PJM Interconnection	Yes	
31	City of Tallahassee	Yes	
32	City of Tallahassee	Yes	
33	City of Tallahassee	Yes	
34	Hydro-Quebec TransEnergie	Yes	

2. Do you agree with the implementation period of the proposed standard? If not, what do you believe the implementation period should be and why?

No.	Organization	Yes/ No	Question 2 Comment
1	Florida Municipal Power Agency	No	<p>FMPA sees two issues with the proposed 6 month implementation.</p> <ol style="list-style-type: none"> <li>1. First, conducting a UFLS design study or event evaluation is a complex study that becomes an important part of a PC’s “year ahead” projection of work, and the proposed changes now require Corrective Action Plans which may require the coordination and agreement of a large number of participants to schedule and rectify issues identified prior to the date of issue of the study (e.g. within the 5 year or two year interval). If an entity is in the current year that its 5 year assessment is required, and PRC-006-1 is replaced with PRC-006-2, suddenly additional time is required to complete the study which was not anticipated. Furthermore, entities’ actual UFLS settings are only reported annually, and may be in a state of flux. FMPA believes the date should at minimum be 1 year, as a result.</li> <li>2. Secondarily and similarly, since PRC-006-1 does not require Corrective Action Plans, it is not clear what will happen if an entity is in the middle of a 2 year event study when the transition occurs. FMPA believes either the entities that are currently in the process of conducting studies should be allowed to finish under the old standard, or that an additional year should be afforded.</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. The SDT appreciates your comments and agrees that the UFLS design assessment is complex and can be part of a year ahead projection of work. However, the SDT believes that the six-month implementation period is reasonable regardless of whether the entity is currently undertaking its five-year assessment.</li> <li>2. The SDT maintains that a six month implementation period is reasonable; this amount of time is sufficient to allow for development of a Corrective Action Plan for entities regardless of the current state of completion of a design assessment.</li> </ol>			
2	David Kiguel	No	<p>Implementation schedule of Requirements R9 and R10 should be agreed upon among involved entities. If design and construction work is required, sufficient time must be given for funding and regulatory approvals as required.</p>
<p><b>Response:</b></p> <p>The proposed implementation period for PRC-006-2 is the first day of the first calendar quarter six months after the standard is approved by the applicable governmental authority. This effective date applies to all of the requirements contained in PRC-006-2. The SDT believes the commenter may be referring to the schedule for implementation referenced in Requirements R9 and R10. If this is the case, the SDT agrees that UFLS entities should be, and are, included in the development of the CAP. This occurs through application of Requirement R14. Under Requirement R15, if a PC conducts a design assessment and determines that the UFLS program fails to meet the performance characteristics required by Requirement R3, then the PC must develop a CAP. The CAP will outline the corrections and alterations necessary to fix the deficiencies that were identified in the UFLS program (in order to bring the program into compliance with the</p>			

No.	Organization	Yes/ No	Question 2 Comment
<p>performance characteristics in Requirement R3). The CAP will also specify the timeline or schedule for the UFLS entities to implement changes to the UFLS program. Under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the UFLS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities to provide comments regarding the proposed program before it is finalized.</p>			
3	Northeast Power Coordinating Council	Yes	
4	Arizona Public Service Company	Yes	
5	Puget Sound Energy	Yes	
6	MRO NERC Standards Review Forum	Yes	
7	Dominion NERC Compliance Policy	Yes	
8	Duke Energy	Yes	
9	ISO RTO Council Standards Review Committee	Yes	
10	ACES Standards Collaborators	Yes	Given that the UFLS program assessment requirements, R4, R5, and R12, are already effective. The approximate six to nine month implementation time frame is reasonable.
11	Bonneville Power Administration	Yes	
12	ATCO Electric	Yes	
13	Public Service Company of New Mexico	Yes	



No.	Organization	Yes/ No	Question 2 Comment
14	Oncor Electric Delivery LLC	Yes	
15	Pepeco Holdings Inc.	Yes	
16	American Electric Power	Yes	
17	Independent Electricity System Operator	Yes	
18	Public Utility District No. 1 of Cowlitz County, WA	Yes	
19	ISO New England	Yes	
20	Idaho Power	Yes	We agree with implementation period of the proposed standard.
21	American Transmission Company	Yes	
22	Tacoma Power	Yes	
23	South Carolina Electric & Gas	Yes	
24	PJM Interconnection	Yes	
25	City of Tallahassee	Yes	
26	City of Tallahassee	Yes	
27	City of Tallahassee	Yes	

No.	Organization	Yes/ No	Question 2 Comment
28	Texas Reliability Entity	Yes	
29	Hydro-Quebec TransEnergie	Yes	

3. The UFLS drafting team reviewed five requirements (Requirements R6, R7, R8, R10 and R14) contained in PRC-006-1 to consider whether the requirements should be retired as a result of the Paragraph 81 (P81) and Independent Expert Review Project (IERP) recommendations. The team determined that these requirements are necessary and/or support reliability objectives, and they should not be retired. The team drafted a justification document outlining the basis for its conclusion that the requirements should not be retired, which can be found on the project page. Do you agree with the drafting team conclusions that the requirements should not be retired? If not, please identify the specific conclusions that you do not agree with, and the basis for your disagreement.

No.	Organization	Yes/ No	Question 3 Comment
1	Dominion NERC Compliance Policy	No	While we agree with some of the reasons the SDT used to retain these requirements, we do agree with the IERP Recommendation that these ultimately be retired for the reasons they cited. At some point, the many requirements scattered throughout the body of reliability standards that call for the provision of data, maintenance of models and/or database(s) or coordination and cooperation as necessary to support reliability should be rolled into a very few requirements that apply to all registered entities. There should not be a need to have to include a similar requirement in each standard.
<p><b>Response:</b> The SDT appreciates your comment, and understands your position. However, for purposes of the <i>Project 2008-02 UFLS</i> effort, the SDT was limited to addressing the FERC directive and reviewing five requirements (Requirements R6, R7, R8, R10 and R14) contained in PRC-006-1 to consider whether the requirements should be retired as a result of the P81 and IERP recommendations. Based on that review, the SDT concluded that the five (5) requirements should not be retired because they are necessary and/or support reliability objectives. See, <a href="#">UFLS SDT Response to P81 and IERP Recommendations</a>. However, the SDT notes that your comments regarding consolidation of the data/maintenance requirements is well-received and believes it should be raised when the PRC standards undergo periodic review.</p>			
2	Duke Energy	No	<p>Duke Energy does not agree with the standard drafting team in retaining R7 and R14 as enforceable requirements in this standard.</p> <ol style="list-style-type: none"> <li>1. R7: Duke Energy agrees with the Paragraph 81 team, and views this requirement as unnecessary, and largely administrative in nature. We feel that based on the infrequency with which requests like the one specified in R7 are made, and the likelihood of not receiving cooperation even in the event that a request was made, is so remote that it does not rise to the level of necessitating its own requirement.</li> <li>2. R14: Duke Energy feels that this requirement is purely administrative, and echoes the opinion of the Independent Expert Review Panel. We feel that simply requiring a Planning Coordinator to respond to</li> </ol>

No.	Organization	Yes/ No	Question 3 Comment
			<p>comments made by UFLS Entities in its Planning Coordinator area, is not necessary to maintain reliability of the BES. While this requirement may be good business, and may allow for better working relationships between entities, it is not a requirement for BES reliability.</p>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>As an initial matter, the SDT notes that the P81 team concluded that this requirement <i>does</i> in fact support reliability; specifically, NERC Reliability Principle No. 3: Information necessary for the planning operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.<sup>2</sup> However, it was identified as a potential candidate for review under Phase 2 because the P81 team believed, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.” The UFLS SDT agreed with the P81 team that the requirement <i>does</i> in fact support reliability, and although it is ideal to presume entities will share data, there is no other requirement mandating that entities do so; nor is there any other requirement that establishes the parameters for the type of data to be exchanged or the time frame for doing so. The SDT believes it is important to reiterate that the PRC-006-1 standard establishes common performance characteristics that all UFLS programs must meet; it does not set mandatory continent-wide UFLS program parameters (such as setting program specific load shedding frequency thresholds, step sizes, and time delays). Given the approach of establishing common performance characteristics, PRC-006 contains requirements outlining how the PCs and UFLS entities support the necessary and critical exchange of information needed for use in designing and assessing performance of the UFLS programs. Specifically, this is achieved through Requirements R6 through R8, which establish requirements to maintain a UFLS database and share data necessary to maintain that database. Requirement R7, currently at issue, requires that PCs exchange critical UFLS database information with other PCs within its interconnection within 30 calendar days of a request. This is especially important where identified islands include portions of two or more PC areas, as UFLS assessments will need to include the UFLS data applicable to each of those areas. Requirement R7 ensures the necessary sharing of this critical data.</li> <li>The UFLS SDT disagrees that Requirement R14 should be retired because it serves a purpose in support of reliability. The requirement was added by the <i>Project 2007-1 UFLS</i> drafting team in response to numerous industry comments during the standard development process expressing concern that without the requirement, UFLS entities and TOs would have no involvement or input in the process of the PC defining the UFLS program and schedule for implementation. Thus without this safety net, the PC would have no obligation to consider information provided by the UFLS entities for which the program was being designed, including information that entities may provide related to lessons learned, first-hand experiences, and opportunities for improvement, which may improve the overall effectiveness of the UFLS program. Additionally, and of considerable importance, Requirement R14 gives smaller entities the opportunity to provide the PC with input specifically relating to the schedule for implementation specified by the PC, including factors such as the time needed for these smaller entities to conduct budget planning and implementation, recognizing that major revisions and allowances may take longer for smaller entities working with more constrained budgets than larger entities.</li> </ol>			

<sup>2</sup> [Link to NERC Reliability Principles.](#)

No.	Organization	Yes/ No	Question 3 Comment
3	ISO RTO Council Standards Review Committee	No	<p>1. We do not think that R10 is consistent with the purpose of PRC-006-2. The purpose statement 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.” R10 is to correct for over-voltages as a result of load shedding actions taken by protective devices performing to requirements for PRC-006-2. Although this is a good practice, we agree with the IERP Report that this requirement should not be mandated within this standard. The correction of overvoltage is covered in TPL and VAR as stated by the IERP Report. Such corrections should be made regardless of what the triggering circumstance of an overvoltage condition is. To apply an additional requirement R10 to correct for overvoltage can subject entities to two similar requirements - which is another reason for P81 elimination. It would be appropriate to note in PRC-006 through an explanatory text perhaps in a Guideline or Technical document that overvoltage can result from frequency related load shedding actions and entities must be aware of the requirements in TPL and VAR are complied with.</p> <p>2. We disagree with the SDT conclusion for R14. The IERP Report has it right. R14 is administrative and does not provide a fundamental reliability need. R14 does SUPPORT the reliability need but it does not rise to the level to be a distinct requirement with a compliance measure. To address the concern raised in Project 2007-1 for ensuring UFLS entities and TO’s have a role in defining the UFLS program, PRC-006 should only require that the PC performing a UFLS study request input from those entities identified in its study - which is already done in R6. It seems the intent of R14 is to ensure the study is thorough and comprehensive. This in and of itself is not a fundamental reliability need but rather should be an assumption that a credible and qualified PC will perform studies with such diligence. R6 already requires a PC to have comprehensive information in maintaining a UFLS database - essentially ensuring the same underlying purpose of R14.</p> <p>R6. Each Planning Coordinator shall 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.</p> <p>M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.</p>

No.	Organization	Yes/ No	Question 3 Comment
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>The IERP did not conclude that Requirement R10 is inconsistent with the purpose of PRC-006. The IERP recommended Requirement R10 for retirement on the grounds that it is more appropriate as a Guideline, because accountability is met under the TPL and VAR Reliability Standards. However, of note the IERP found that Requirement R10 does support Reliability Principle Nos. 1 and 4.<sup>3</sup> The SDT reviewed Requirement R10 and concluded that it should not be retired because this would create a gap causing a risk to reliability. Requirement R10 was added to address control of overvoltage conditions during underfrequency events (e.g., the Western Interconnection has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event). The IERP recommended retirement on the basis that accountability for controlling voltage is met under the TPL and VAR standards; however, the IERP did not point to any specific standard or requirement in support of that position. The UFLS SDT reviewed the existing TPL and VAR standards and determined that the specific actions required under Requirement R10 – specifically the switching of devices by Transmission Owners – is not covered elsewhere in the TPL or VAR standards. Similarly, the commenter does not point to any specific TPL or VAR standard in support of this position. While the TPL and VAR families of standards address similar issues, Transmission Owners are not included as applicable entities under either family of standards, and Transmission Owners therefore are not compelled to provide automatic switching on their equipment or adherence to a schedule of application determined by the Planning Coordinator. For these reasons, the UFLS SDT team believes Requirement R10 should not be retired.</li> <li>The UFLS drafting team concluded that Requirement R14 should not be retired because it serves a purpose in support of reliability. The underlying purpose of Requirement R14 is to ensure that the PC considers any comments and concerns raised by UFLS entities and/or TOs in the development of the UFLS program. For example, there may be practical limitations for a UFLS entity that may not be able to provide tripping per the UFLS program that is under development by the PC. Under those circumstances, Requirement R14 would allow for the PC and UFLS entity to coordinate so that a reliable and implementable UFLS program is developed. The SDT disagrees that this is achieved under Requirement R6. That requirement requires the PC to maintain the database after the UFLS program is finalized and already in place. The data is used for event analysis and assessments. Requirement R14 applies during the development or modification of the UFLS program <i>before it is finalized</i>.</li> </ol>			
4	ACES Standards Collaborators	No	<ol style="list-style-type: none"> <li>R7 is clearly meets multiple P81 criteria (B1 - Administrative, B2 - Data Collection, B4 - Reporting). Specifically, it requires sharing data and information with a third party and provides little to no reliability benefit. The requirement does not even compel the recipient PC to use the data so how could this be viewed as anything other than administrative.</li> </ol>

<sup>3</sup> [Link to NERC Reliability Principles](#)

Reliability Principle No. 1: Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Reliability Principle No. 4: Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

No.	Organization	Yes/ No	Question 3 Comment
			<p>2. We disagree with the assessment for R8 and believe that this requirement clearly meets P81 criteria (B1 - Administrative, B2 - Data Collection, B4 - Reporting, and B7 - Redundant). It involves the requirement to share information with third parties which provide little to no reliability benefit. Contrary to the statement in the analysis, the PC has historically been able to get this information required in R8 and will continue to get the information because there are usually tariff or interconnection agreements that require the information and most UFLS entities understand the reliability need for the information and are willing to provide it. Furthermore, before PRC-006-1 became effective, PCs did not have any issues with receiving this data.</p> <p>3. R6 also clearly meets P81 criteria. It does not compel anything that supports reliability. It does not compel the PC to have the UFLS information. It simply compels the PC to have the information in a database. How, the PC organizes the necessary UFLS information is irrelevant to reliability as long as they have the information and use it.</p> <p>4. R14 also clearly meets P81 criteria. Specifically, it meets the documentation criterion in that it requires a document to be produced that provides no reliability benefit. In this requirement, the PC just has to respond to the submitter of the written comments. The reasons do not even have to be technically justified. This requirement is a “feel-good” requirement for the UFLS entities to be able to compel some response to their concerns. This is simply unneeded and the UFLS entities and PC should work together to address any concerns outside of compliance processes. This approach would be more efficient, effective and reliable.</p>
<p><b>Response:</b></p> <p>1. The SDT disagrees and reiterates its position that Requirement R7 is necessary and supports a reliability objective. The SDT notes that the P81 team also concluded that this requirement <u>does</u> in fact support reliability; specifically, NERC Reliability Principle No. 3: Information necessary for the planning operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.<sup>4</sup> However, it was identified as a potential candidate for review under Phase 2 because the P81 team believed, “[t]here should be a clear expectation for PCs to share data necessary to determine their UFLS program parameters.” The UFLS SDT agreed with the P81 team that the requirement <u>does</u> in fact support reliability, and although it is ideal to presume entities will share data, there is no other requirement mandating that entities do so; nor is there any other requirement that establishes the parameters for the type of data to be exchanged or the time frame for doing so. The SDT believes it is important to reiterate that the PRC-006 standard establishes common performance characteristics that all UFLS programs must meet; it does not set mandatory continent-wide UFLS program parameters (such as setting program specific load shedding frequency thresholds, step sizes, and time delays). Given the approach of establishing common performance characteristics, PRC-006 contains</p>			

<sup>4</sup> [Link to NERC Reliability Principles.](#)

No.	Organization	Yes/ No	Question 3 Comment
<p>requirements outlining how the PCs and UFLS entities support the necessary and critical exchange of information needed for use in designing and assessing performance of the UFLS programs. Specifically, this is achieved through Requirements R6 through R8, which establish requirements to maintain a UFLS database and share data necessary to maintain that database. Requirement R7, currently at issue, requires that PCs exchange critical UFLS database information with other PCs within its interconnection within 30 calendar days of a request. This is especially important where identified islands include portions of two or more PC areas, as UFLS assessments will need to include the UFLS data applicable to each of those areas. Requirement R7 ensures the necessary sharing of this critical data.</p> <p>2. The SDT disagrees and believes that this requirement is necessary for reliability. Requirement R8 ensures that the PC has the necessary data to conduct the design and performance assessments. The basis for this position is outlined in greater detail in the previous response.</p> <p>3. The SDT disagrees and believes that this requirement is necessary for reliability. The basis for this position is outlined in the previous response.</p> <p>4. The UFLS SDT disagrees that Requirement R14 should be retired because it serves a purpose in support of reliability. The requirement was added by the <i>Project 2007-1 UFLS</i> drafting team in response to numerous industry comments during the standard development process expressing concern that without the requirement, UFLS entities and TOs would have no involvement or input in the process of the PC defining the UFLS program and schedule for implementation. Thus without this safety net, the PC would have no obligation to consider information provided by the UFLS entities for which the program was being designed, including information that entities may provide related to lessons learned, first-hand experiences, and opportunities for improvement, which may improve the overall effectiveness of the UFLS program. Additionally, and of considerable importance, Requirement R14 gives smaller entities the opportunity to provide the PC with input specifically relating to the schedule for implementation specified by the PC, including factors such as the time needed for these smaller entities to conduct budget planning and implementation, recognizing that major revisions and allowances may take longer for smaller entities working with more constrained budgets than larger entities.</p>			
5	Florida Municipal Power Agency	No	The five requirements should all be retired as recommended by the independent experts. These requirements are all either too prescriptive in nature and/or administrative in nature. This continued approach is not risk-based nor results-based for standards development.
<p><b>Response:</b> The SDT thanks you for your comments, but disagrees with your position. As outlined in the justification document, the SDT believes the five (5) requirements at issue are necessary and/or support reliability objective(s), and as a result should not be retired.</p>			
6	Flathead Electric Cooperative, Inc.	No	
<p><b>Response:</b> No comment provided by commenter.</p>			



No.	Organization	Yes/ No	Question 3 Comment
7	Public Utility District No. 1 of Cowlitz County, WA	No	<ol style="list-style-type: none"> <li>1. Concerning R8, Cowlitz sees this as a fill-in-the-blank Requirement. The Requirement should not be retired, it should be modified. This Requirement should specify the specific data to be available allowing stakeholder comment; as written, the UFLS entity is possibly exposed to unreasonable Planning Coordinator data requests.</li> <li>2. Cowlitz will defer to the opinions expressed by Planning Coordinators on Requirements R6 and R7.</li> <li>3. However, concerning Requirement R6, this appears redundant to Requirement R4. It is not possible to “conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation...” if there is no “UFLS database containing data necessary to model its UFLS program.”</li> <li>4. Further, R7 appears redundant to R5 as coordination is not possible without the sharing of data.</li> <li>5. Concerning R9 and R10, both of these Requirements mandate the addition or improvement of BPS facilities if “automatic tripping/switching” equipment is not installed. From the Federal Power Act, section 216: “The term ‘reliability standard’ means a requirement, approved by the Commission under this section, to provide for reliable operation of the bulk-power system. The term includes requirements for the operation of existing bulk-power system facilities... .. the design of planned additions or modifications to such facilities... ..but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity.” The requirements should be revised to clarify as where automatic tripping/switching is available, and future plans for improvements and expansion shall include consideration of UFLS Plan needs.</li> <li>6. Concerning Requirement 14, Cowlitz is not opposed.</li> </ol>
<p><b>Response:</b></p> <ol style="list-style-type: none"> <li>1. The SDT agrees that Requirement R8 should not be retired, but does not agree that the standard should be modified. The language at issue allows for the PC to collect data necessary to “support maintenance of each PCs UFLS database.” The SDT feels as though this language limits the nature/type of information that may be collected by the PC, but yet allows enough flexibility for the PCs to collect the data points for their unique UFLS program.</li> <li>2. No response needed.</li> <li>3. The SDT agrees that the information collected through Requirement R6 is used by and necessary for the PC to conduct the design assessments required by Requirement R4. This is why the data requirements of Requirements R6 through R8 were developed.</li> <li>4. The SDT agrees that the sharing of data makes effective coordination possible.</li> </ol>			

No.	Organization	Yes/ No	Question 3 Comment
5.			The SDT disagrees with the commenters conclusion regarding Requirements R9 and R10. The SDT notes that PRC-006-1 is a FERC-approved standard, and the SDT did not make any modifications to the language the commenter takes issue with. See, See, FERC Order No. 763, <i>Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards</i> , 139 FERC ¶ 61,098 (May 7, 2012). <a href="#">[Link to FERC Order No. 763]</a>
6.			No response needed.
8	ISO New England	No	<ol style="list-style-type: none"> <li data-bbox="569 488 1944 943">1. We do not think that R10 is consistent with the purpose of PRC-006-2. The purpose statement 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.” R10 is to correct for over-voltages as a result of load shedding actions taken by protective devices performing to requirements for PRC-006-2. Although this is a good practice, we agree with the IERP Report that this requirement should not be mandated within this standard. The correction of overvoltage is covered in TPL and VAR as stated by the IERP Report. Such corrections should be made regardless of what the triggering circumstance of an overvoltage condition is. To apply an additional requirement R10 to correct for overvoltage can subject entities to two similar requirements - which is another reason for P81 elimination. It would be appropriate to note in PRC-006 through an explanatory text perhaps in a Guideline or Technical document that overvoltage can results from frequency related load shedding actions and entities must be aware of the requirements in TPL and VAR are complied with. We disagree with the SDT conclusion for R14. The IERP Report has it right.</li> <li data-bbox="569 943 1944 1421">2. R14 is administrative and does not provide a fundamental reliability need. R14 does SUPPORT the reliability need but it does not rise to the level to be a distinct requirement with a compliance measure. To address the concern raised in Project 2007-1 for ensuring UFLS entities and TO’s have a role in defining the UFLS program, PRC-006 should only require that the PC performing a UFLS study request input from those entities identified in its study - which is already done in R6. It seems the intent of R14 is to ensure the study is thorough and comprehensive. This in and of itself is not a fundamental reliability need but rather should be an assumption that a credible and qualified PC will perform studies with such diligence. R6 already requires a PC to have comprehensive information in maintaining a UFLS database - essentially ensuring the same underlying purpose of R14.R6. Each Planning Coordinator shall 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.M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments</li> </ol>

No.	Organization	Yes/ No	Question 3 Comment
			of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
<p><b>Response:</b></p> <p>1. The IERP did not conclude that Requirement R10 is inconsistent with the purpose of PRC-006. The IERP recommended Requirement R10 for retirement on the grounds that it is more appropriate as a Guideline, because accountability is met under the TPL and VAR Reliability Standards. However, of note the IERP found that Requirement R10 does support Reliability Principle Nos. 1 and 4.<sup>5</sup> The SDT reviewed Requirement R10 and concluded that it should not be retired because this would create a gap causing a risk to reliability. Requirement R10 was added to address control of overvoltage conditions during underfrequency events (e.g., the Western Interconnection has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event). The IERP recommended retirement on the basis that accountability for controlling voltage is met under the TPL and VAR standards; however, the IERP did not point to any specific standard or requirement in support of that position. The UFLS SDT reviewed the existing TPL and VAR standards and determined that the specific actions required under Requirement R10 – specifically the switching of devices by Transmission Owners – is not covered elsewhere in the TPL or VAR standards. Similarly, the commenter does not point to any specific TPL or VAR standard in support of this position. While the TPL and VAR families of standards address similar issues, Transmission Owners are not included as applicable entities under either family of standards, and Transmission Owners therefore are not compelled to provide automatic switching on their equipment or adherence to a schedule of application determined by the Planning Coordinator. For these reasons, the UFLS SDT team believes Requirement R10 should not be retired.</p> <p>2. The UFLS drafting team concluded that Requirement R14 should not be retired because it serves a purpose in support of reliability. The underlying purpose of Requirement R14 is to ensure that the PC considers any comments and concerns raised by UFLS entities and/or TOs in the development of the UFLS program. For example, there may be practical limitations for a UFLS entity that may not be able to provide tripping per the UFLS program that is under development by the PC. Under those circumstances, Requirement R14 would allow for the PC and UFLS entity to coordinate so that a reliable and implementable UFLS program is developed. The SDT disagrees that this is achieved under Requirement R6. That requirement requires the PC to maintain the database after the UFLS program is finalized and already in place. The data is used for event analysis and assessments. Requirement R14 applies during the development or modification of the UFLS program <i>before it is finalized</i>.</p>			
9	David Kiguel	No	1. R6 is purely administrative in nature and meets the Paragraph 81 Criteria. The manner how the PC compiles and stores the information is up to the entity and should not be specified in the standard. R1 meets the objective ("what") and the standard should not specify how this is to be achieved.

<sup>5</sup> [Link to NERC Reliability Principles](#)

Reliability Principle No. 1: Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Reliability Principle No. 4: Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

No.	Organization	Yes/ No	Question 3 Comment
			<p>2. R7: For the same reason given in the comment to R6, I recommend deletion of "its UFLS database containing" in R7. Obligation to provide data is sufficient.</p> <p>3. R8: The format and schedule specified in R8 should be mutually agreed upon among the involved entities so that it's feasible and practical.</p>
<p><b>Response:</b></p> <p>1. The SDT disagrees that Requirement R6 is purely administrative in nature; this requirement is necessary and supports reliability objectives. The SDT reiterates that the PRC-006 standard establishes common performance characteristics that all UFLS programs must meet; it does not set mandatory continent-wide UFLS program parameters (such as setting program specific load shedding frequency thresholds, step sizes, and time delays). Given the approach of establishing common performance characteristics, PRC-006 contains requirements outlining how the PCs and UFLS entities support the necessary and critical exchange of information needed for use in designing and assessing performance of the UFLS programs. Specifically, this is achieved through Requirements R6 through R8, which establish requirements to maintain a UFLS database and share data necessary to maintain that database. Requirement R6, currently at issue, requires that PCs maintain the database necessary to model its UFLS program for use of its event analyses and assessments of the UFLS program at least once every calendar year, with no more than 15 months between maintenance activities.</p> <p>2. For the reasons provided above, the SDT believes that Requirement R7 is necessary and/or supports a reliability objective. Requirement R7 requires that PCs exchange critical UFLS database information with other PCs within its interconnection within 30 calendar days of a request. This is especially important where identified islands include portions of two or more PC areas, as UFLS assessments will need to include the UFLS data applicable to each of those areas. Requirement R7 ensures the necessary sharing of this critical data.</p> <p>3. For the reasons provided above, the SDT believes that Requirement R8 is necessary and/or supports a reliability objective. Requirement R8 ensures that the PC has the necessary data to conduct the design and performance assessments. Under Requirement R14, <i>before</i> finalizing its UFLS program, each PC must respond to comments from the UFLS entities and TOs with regard to the "format and schedule of UFLS data submittal." This ensures that the UFLS entities and/or TO have a voice in the format and schedule for submittal.</p>			
10	City of Tallahassee	No	<p>The City of Tallahassee (TAL) maintains that R10 should be retired. If the entity's UFLS program requires the automatic shedding for under frequency and then switching in response to over voltage, the entity must comply with that regardless of whether R10 is enforceable or retired. In addition, the entity is required to maintain acceptable system voltage in accordance with system operating and transmission planning standards. Regulatory duplication is not desirable.</p>

No.	Organization	Yes/ No	Question 3 Comment
<p><b>Response:</b>                      The SDT reviewed Requirement R10 and concluded that it should not be retired because this would create a gap causing a risk to reliability. Requirement R10 was added to address control of overvoltage conditions during underfrequency events (e.g., the Western Interconnection has very long transmission corridors which can create an overvoltage condition when those lines are unloaded, such as during an underfrequency event). The IERP recommended retirement on the basis that accountability for controlling voltage is met under the TPL and VAR standards; however, the IERP did not point to any specific standard or requirement in support of that position. The UFLS SDT reviewed the existing TPL and VAR standards and determined that the specific actions required under Requirement R10 – specifically the switching of devices by Transmission Owners – is not covered elsewhere in the TPL or VAR standards. Similarly, the commenter does not point to any specific TPL or VAR standard in support of this position. While the TPL and VAR families of standards address similar issues, Transmission Owners are not included as applicable entities under either family of standards, and Transmission Owners therefore are not compelled to provide automatic switching on their equipment or adherence to a schedule of application determined by the Planning Coordinator. For these reasons, the UFLS SDT team believes Requirement R10 should not be retired.</p>			
11	Northeast Power Coordinating Council	Yes	
12	Arizona Public Service Company	Yes	
13	Puget Sound Energy	Yes	
14	MRO NERC Standards Review Forum	Yes	
15	Bonneville Power Administration	Yes	
16	ATCO Electric	Yes	
17	Public Service Company of New Mexico	Yes	
18	Oncor Electric Delivery LLC	Yes	
19	Pepco Holdings Inc.	Yes	The requirements included in the standard under R6, R7, R8 and R14 all make sense to be logically included in this standard. The need for over voltage tripping of BES capacitor banks to cover for a possible system over

No.	Organization	Yes/ No	Question 3 Comment
			correction should be determined quickly by the respective planning coordinator to allow adequate time for scheme addition or medication to support R10.
<b>Response:</b> The SDT thanks you for your comments.			
20	American Electric Power	Yes	
21	Independent Electricity System Operator	Yes	
22	Exelon Companies	Yes	<p>The conclusion regarding "Requirement R8 should not be retired" in the justification document, beginning on page 3, contains wording that could be considered to negatively portray UFLS entities commitment to reliability and support of the PC. Specifically as written; "Without Requirement R8, the PCs would not be provided with the UFLS data from the UFLS entities..." If in scope for the comment process, we propose that the SDT modify the justification document and revise to say that, "Requirement R8 will ensure the PC has the necessary data to conduct their design and performance assessments."</p> <p>We agree that the Requirements R6, R7, R8, R10 and R14 should NOT be retired, and agree with the justifications of the SDT except as aforementioned.</p>
<b>Response:</b> The SDT thanks you for your comment, and agrees with your proposed changes to the justification document. The changes will be made and the document reposted with the language you propose.			
23	Idaho Power	Yes	We agree with the drafting team conclusions that the requirements should not be retired.
<b>Response:</b> The SDT thanks you for your comments.			
24	American Transmission Company	Yes	
25	Tacoma Power	Yes	
26	South Carolina Electric & Gas	Yes	

No.	Organization	Yes/ No	Question 3 Comment
27	PJM Interconnection	Yes	
28	Texas Reliability Entity	Yes	

4. If you have any other comments or concerns on the proposed standard (related to an issue that falls within the limited scope of the SAR), please provide them here:

No.	Organization	Yes/ No	Question 4 Comment
1	Arizona Public Service Company	No	
2	Puget Sound Energy	No	
3	MRO NERC Standards Review Forum	No	
4	ATCO Electric	No	
5	Oncor Electric Delivery LLC	No	
6	Pepco Holdings Inc.	No	
7	American Electric Power	No	
8	Flathead Electric Cooperative, Inc.	No	
9	ISO New England	No	
10	Idaho Power	No	
11	South Carolina Electric & Gas	No	
12	PJM Interconnection	No	
13	City of Tallahassee	No	



No.	Organization	Yes/ No	Question 4 Comment
14	City of Tallahassee	No	
15	City of Tallahassee	No	
16	SPP Standards Review Group	Yes	<ol style="list-style-type: none"> <li>1. Although the following do not specifically fall within the limited scope of the SAR, they are errata in Measure M9 that should be addressed while the drafting team is dealing with Requirement R9. Use a lower case 'entity' when referring to UFLS entities in Measure M9. Also, capitalize 'Load' in Measure M9 to make it consistent with Requirement R9.</li> <li>2. Again, this does not fall within the scope of the SAR but it is an errata that should be addressed while the standard is being revised. In the 2nd bullet under 1.2 Evidence Retention, insert 'its' between 'of' and 'UFLS'.</li> <li>3. Likewise, this does not fall within the scope of the SAR but it is an errata that should be addressed while the standard is being revised. In the VSLs for Requirement R3, change 'characteristic' to characteristics'.</li> <li>4. Also, hyphenate 30-, 40-, 50-calendar days and other similar usage in the VSLs for Requirements R7 and R8.</li> <li>5. Include calendar in 13-calendar, 14-calendar, 15-calendar months and hyphenate in the VSLs for Requirements R11, R12 and R15.</li> <li>6. We recommend that all changes made to the standard be reflected in the RSAW as well.</li> </ol>
<p><b>Response:</b>            The SDT thanks you for your keen eye and comments. The SDT is being extremely cautious about making any changes outside of the limited scope of the SAR, and for these reasons, has decided not to make the suggested improvements at this time. The SDT notes that when the UFLS standard is under review during the next periodic review, these changes/improvements to the standard should be made.</p>			
17	Duke Energy	Yes	Duke Energy requests clarification from the drafting team regarding R15. Is it the drafting team's intent to require an entity to do a design assessment, and develop a corrective action plan, if warranted, in the time frames listed in 15.1 and 15.2? More specifically, does the time frame to develop a corrective action plan trigger from the date of the deficiency being found, or the date of the last assessment? As written, the

No.	Organization	Yes/ No	Question 4 Comment
			language appears to require that an entity does both the design assessment and the corrective action plan within the period specified in 15.1 and 15.2.
<p><b>Response:</b> The SDT agrees that the statements in sentences 2 and 4 above are accurate. Requirement R15 requires the PC to perform an assessment, and if warranted, develop a CAP within the time frames provided in Parts 15.1 and 15.2. If the design assessment was performed under Requirement R4 or R5, then the design assessment <i>and</i> CAP (if warranted) must be developed within the five-year period provided under Requirement R4 or R5. If the design assessment was performed under Requirement R12, then the design assessment <i>and</i> CAP (if warranted) must be developed within the two-year time frame provided under Requirement R12.</p>			
18	ACES Standards Collaborators	Yes	Thank you for the opportunity to comment.
19	Bonneville Power Administration	Yes	BPA suggests several references to PRC-006-1 in the WECC regional variance (pp. 27-29) should be corrected to PRC-006-2, specifically in paragraphs: E.B.3.1, E.B.3.2 and E.B.4.1 thru E.B.4.6. BPA believes the new requirement, R15, should be written into the WECC regional variance. Required CAPs in R15 are contingent upon analysis done in R4, R5, or R12, and performance characteristics of R3, all of which are superseded by the regional variance in the WECC. As written it would appear PCs in the WECC would be automatically excluded from compliance with R15 of the standard. BPA believes reference to SPS should be swapped for RAS per project 2010-05.2 (SPS references in PRC-006-2 in R2.2 and E.B.2.2.)
<p><b>Response:</b> The SDT agrees that the regional variance does not contain the exact language from Requirement R5, but the PC nevertheless conducts design assessments pursuant to Requirement E.B.4 and Requirement E.B.12. The SDT understands that Requirement R15 could be applied to these WECC variance provisions without issue. Furthermore, the SDT did not revise the WECC variance because development of new or modifications to existing Regional Reliability Standards, or, in this case, an Interconnection-wide regional variance, should be handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the WECC variance at issue must be developed through the WECC Regional Reliability Standards development procedure.</p> <p>Also, with regard to your suggestion to replace the SPS reference with RAS, this does not fall within the scope of the SAR for Project 2008-02 UFLS. As correctly noted, these changes are being handled by the Project 2010-5.2 SDT effort. For a current status on that project, click <a href="#">here</a>.</p>			

No.	Organization	Yes/ No	Question 4 Comment
20	Public Service Company of New Mexico	Yes	PNM HAS THE FOLLOWING COMMENT FOR PRC-010-1 THAT WE DID NOT SUBMIT DURING THE COMMENT PERIOD FOR THE SDT'S CONSIDERATION - PNM's concern is that the proposed PRC-010-1 standard requires the PC to annually update the UVLS database. PNM as a PC believes this should be the responsibility of the UVLS entity not the PC. As written, PCs would have to send a request for updates to all UVLS entities within their PC area every year rather than putting the obligation for data submittal on the UVLS entities. PNM is a smaller entity but is registered as a PC, and as such this could potentially create an administrative burden for the PC particularly if the UVLS entity is one that you have to repeatedly request information from without response. Suggested edit to address PNM's concern:R6: replace "update" with "maintain"R7: remove "and schedule" and add "at least once each calendar year" at the end of R7 following "UVLS Program databased"
<p><b>Response:</b>  <i>Project 2008-02 UFLS</i> is a separate and distinct project from <i>Project 2008-02 UVLS</i>. All comments related to the UVLS standard drafting team efforts must be submitted in conjunction with the UVLS postings and balloting. Of note, the final ballot for the UVLS project concluded on September 18, 2014, and the standard received sufficient affirmative votes for approval.</p>			
21	Public Utility District No. 1 of Cowlitz County, WA	Yes	The Standard should not refer to version 1 (e.g.: 3.1. Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1) for every reference to PRC-006-2 - Attachment 1.
<p><b>Response:</b>            The SDT thanks you for your comment, and has replaced references to PRC-006-1 with PRC-006-2.</p>			
22	Tacoma Power	Yes	Why is there not a Lower VSL for Requirement R15?
<p><b>Response:</b>            The SDT did not believe it was proper to assign a Lower VSL for this particular Requirement. As outlined in the NERC VSL Criteria: Violation Severity Levels (VSLs) define the degree to which compliance with a requirement was not achieved. Each requirement must have at least one VSL. While it is preferable to have four VSLs for each requirement, some requirements do not have multiple “degrees” of noncompliant performance and may have only one, two, or three VSLs.</p>			
23	David Kiguel	Yes	Clarification is requested about the technical justification for using a 25 % threshold in R3.
<p><b>Response:</b>            Given the limited scope of the SAR, the <i>Project 2008-02 UFLS</i> standard drafting team did not make any modifications to the standard other than to address the FERC directive by making explicit in the standard that if deficiencies are identified as a result of an assessment, the PC shall develop a CAP</p>			

No.	Organization	Yes/ No	Question 4 Comment
<p>and schedule for implementation by the UFLS entities. No other changes were made to the standard, including the consideration of technical justification for using a 25 percent threshold in Requirement R3. For further information regarding the <i>Project 2007-01 UFLS</i> history and standard drafting team justification, please see the project page by clicking <a href="#">here</a>. Also, see, <a href="#">NERC Petition</a>, pp. 9, 15, discussing basis for 25 percent imbalance threshold.</p>			
24	Hydro-Quebec TransEnergie	Yes	<p>Hydro- Quebec understands that the actual scope of revision is very limited. However, the issues brought by HQ's latest comments for PRC-006-2 are very limited and concerns Attachment 1A (Quebec) and some editorial changes in the Regional Variance for the Quebec Interconnection. Those portions of the standard impact only NERC members in Quebec, which are very few (Hydro- Quebec TransEnergie and Hydro- Quebec Production). It is a unique situation where a regional variance addresses only a portion of a NERC Region, the Quebec Interconnection. So, it seems not convenient to start a new Standard Drafting Team for modifications that impact so few members. We ask if it is possible to include those modifications in the actual revision of PRC-006-2 for efficiency purposes. Those are the following:</p> <ol style="list-style-type: none"> <li>1. Regional Variance for the Quebec Interconnection, E.A.3, change this portion to better reflect R3 : [...] including notification of and for implementation [...] (instead of [...] including a schedule for implementation [...])</li> <li>2. Regional Variance for the Quebec Interconnection, E.A.4.2, Attachment 1A (instead of 2A)</li> <li>3. Attachment 1 A (Quebec): the minimum system frequency curve should continue with the same slope from 30 sec to 60 sec, and, at 60 sec, it should be adjusted to 59 Hz instead of 59,3 Hz. The justification for such changes is the following: The Quebec Interconnection (QI) has much less inertia than other Interconnections. This implies a greater variation of frequency for all kinds of contingencies. The curve of Attachment 1A (Quebec) doesn't take that into account for the time frame following the 30 second mark. It is requested that the steady state condition would allow a larger frequency gap than other Interconnections, as the QI has already a larger gap allowed at short term (between 56 Hz and 63 Hz) than other interconnections (from 58 Hz to 61,8 Hz). Also, it is requested that the time to attain the steady state, which is 60 seconds for other Interconnections (Attachment 1), would be at least or even longer for the Quebec Interconnection, instead of the actual 30 seconds value of Attachment 1A. Those proposed changes are necessary to limit the amount and frequency of load shedding for different contingencies.</li> </ol> <p>The proposed changes do not affect the reliability of the QI, but help to fit the unique characteristics of the system.</p>

No.	Organization	Yes/ No	Question 4 Comment
<p><b>Response:</b>                      The SDT understands the issues raised by Hyrdo-Quebec and agrees that it would be much more convenient to make the modifications suggested by Hydo-Quebec at the same time as the modifications to the continent-wide standard. However, the SDT is not able to revise the Quebec Interconnection regional variance because modifications to Interconnection-wide regional variances are handled by members of that particular region. See, Section 9.1 of the NERC Standards Process Manual, which provides: “[a]ny Variance from a NERC Reliability Standard Requirement that is proposed to apply to Registered Entities within a Regional Entity organized on an Interconnection-wide basis shall be considered an Interconnection-wide Variance and shall be developed through that Regional Entity’s NERC-approved Regional Reliability Standards development procedure.” Any modifications to the Quebec Interconnection-wide variance must be developed through the NPCC Regional Reliability Standards development procedure.</p> <p>However, the SDT agrees to make the non-substantive errata changes proposed by Hydro-Quebec in Part 2 of this comment. Specifically, the SDT will correct the typographical error and modify “Attachment 2A” to “Attachment 1A.” The other proposed revisions are substantive in nature and may not be modified by this SDT.</p>			
25	Exelon Companies		<p>The background section says that a SDT consideration in developing R15 is that the PC will consider in developing a Corrective Action Plan the "time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be necessary for inclusion of approved changing in budgeting cycles". It is our understanding that the Corrective Action Plan and a schedule for implementation by the UFLS entities within its area as developed per R15 are subject to the requirement (R14) "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". This is not clear as written. We would like the SDT to address this point in the Requirement and or the Justification.</p>
<p><b>Response:</b>                      The SDT agrees with your understanding that the schedule for implementation and, if necessary, Corrective Action Plan are developed as a part of the UFLS Program. This is because under Requirement R14, <i>before the PC finalizes</i> the UFLS program, UFLS entities may submit comments to the PC regarding the proposed UFLS program. The PC must provide written responses to those comments, indicating whether changes will be made to the UFLS program as a result of the comments, and if not, the reason why changes will not be made. Because the CAP required by Requirement R15 is developed as a result of the PC having to modify the ULFS program in order to bring it into compliance with Requirement R3, then the PC must allow affected UFLS entities to provide comments regarding the proposed program before it is finalized. The SDT appreciates your response but believes this is sufficiently clear in the standard.</p>			

### Standard Development Timeline

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### Development Steps Completed

1. The Standards Committee (SC) authorized posting of the revised Standards Authorization Request (SAR) for informal comment on May 16, 2014.
2. The revised SAR was posted for informal comment from May 23, 2014 through June 23, 2014.
3. A draft of PRC-006-2 was posted for a 45-day formal comment period and ballot on August 22, 2014. The ten day initial ballot is from September 26, 2014 to October 6, 2014.

#### Description of Current Draft

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (2012).

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with a 10-day ballot period	August 22, 2014
10-day Final Ballot	October 2014
Present to NERC Board of Trustees for Approval	November 2014

#### Effective Dates

PRC-006-2 shall become effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

### Version History

Version	Date	Action	Change Tracking
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.

### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Glossary of Terms used in Reliability Standards (Glossary) are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

N/A



*When this standard has received ballot approval, the rationale boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**
2. **Number:** PRC-006-2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. **Effective Date:**
  - 5.1. This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).

**B. Requirements and Measures**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
- 2.2.** 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, and
- 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-2 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer

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than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
- Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
- Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

- M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.
- R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-2 - Attachment 1.
  - 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
  - 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
  - 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-2 — Attachment 1.
  - 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

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- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*

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- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. [*VRF: Lower*][*Time Horizon: Long-term Planning*]
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. [*VRF: High*][*Time Horizon: Long-term Planning*]
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

### Rationale for Requirement R9:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. [*VRF: High*][*Time Horizon: Long-term Planning*]

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

**R13.** Each 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

**Rationale for Requirement R10:**

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, shall 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 following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following *[VRF: Lower][Time Horizon: Long-term Planning]*:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

**R15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]

**15.1.** For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

**15.2.** For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

**M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

### Rationale for Requirement R15:

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

## C. Compliance

### 1. Compliance Monitoring Process

#### 1.1. Compliance Enforcement Authority

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

#### 1.2. Evidence Retention

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, R14, and R15, Measures M1, M2, M3, M4, M5, M12, M14, and M15 as well as any evidence necessary to show compliance since the last compliance audit.



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- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

### **1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

### **1.4. Additional Compliance Information**

None

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
<b>R3</b>	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, 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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R4</b>	<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>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>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>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 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 determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<b>R5</b>	N/A	N/A	N/A	<p>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</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	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>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to	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	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	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	support maintenance of each Planning Coordinator’s UFLS database.	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.	Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.	Planning Coordinator’s UFLS database.  OR The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.
<b>R9</b>	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 implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	The Transmission Owner provided less than 100% but more than (and including) 95% automatic switching of	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks,

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>
<b>R11</b>	<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 one year but less than or equal to 13 months of actuation.</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 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.</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 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 an islanding event resulting in system frequency</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 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 an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program,</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>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>	<p>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 an 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>
<b>R12</b>	N/A	<p>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.</p>	<p>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.</p>	<p>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.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program</p>



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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				deficiencies were identified per Requirement R11, failed to conduct and document a UFLS design assessment to consider the identified deficiencies.
<b>R13</b>	N/A	N/A	N/A	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
<b>R14</b>	N/A	N/A	N/A	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				response to comments whether changes were made or reasons why changes were not made to the items in Parts 14.1 through 14.3.
<b>R15</b>	N/A	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>OR</p> <p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				frame for development by a period greater than 2 months.

### E. Regional Variances

#### E.A. Regional Variance for the Quebec Interconnection

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**E.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*

**E.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

**E.A.4.** Each Planning Coordinator shall 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 E.A.3 for each island identified in Requirement

R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>EA3</b>	N/A	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<b>EA4</b>	N/A	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS</p>

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3

**E.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**E.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.E.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

**E.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**E.B.2.1.** Those islands selected by applying the criteria in Requirement E.B.1, and

**E.B.2.2.** 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.

**M.E.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

**EB.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**E.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60



seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**E.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**E.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**E.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M.E.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

**E.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that

trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

**E.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**E.B.11.1.** The performance of the UFLS equipment,

**E.B.11.2** The effectiveness of the UFLS program

**M.E.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

**E.B.12.** Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**M.E.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>E.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<p><b>E.B.4</b></p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
<b>E.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.  OR	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation.  OR

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.</p>	<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
<b>E.B.12</b>	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	<p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies</p>



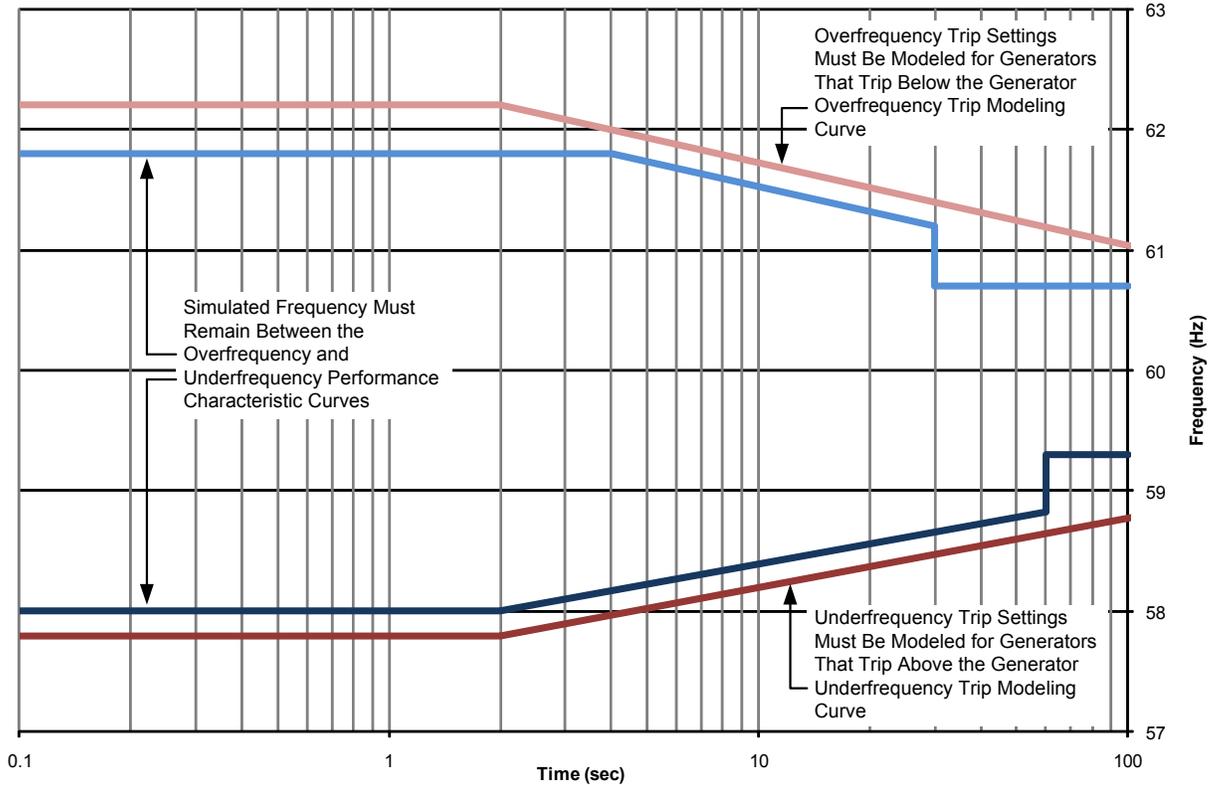
**Associated Documents**

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	

## PRC-006-2 – Attachment 1

### Underfrequency Load Shedding Program Design Performance and Modeling Curves for Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

#### Curve Definitions

Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic
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## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

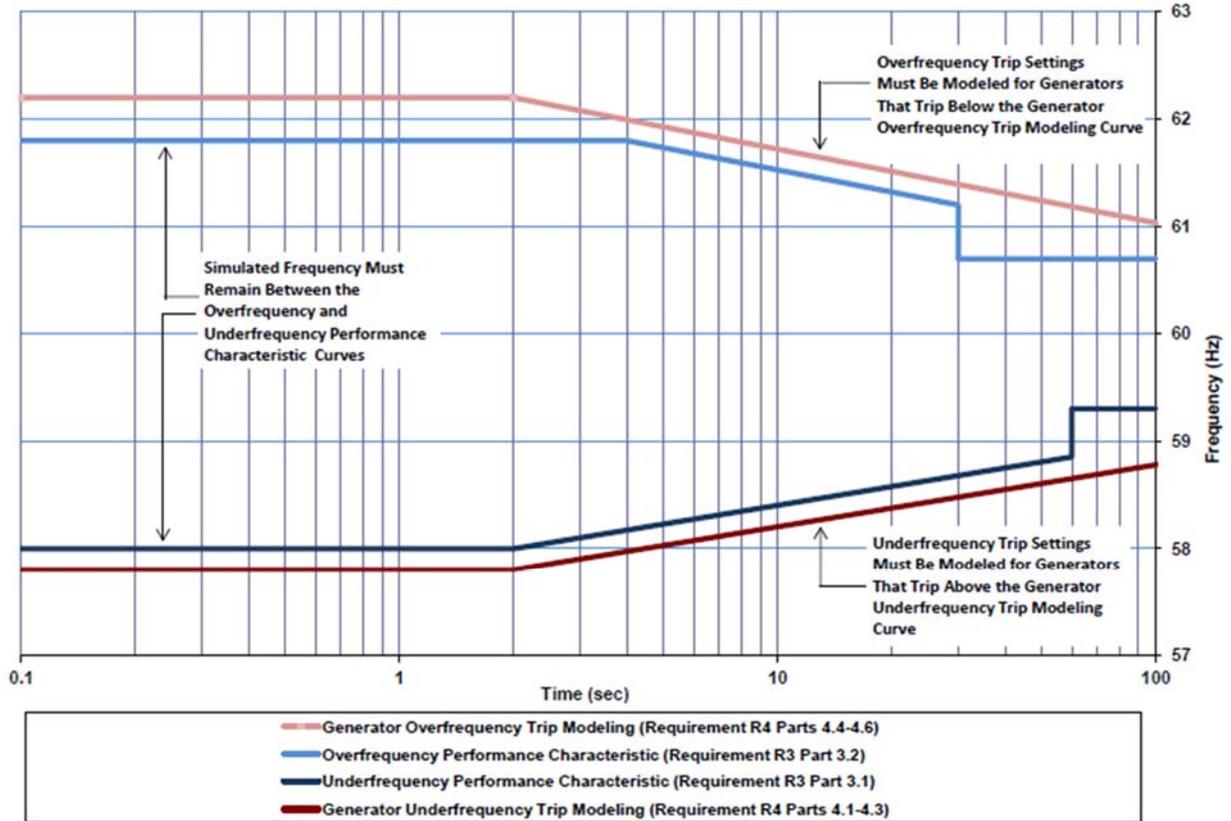
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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575\log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575\log(t) +$ 57.83 Hz	$f = 59.3$ Hz

**PRC-006 – Attachment 1A (Quebec)**

Underfrequency Load Shedding Program

Design Performance and Modeling Curves for Regional Variances EA3, Parts EA3.1-EA3.3 and EA4, Parts EA4.1-EA4.4



### Standard Development Timeline

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### Development Steps Completed

1. The Standards Committee (SC) authorized posting of the revised Standards Authorization Request (SAR) for informal comment on May 16, 2014.
2. The revised SAR was posted for informal comment from May 23, 2014 through June 23, 2014.
3. A draft of PRC-006-2 was posted for a 45-day formal comment period and ballot on August 22, 2014. The ten day initial ballot is from September 26, 2014 to October 6, 2014.

#### Description of Current Draft

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (2012).

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with a 10-day ballot period	August 22, 2014
10-day Final Ballot	<del>September-October</del> 2014
Present to NERC Board of Trustees for Approval	November 2014

#### Effective Dates

PRC-006-2 shall become effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
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1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.

### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Glossary of Terms used in Reliability Standards (Glossary) are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

N/A

*When this standard has received ballot approval, the rationale boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**
2. **Number:** PRC-006-2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. **Effective Date:**
  - 5.1. This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.
6. **Background:**

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098 (2012).



**B. Requirements and Measures**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: [*VRF: Medium*][*Time Horizon: Long-term Planning*]
  - 2.1.** Those islands selected by applying the criteria in Requirement R1, and
  - 2.2.** 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, and
  - 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]
  - 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-~~1~~2- Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
  - 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-~~1~~2- Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
  - 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer

## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
- Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
- Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.

**R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*

- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*

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- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. [*VRF: Lower*][*Time Horizon: Long-term Planning*]
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. [*VRF: High*][*Time Horizon: Long-term Planning*]
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation , including any Corrective Action Plan, per Requirement R9.

### Rationale for Requirement R9:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R10.** Each Transmission Owner shall 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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. [*VRF: High*][*Time Horizon: Long-term Planning*]

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation, including any Corrective Action Plan, per Requirement R10.

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. [*VRF: Medium*][*Time Horizon: Operations Assessment*]

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

**R13.** Each 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

### Rationale for Requirement R10:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, shall 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 following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following *[VRF: Lower][Time Horizon: Long-term Planning]*:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

**R15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]

**15.1.** For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

**15.2.** For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

**M15.** Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

**Rationale for Requirement R15:**

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

**C. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Enforcement Authority**

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

**1.2. Evidence Retention**

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, R14, and R15, Measures M1, M2, M3, M4, M5, M12, M14, and M15 as well as any evidence necessary to show compliance since the last compliance audit.

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- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

### **1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

### **1.4. Additional Compliance Information**

None



2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
<b>R3</b>	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, 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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R4</b>	<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>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>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>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 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 determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<b>R5</b>	N/A	N/A	N/A	<p>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</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	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>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to	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	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	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	support maintenance of each Planning Coordinator’s UFLS database.	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.	Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.	Planning Coordinator’s UFLS database.  OR The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.
<b>R9</b>	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 implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	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 implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for implementation, including any Corrective Action Plan, as determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	The Transmission Owner provided less than 100% but more than (and including) 95% automatic switching of	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks,

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>	<p>Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for implementation , including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</p>
<b>R11</b>	<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 one year but less than or equal to 13 months of actuation.</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 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.</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 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 an islanding event resulting in system frequency</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 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 an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program,</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>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>	<p>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 an 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>
<b>R12</b>	N/A	<p>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.</p>	<p>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.</p>	<p>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.</p> <p>OR</p> <p>The Planning Coordinator, in which UFLS program</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				deficiencies were identified per Requirement R11, failed to conduct and document a UFLS design assessment to consider the identified deficiencies.
<b>R13</b>	N/A	N/A	N/A	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
<b>R14</b>	N/A	N/A	N/A	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



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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				response to comments whether changes were made or reasons why changes were not made to the items in Parts 14.1 through 14.3.
<b>R15</b>	N/A	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</p>	<p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</p> <p>OR</p> <p>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				frame for development by a period greater than 2 months.

### E. Regional Variances

#### E.A. Regional Variance for the Quebec Interconnection

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**E.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*

**E.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

**E.A.4.** Each Planning Coordinator shall 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 E.A.3 for each island identified in Requirement

R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment ~~2A1A~~, and

**E.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>EA3</b>	N/A	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<b>EA4</b>	N/A	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3

**E.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**E.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.E.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

**E.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**E.B.2.1.** Those islands selected by applying the criteria in Requirement E.B.1, and

**E.B.2.2.** 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.

**M.E.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

**EB.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**E.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60

seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**E.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**E.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**E.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M.E.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

**E.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that



trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

**E.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**E.B.11.1.** The performance of the UFLS equipment,

**E.B.11.2** The effectiveness of the UFLS program

**M.E.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

**E.B.12.** Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M.E.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>E.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<p><b>E.B.4</b></p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
<b>E.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.  OR	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation.  OR

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.</p>	<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
<b>E.B.12</b>	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.  OR  The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies

**Associated Documents**

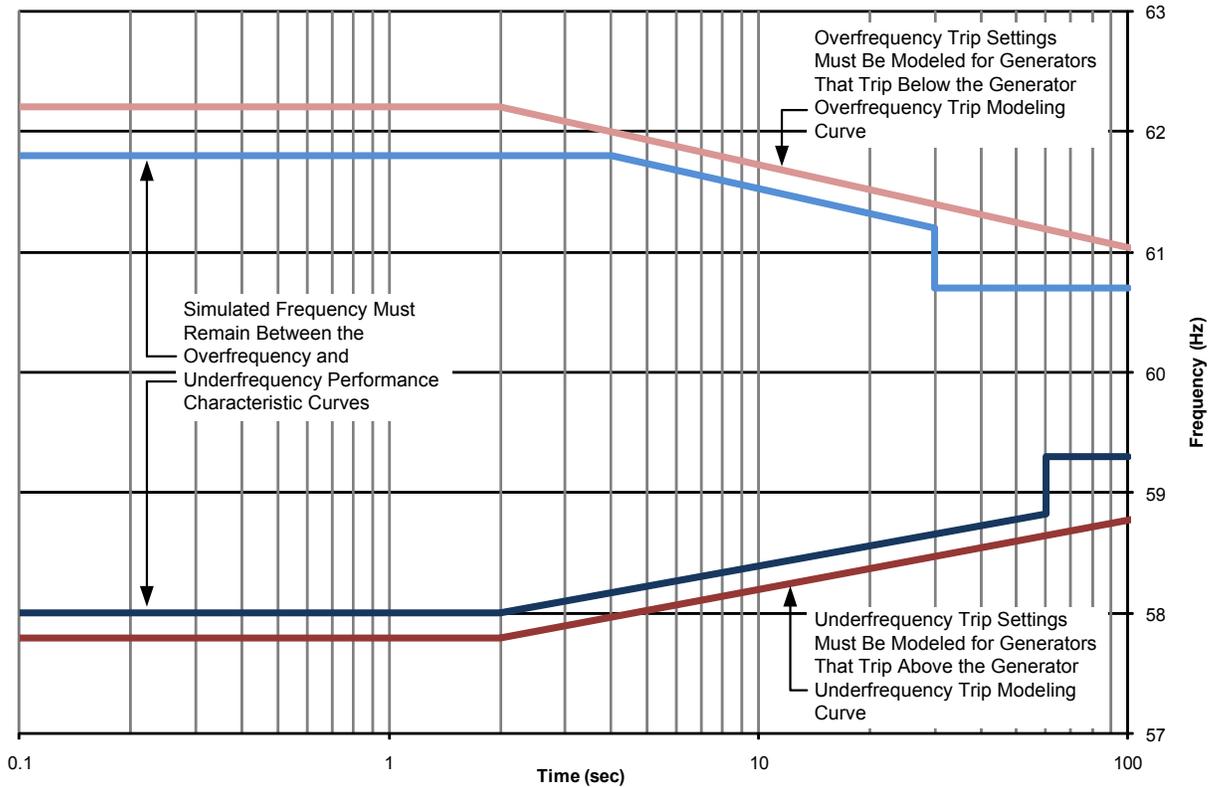
**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	



## PRC-006-2 – Attachment 1

### Underfrequency Load Shedding Program Design Performance and Modeling Curves for Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

#### Curve Definitions

Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic
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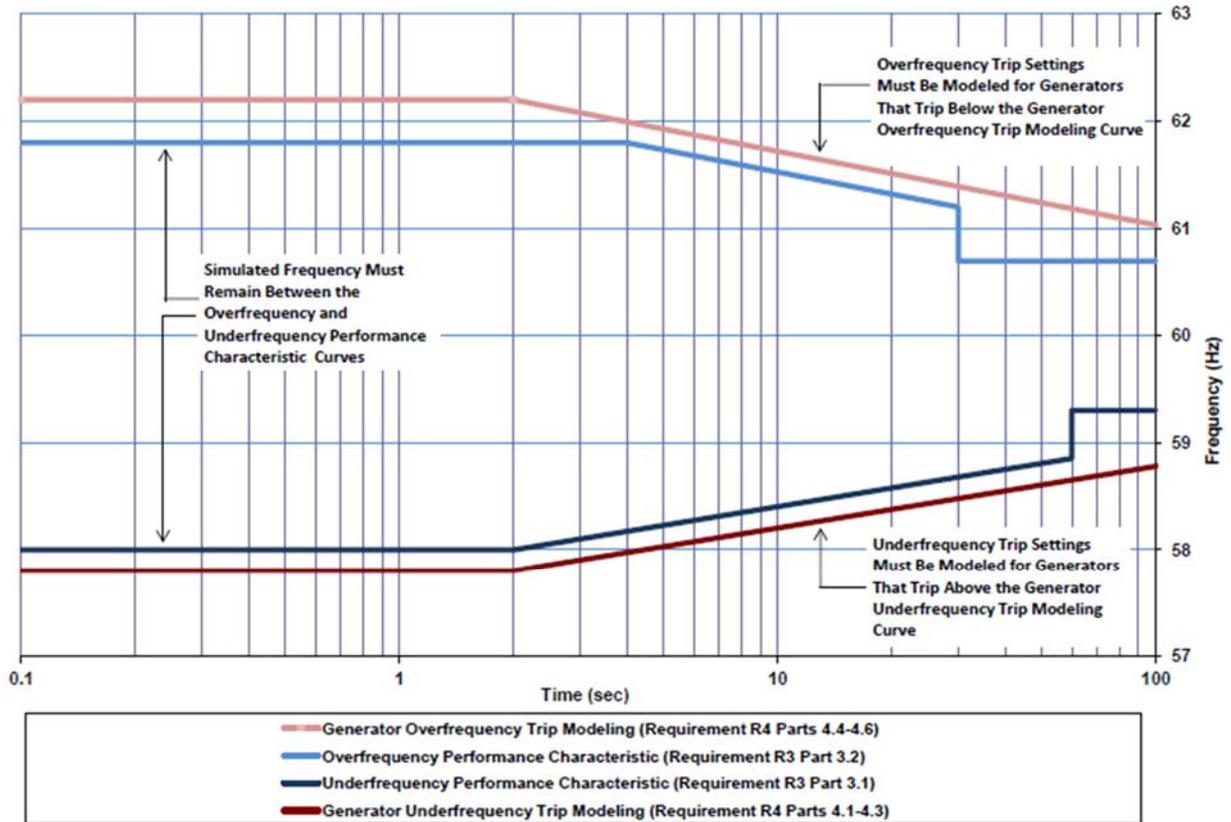
## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575 \log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575 \log(t) +$ 57.83 Hz	$f = 59.3$ Hz

**PRC-006-2 – Attachment 1A (Quebec)**  
**Underfrequency Load Shedding Program**

**Design Performance and Modeling Curves for Regional Variances EA3, Parts EA3.1-EA3.3 and EA4, Parts EA4.1-EA4.4**



### Standard Development Timeline

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### Development Steps Completed

1. The Standards Committee (SC) authorized posting of the revised Standards Authorization Request (SAR) for informal comment on May 16, 2014.
2. The revised SAR was posted for informal comment from May 23, 2014 through June 23, 2014.
3. A draft of PRC-006-2 was posted for a 45-day formal comment period and ballot on August 22, 2014. The ten day initial ballot is from September 26, 2014 to October 6, 2014.

#### Description of Current Draft

This is the first draft of the proposed Reliability Standard PRC-006-2, and it is being posted for stakeholder comment and initial ballot. This draft includes proposed revisions to address the directive in the FERC Order issued May 7, 2012, in Docket No. RM11-20-000, *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, 139 FERC ¶ 61,098, P48 (2012).

Anticipated Actions	Anticipated Date
45-day Formal Comment Period with a 10-day ballot period	August 22, 2014
10-day Final Ballot	September 2014
Present to NERC Board of Trustees for Approval	November 2014

#### Effective Dates

PRC-006-2 shall become effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

### Version History

Version	Date	Action	Change Tracking
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
2	TBD	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	Revisions to existing Requirement R9 and R10 and addition of new Requirement R15.

### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Glossary of Terms used in Reliability Standards (Glossary) are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

N/A

## Standard PRC-006-~~1~~2 — Automatic Underfrequency Load Shedding

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*When this standard has received ballot approval, the rationale boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** **Automatic Underfrequency Load Shedding**
2. **Number:** PRC-006-~~1~~2
3. **Purpose:** 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.
4. **Applicability:**
  - 4.1. Planning Coordinators
  - 4.2. UFLS entities 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 one or more of the following:
    - 4.2.1 Transmission Owners
    - 4.2.2 Distribution Providers
  - 4.3. Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.
5. ~~(Proposed)-~~**Effective Date:**
  - 5.1. ~~This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction. The standard, with the exception of Requirement R4, Parts 4.1 through 4.6, is effective the first day of the first calendar quarter one year after applicable regulatory approvals.~~
  - 5.2. ~~Parts 4.1 through 4.6 of Requirement R4 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.~~
6. Background:

PRC-006-2 was developed under Project 2008-02: Underfrequency Load Shedding (UFLS). The drafting team revised PRC-006-1 for the purpose of addressing the directive issued in FERC Order No. 763. Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards, 139 FERC ¶ 61,098 (2012).

**B. Requirements and Measures**

- R1.** Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- M1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.
- R2.** Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: [*VRF: Medium*][*Time Horizon: Long-term Planning*]
- 2.1.** Those islands selected by applying the criteria in Requirement R1, and
- 2.2.** 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, and
- 2.3.** A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.
- M2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.
- R3.** Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). [*VRF: High*][*Time Horizon: Long-term Planning*]
- 3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-~~1~~2- Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-~~1~~2- Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and
- 3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer



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than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

- Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES
- Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES
- Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.

**R4.** Each Planning Coordinator shall 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. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*

- 4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-~~21~~ - Attachment 1.
- 4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-~~21~~ — Attachment 1.
- 4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

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- M4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.
- R5.** Each 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, shall 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 one of the following: *[VRF: High][Time Horizon: Long-term Planning]*
- Develop 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
  - Conduct 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
  - Conduct 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 the ERO.
- M5.** Each 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, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.
- R6.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*
- M6.** Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.
- R7.** Each Planning Coordinator shall 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. *[VRF: Lower][Time Horizon: Long-term Planning]*

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- M7.** Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.
- R8.** Each UFLS entity shall 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. [*VRF: Lower*][*Time Horizon: Long-term Planning*]
- M8.** Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.
- R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for implementation application, including any Corrective Action Plan,- as determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. [*VRF: High*][*Time Horizon: Long-term Planning*]
- M9.** Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for implementation application, including any Corrective Action Plan, per Requirement R9.

### Rationale for Requirement R9:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a Planning Coordinator (PC) assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R10.** Each Transmission Owner shall 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 implementation-application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*

**M10.** Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for implementation-application, including any Corrective Action Plan, per Requirement R10.

**R11.** Each Planning Coordinator, in whose area a BES 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 to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**11.1.** The performance of the UFLS equipment,

**11.2.** The effectiveness of the UFLS program.

**M11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

**R12.** Each Planning Coordinator, in whose islanding event assessment (per 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. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

### Rationale for Requirement R10:

The “Corrective Action Plan” language was added in response to the FERC directive from Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. The revised language adds clarity by requiring that each UFLS entity follow the UFLS program, including any Corrective Action Plan, developed by the PC.

Also, to achieve consistency of terminology throughout this standard, the word “application” was replaced with “implementation.” (See Requirements R3, R14 and R15)

**R13.** Each 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, shall 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 following: [*VRF: Medium*][*Time Horizon: Operations Assessment*]

- Conduct 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
- Conduct 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
- Conduct 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, identify 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 the ERO.

**M13.** Each 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, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

**R14.** Each Planning Coordinator shall 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 following [*VRF: Lower*][*Time Horizon: Long-term Planning*]:

**14.1.** UFLS program, including a schedule for implementation

**14.2.** UFLS design assessment

**14.3.** Format and schedule of UFLS data submittal

**M14.** Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, 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 per Requirement R14.

R15. Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area. [VRF: High][Time Horizon: Long-term Planning]

15.1. For UFLS design assessments performed under Requirement R4 or R5, the Corrective Action Plan shall be developed within the five-year time frame identified in Requirement R4.

15.2. For UFLS design assessments performed under Requirement R12, the Corrective Action Plan shall be developed within the two-year time frame identified in Requirement R12.

M15. Each Planning Coordinator that conducts a UFLS design assessment under Requirement R4, R5, or R12 and determines that the UFLS program does not meet the performance characteristics in Requirement R3, shall have a dated Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, that was developed within the time frame identified in Part 15.1 or 15.2.

Rationale for Requirement R15:

Requirement R15 was added in response to the directive from FERC Order No. 763, which raised concern that the standard failed to specify how soon an entity would need to implement corrections after a deficiency is identified by a PC assessment. Requirement R15 addresses the FERC directive by making explicit that if deficiencies are identified as a result of an assessment, the PC shall develop a Corrective Action Plan and schedule for implementation by the UFLS entities.

A “Corrective Action Plan” is defined in the NERC Glossary of Terms as, “a list of actions and an associated timetable for implementation to remedy a specific problem.” Thus, the Corrective Action Plan developed by the PC will identify the specific timeframe for an entity to implement corrections to remedy any deficiencies identified by the PC as a result of an assessment.

**C. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Enforcement Authority**

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

**1.2. Evidence Retention**

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, ~~and R14,~~ and R15, Measures M1, M2, M3, M4,

M5, M12, ~~and M14~~, and M15 as well as any evidence necessary to show compliance since the last compliance audit.

- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.
- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

**1.3. Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaints

**1.4. Additional Compliance Information**

None

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	N/A	<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>	<p>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.</p>	<p>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>
<b>R2</b>	N/A	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to</p>	<p>The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all</p>



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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.  OR  The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.
<b>R3</b>	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., 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.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, 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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R4</b>	<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>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>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>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 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 determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2</p>
<b>R5</b>	N/A	N/A	N/A	<p>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</p>

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
<b>R6</b>	N/A	N/A	N/A	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>R7</b>	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.	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.	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.	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>R8</b>	The UFLS entity provided data to its Planning Coordinator(s) less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to	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	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	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

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	support maintenance of each Planning Coordinator’s UFLS database.	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.	Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.	Planning Coordinator’s UFLS database.  OR The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator’s UFLS database.
<b>R9</b>	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 <u>implementation application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.	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 <u>implementation-application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.	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 <u>implementation application, including any Corrective Action Plan, as</u> -determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for <u>implementation application, including any Corrective Action Plan, as</u> determined by the Planning Coordinator(s) area in which it owns assets.
<b>R10</b>	The Transmission Owner provided less than 100% but more than (and including)	The Transmission Owner provided less than 95% but more than (and including)	The Transmission Owner provided less than 90% but more than (and including) 85%	The Transmission Owner provided less than 85% automatic switching of its

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>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 <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>90% automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>	<p>existing capacitor banks, Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for <u>implementation application, including any Corrective Action Plan, as determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission.</u></p>
<b>R11</b>	<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 one year but less than or equal to 13 months of actuation.</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 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.</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 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 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 an islanding event resulting in system frequency</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an 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>	<p>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 an 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>
<b>R12</b>	N/A	<p>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.</p>	<p>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</p>	<p>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.</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			to 26 months of event actuation.	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>R13</b>	N/A	N/A	N/A	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
<b>R14</b>	N/A	N/A	N/A	The Planning Coordinator failed to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>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>
<p><b><u>R15</u></b></p>	<p><u>N/A</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period of up to 1 month.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area, but exceeded the permissible time frame for development by a period greater than 1 month but not more than 2 months.</u></p>	<p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, but failed to develop a Corrective Action Plan and a schedule for implementation by the UFLS entities within its area.</u></p> <p><u>OR</u></p> <p><u>The Planning Coordinator determined, through a UFLS design assessment performed under Requirement R4, R5, or R12, that the UFLS program did not meet the performance characteristics in Requirement R3, and developed a Corrective Action Plan and a schedule for implementation by the UFLS</u></p>



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<u>entities within its area, but exceeded the permissible time frame for development by a period greater than 2 months.</u>

**E. Regional Variances**

**E.A. Regional Variance for the Quebec Interconnection**

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

**E.A.3.** Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).  
*[VRF: High][Time Horizon: Long-term Planning]*

**E.A.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.A.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**EA.3.3.1.** Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

**EA.3.3.2.** Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

**EA.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

**M.E.A.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

**E.A.4.** Each Planning Coordinator shall 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 E.A.3 for each island identified in Requirement

R2. The simulation shall model each of the following; [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.A.4.1** Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

**E.A.4.2** Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment ~~2A1A~~, and

**E.A.4.3** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.A.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>EA3</b>	N/A	<p>The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions</p> <p>OR</p> <p>The Planning Coordinator failed to develop a UFLS program.</p>
<b>EA4</b>	N/A	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.</p>	<p>The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3.</p> <p>OR</p> <p>The Planning Coordinator failed to conduct and document a UFLS</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

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E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3

**E.B. Regional Variance for the Western Electricity Coordinating Council**

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

**E.B.1.** Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

**M.E.B.1.** Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

**E.B.2.** Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

**E.B.2.1.** Those islands selected by applying the criteria in Requirement E.B.1, and

**E.B.2.2.** 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.

**M.E.B.2.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

**EB.3.** Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance =  $[(\text{load} - \text{actual generation output}) / (\text{load})]$ , of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

**E.B.3.1.** Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.2.** Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60

seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

**E.B.3.3.** Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall 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 each of the following:

**E.B.3.3.1.** Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

**E.B.3.3.2.** Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

**E.B.3.3.3.** Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

**M.E.B.3.** Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

**E.B.4.** Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: [*VRF: High*][*Time Horizon: Long-term Planning*]

**E.B.4.1.** Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.2.** Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.3.** Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

**E.B.4.4.** Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that

trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.5.** Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.6.** Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

**E.B.4.7.** Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

**M.E.B.4.** Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

**E.B.11.** Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

**E.B.11.1.** The performance of the UFLS equipment,

**E.B.11.2** The effectiveness of the UFLS program

**M.E.B.11.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

**E.B.12.** Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

**M.E.B.12.** Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.



**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.1</b>	N/A	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p> <p>OR</p> <p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that 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, that may form islands</p>	<p>The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>E.B.2</b>	N/A	N/A	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p>	<p>The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2</p> <p>OR</p> <p>The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.</p>
<b>E.B.3</b>	N/A	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included 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 E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions</p>	<p>The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions</p> <p>OR</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.</p>
<p><b>E.B.4</b></p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p>	<p>The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.</p> <p>OR</p> <p>The Planning Coordinator failed to participate in and document a coordinated UFLS assessment</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
<b>E.B.11</b>	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.  OR	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation.  OR

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.</p>	<p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.</p> <p>OR</p> <p>The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as</p>

**Standard PRC-006-2 — Automatic Underfrequency Load Shedding**

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
<b>E.B.12</b>	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation.  OR  The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies

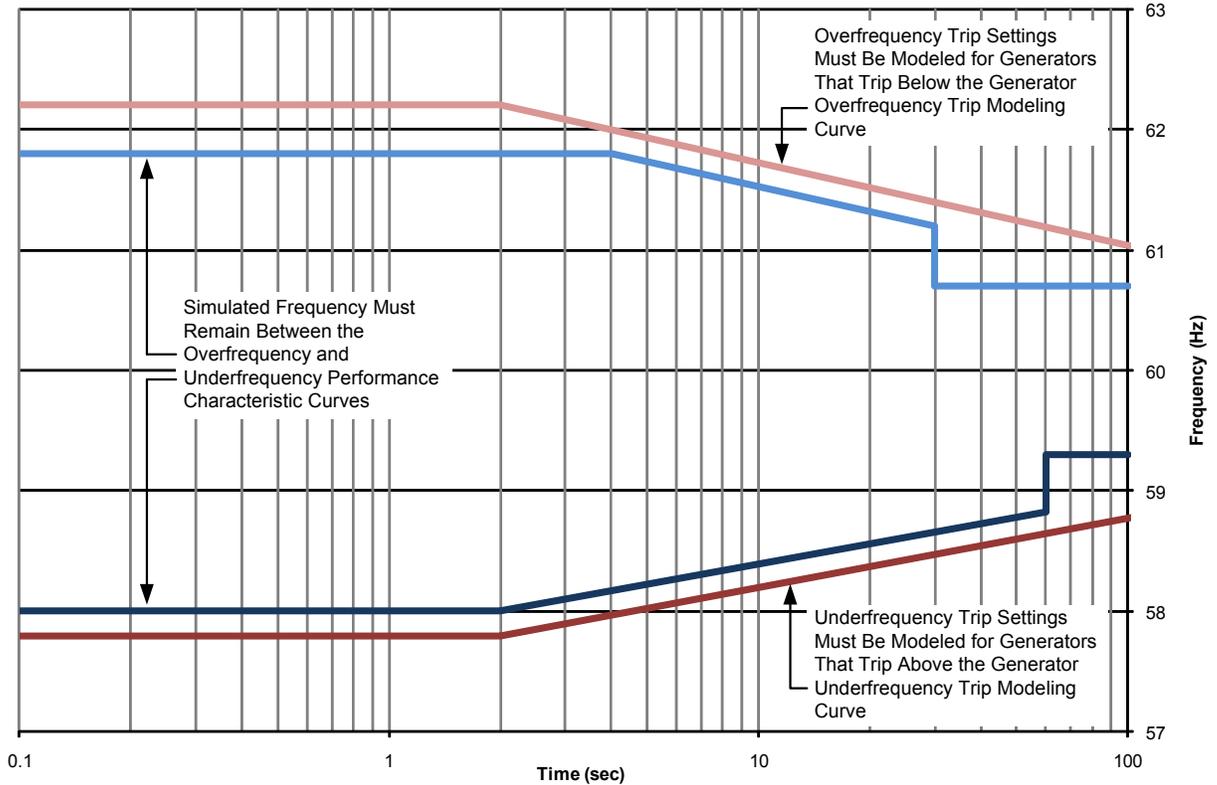
**Associated Documents**

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	
1	November 9, 2012	FERC Letter Order issued accepting the modification of the VRF in R5 from (Medium to High) and the modification of the VSL language in R8.	
<u>2</u>	<u>TBD</u>	Revisions made under Project 2008-02: Undervoltage Load Shedding (UVLS) & Underfrequency Load Shedding (UFLS) to address directive issued in FERC Order No. 763.	

PRC-006-1.2 – Attachment 1

Underfrequency Load Shedding Program  
 Design Performance and Modeling Curves for  
 Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6



- Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

Curve Definitions

Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 4 \text{ s}$	$4 \text{ s} < t \leq 30 \text{ s}$	$t > 30 \text{ s}$
$f = 62.2 \text{ Hz}$	$f = -0.686\log(t) + 62.41 \text{ Hz}$	$f = 61.8 \text{ Hz}$	$f = -0.686\log(t) + 62.21 \text{ Hz}$	$f = 60.7 \text{ Hz}$

Generator Underfrequency Trip Modeling	Underfrequency Performance Characteristic



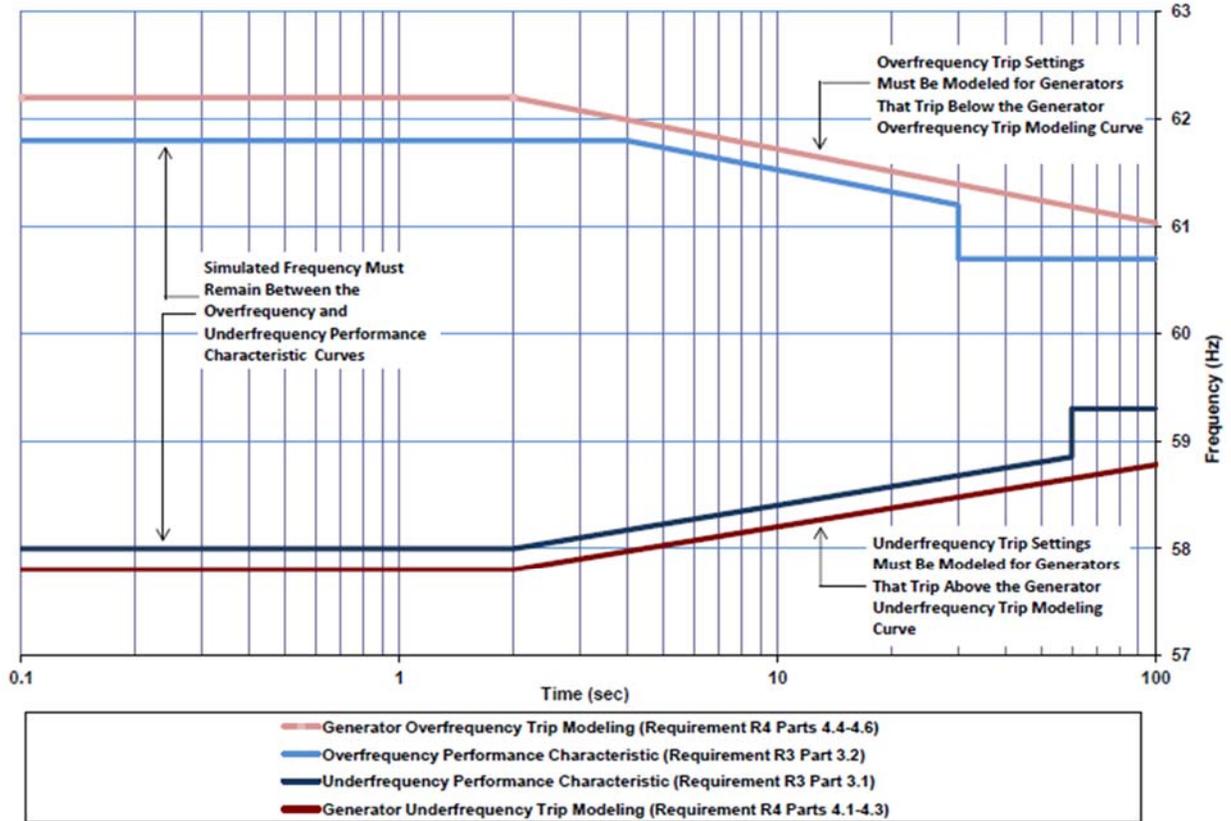
## Standard PRC-006-2 — Automatic Underfrequency Load Shedding

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$t \leq 2 \text{ s}$	$t > 2 \text{ s}$	$t \leq 2 \text{ s}$	$2 \text{ s} < t \leq 60 \text{ s}$	$t > 60 \text{ s}$
$f = 57.8$ Hz	$f = 0.575 \log(t) + 57.63$ Hz	$f = 58.0$ Hz	$f = 0.575 \log(t) +$ 57.83 Hz	$f = 59.3$ Hz

**PRC-006-2 – Attachment 1A (Quebec)**  
**Underfrequency Load Shedding Program**

**Design Performance and Modeling Curves for Regional Variances EA3, Parts EA3.1-EA3.3 and EA4, Parts EA4.1-EA4.4**



## Implementation Plan

### Project 2008-02: Underfrequency Load Shedding (UFLS)

#### Requested Approval

- PRC-006-2: Automatic Underfrequency Load Shedding

#### Requested Retirement

- PRC-006-1: Automatic Underfrequency Load Shedding

#### Prerequisite Approvals

- None

#### Revisions to Defined Terms in the NERC Glossary

- None

#### Applicable Entities

- Planning Coordinators
- UFLS entities 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 one or more of the following:
  - Transmission Owners
  - Distribution Providers
- Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators

#### Effective Date

This standard is effective on the first day of the first calendar quarter six months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

#### Retirement of Existing PRC-006-1

PRC-006-1 shall be retired at midnight of the day immediately prior to the Effective Date of PRC-006-2.

# Standards Announcement

## Project 2008-02 Underfrequency Load Shedding (UFLS)

Final Ballot Now Open through October 31, 2014

### [Now Available](#)

A final ballot for **PRC-006-2 - Automatic Underfrequency Load Shedding** is open through **8 p.m. Eastern Friday, October 31, 2014**.

Background information for this project can be found on the [project page](#).

### Instructions for Balloting

In the final ballot, votes are counted by exception. Only members of the ballot pool may cast a ballot; all ballot pool members may change their previously cast votes. A ballot pool member who failed to cast a vote during the last ballot window may cast a vote in the final ballot window. If a ballot pool member cast a vote in the previous ballot and does not participate in the final ballot, that member's vote will be carried over in the final ballot.

Members of the ballot pool associated with this project may log in and submit their vote for the standard by clicking [here](#).

### Next Steps

Voting results for the standard will be posted and announced after the ballot window closes. If approved, it will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#),  
Standards Developer, or at 404.446.2581.*

North American Electric Reliability Corporation  
3353 Peachtree Rd, NE  
Suite 600, North Tower  
Atlanta, GA 30326  
404-446-2560 | [www.nerc.com](http://www.nerc.com)

# Standards Announcement

## Project 2008-02 Underfrequency Load Shedding (UFLS)

### PRC-006-2

#### Final Ballot Results

#### [Now Available](#)

A final ballot for **PRC-006-2 – Automatic Underfrequency Load Shedding** concluded at **8 p.m. Eastern, Friday, October 31, 2014.**

The standard achieved a quorum and received sufficient affirmative votes for approval. Voting statistics are listed below, and the [Ballot Results](#) page provides a link to the detailed results for the ballot.

Ballot
Quorum /Approval
87.53% / 83.12%

Background information for this project can be found on the [project page](#).

#### Next Steps

The standard will be submitted to the NERC Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

For information on the **Standards Development Process**, please refer to the [Standard Processes Manual](#).

*For more information or assistance, please contact [Lacey Ourso](#).*

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Log In

- Ballot Pools
- Current Ballots
- Ballot Results
- Registered Ballot Body
- Proxy Voters
- Register

[Home Page](#)

Ballot Results	
<b>Ballot Name:</b>	Project 2008-02 UFLS PRC-006-2
<b>Ballot Period:</b>	10/22/2014 - 10/31/2014
<b>Ballot Type:</b>	Final
<b>Total # Votes:</b>	323
<b>Total Ballot Pool:</b>	369
<b>Quorum:</b>	<b>87.53 % The Quorum has been reached</b>
<b>Weighted Segment Vote:</b>	83.12 %
<b>Ballot Results:</b>	<b>A quorum was reached and there were sufficient affirmative votes for approval.</b>

Summary of Ballot Results										
Segment	Ballot Pool	Segment Weight	Affirmative		Negative		Negative Vote without a Comment	Abstain	No Vote	
			# Votes	Fraction	# Votes	Fraction				
1 - Segment 1	102	1	68	0.872	10	0.128	0	5	19	
2 - Segment 2	9	0.8	4	0.4	4	0.4	0	0	1	
3 - Segment 3	85	1	64	0.914	6	0.086	0	7	8	
4 - Segment 4	28	1	22	0.846	4	0.154	0	0	2	
5 - Segment 5	75	1	50	0.847	9	0.153	0	7	9	
6 - Segment 6	54	1	40	0.889	5	0.111	0	3	6	
7 - Segment 7	0	0	0	0	0	0	0	0	0	
8 - Segment 8	4	0.4	3	0.3	1	0.1	0	0	0	
9 - Segment 9	4	0.3	3	0.3	0	0	0	0	1	

10 - Segment 10	8	0.8	7	0.7	1	0.1	0	0	0
<b>Totals</b>	<b>369</b>	<b>7.3</b>	<b>261</b>	<b>6.068</b>	<b>40</b>	<b>1.232</b>	<b>0</b>	<b>22</b>	<b>46</b>

**Individual Ballot Pool Results**

Segment	Organization	Member	Ballot	NERC Notes
1	Ameren Services	Eric Scott	Negative	SUPPORTS THIRD PARTY COMMENTS
1	American Electric Power	Paul B Johnson	Negative	SUPPORTS THIRD PARTY COMMENTS
1	American Transmission Company, LLC	Andrew Z Puszta	Affirmative	
1	Arizona Public Service Co.	Brian Cole		
1	Associated Electric Cooperative, Inc.	John Bussman	Affirmative	
1	ATCO Electric	Glen Sutton	Abstain	
1	Austin Energy	James Armke	Affirmative	
1	Avista Utilities	Heather Rosentrater		
1	Balancing Authority of Northern California	Kevin Smith	Affirmative	
1	Baltimore Gas & Electric Company	Christopher J Scanlon	Affirmative	
1	Basin Electric Power Cooperative	David Rudolph	Affirmative	
1	BC Hydro and Power Authority	Patricia Robertson	Abstain	
1	Beaches Energy Services	Don Cuevas	Affirmative	
1	Black Hills Corp	Wes Wingen	Affirmative	
1	Bonneville Power Administration	Donald S. Watkins	Affirmative	
1	Brazos Electric Power Cooperative, Inc.	Tony Kroskey		
1	Bryan Texas Utilities	John C Fontenot	Affirmative	
1	CenterPoint Energy Houston Electric, LLC	John Brockhan	Affirmative	
1	Central Electric Power Cooperative	Michael B Bax		
1	Central Iowa Power Cooperative	Kevin J Lyons	Negative	SUPPORTS THIRD PARTY COMMENTS
1	Central Maine Power Company	Joseph Turano Jr.		
1	City of Tallahassee	Daniel S Langston	Negative	
1	Clark Public Utilities	Jack Stamper	Affirmative	
1	Cleco Corporation	John Lindsey	Affirmative	
1	Colorado Springs Utilities	Shawna Speer	Affirmative	
1	Consolidated Edison Co. of New York	Christopher L de Graffenried	Affirmative	
1	CPS Energy	Glenn Pressler	Affirmative	
1	Dairyland Power Coop.	Robert W. Roddy	Affirmative	
1	Dayton Power & Light Co.	Hertzel Shamash	Affirmative	
1	Dominion Virginia Power	Larry Nash	Affirmative	
1	Duke Energy Carolina	Doug E Hills	Affirmative	
1	Entergy Transmission	Oliver A Burke		
1	FirstEnergy Corp.	William J Smith	Affirmative	
1	Florida Keys Electric Cooperative Assoc.	Dennis Minton	Affirmative	
1	Florida Power & Light Co.	Mike O'Neil	Affirmative	
1	Gainesville Regional Utilities	Richard Bachmeier	Affirmative	
1	Georgia Transmission Corporation	Jason Snodgrass	Affirmative	
1	Great River Energy	Gordon Pietsch	Affirmative	
1	Hoosier Energy Rural Electric Cooperative, Inc.	Bob Solomon		
1	Hydro One Networks, Inc.	Muhammed Ali	Affirmative	
1	Hydro-Quebec TransEnergie	Martin Boisvert	Affirmative	
1	Idaho Power Company	Molly Devine	Affirmative	
1	International Transmission Company Holdings Corp	Michael Moltane	Affirmative	
1	JDRJC Associates	Jim D Cyrulewski	Affirmative	
1	JEA	Ted E Hobson	Affirmative	
1	KAMO Electric Cooperative	Walter Kenyon	Affirmative	
1	Kansas City Power & Light Co.	Daniel Gibson	Affirmative	
				SUPPORTS

				THIRD PARTY COMMENTS
1	Lakeland Electric	Larry E Watt	Negative	
1	Lincoln Electric System	Doug Bantam		
1	Long Island Power Authority	Robert Ganley	Affirmative	
1	Los Angeles Department of Water & Power	faranak sarbaz	Affirmative	
1	Lower Colorado River Authority	Martyn Turner	Affirmative	
1	M & A Electric Power Cooperative	William Price	Affirmative	
1	MEAG Power	Danny Dees	Affirmative	
1	MidAmerican Energy Co.	Terry Harbour	Affirmative	
1	Minnkota Power Coop. Inc.	Daniel L Inman	Affirmative	
1	Muscatine Power & Water	Andrew J Kurriger		
1	N.W. Electric Power Cooperative, Inc.	Mark Ramsey	Affirmative	
1	National Grid USA	Michael Jones	Affirmative	
1	NB Power Corporation	Alan MacNaughton	Abstain	
1	Nebraska Public Power District	Jamison Cawley	Affirmative	
1	New York Power Authority	Bruce Metruck	Affirmative	
1	Northeast Missouri Electric Power Cooperative	Kevin White	Affirmative	
1	Northeast Utilities	William Temple		
1	Northern Indiana Public Service Co.	Julaine Dyke	Affirmative	
1	Oklahoma Gas and Electric Co.	Terri Pyle	Affirmative	
1	Omaha Public Power District	Doug Peterchuck	Affirmative	
1	Oncor Electric Delivery	Jen Fiegel		
1	Otter Tail Power Company	Daryl Hanson		
1	Pacific Gas and Electric Company	Bangalore Vijayraghavan		
1	Platte River Power Authority	John C. Collins	Affirmative	
1	Portland General Electric Co.	John T Walker	Affirmative	
1	Potomac Electric Power Co.	David Thorne	Affirmative	
1	PPL Electric Utilities Corp.	Brenda L Truhe	Abstain	
1	Public Service Company of New Mexico	Laurie Williams		
1	Public Service Electric and Gas Co.	Kenneth D. Brown	Affirmative	
1	Public Utility District No. 1 of Okanogan County	Dale Dunckel		
1	Puget Sound Energy, Inc.	Denise M Lietz	Affirmative	
1	Rochester Gas and Electric Corp.	John C. Allen	Affirmative	
1	Sacramento Municipal Utility District	Tim Kelley	Affirmative	
1	Seattle City Light	Pawel Krupa	Affirmative	
1	Seminole Electric Cooperative, Inc.	Glenn Spurlock	Affirmative	
1	Sho-Me Power Electric Cooperative	Denise Stevens	Affirmative	
1	Snohomish County PUD No. 1	Long T Duong	Affirmative	
1	South Carolina Electric & Gas Co.	Tom Hanzlik	Affirmative	
1	South Carolina Public Service Authority	Shawn T Abrams	Abstain	
1	South Texas Electric Cooperative	Renee Davidson		
1	Southern California Edison Company	Steven Mavis	Affirmative	
1	Southern Company Services, Inc.	Robert A. Schaffeld	Affirmative	
1	Southern Illinois Power Coop.	William Hutchison	Negative	SUPPORTS THIRD PARTY COMMENTS
1	Southern Indiana Gas and Electric Co.	Lynnae Wilson	Affirmative	
1	Southwest Transmission Cooperative, Inc.	John Shaver	Negative	
1	Sunflower Electric Power Corporation	Noman Lee Williams	Negative	SUPPORTS THIRD PARTY COMMENTS
1	Tacoma Power	John Merrell	Negative	
1	Tennessee Valley Authority	Howell D Scott	Affirmative	
1	Tri-State Generation & Transmission Association, Inc.	Tracy Sliman	Affirmative	
1	U.S. Bureau of Reclamation	Richard T Jackson		
1	United Illuminating Co.	Jonathan Appelbaum	Affirmative	
1	Westar Energy	Allen Klassen	Affirmative	
1	Western Area Power Administration	Steven Johnson		
1	Wolverine Power Supply Coop., Inc.	Michelle Clements		
1	Xcel Energy, Inc.	Gregory L Pieper	Negative	SUPPORTS THIRD PARTY COMMENTS
2	BC Hydro	Venkataramakrishnan Vinnakota		



2	California ISO	Rich Vine	Affirmative	
2	Electric Reliability Council of Texas, Inc.	Cheryl Moseley	Affirmative	
2	Independent Electricity System Operator	Leonard Kula	Affirmative	
2	ISO New England, Inc.	Matthew F Goldberg	Negative	COMMENT RECEIVED
2	MISO	Marie Knox	Negative	
2	New York Independent System Operator	Gregory Campoli	Negative	SUPPORTS THIRD PARTY COMMENTS
2	PJM Interconnection, L.L.C.	stephanie monzon	Affirmative	
2	Southwest Power Pool, Inc.	Charles H. Yeung	Negative	COMMENT RECEIVED
3	AEP	Michael E Deloach	Negative	SUPPORTS THIRD PARTY COMMENTS
3	Alabama Power Company	Robert S Moore	Affirmative	
3	Ameren Corp.	David J Jendras	Negative	COMMENT RECEIVED
3	APS	Sarah Kist	Affirmative	
3	Associated Electric Cooperative, Inc.	Todd Bennett	Affirmative	
3	Atlantic City Electric Company	NICOLE BUCKMAN	Affirmative	
3	Avista Corp.	Scott J Kinney	Abstain	
3	Basin Electric Power Cooperative	Jeremy Voll	Affirmative	
3	BC Hydro and Power Authority	Pat G. Harrington	Abstain	
3	Beaches Energy Services	Steven Lancaster	Affirmative	
3	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
3	Central Electric Power Cooperative	Adam M Weber	Affirmative	
3	Central Lincoln PUD	Steve Alexanderson	Affirmative	
3	City of Anaheim Public Utilities Department	Dennis M Schmidt		
3	City of Austin dba Austin Energy	Andrew Gallo	Affirmative	
3	City of Bartow, Florida	Matt Culverhouse	Affirmative	
3	City of Clewiston	Lynne Mila	Affirmative	
3	City of Farmington	Linda R Jacobson	Abstain	
3	City of Garland	Ronnie C Hoeinghaus	Abstain	
3	City of Green Cove Springs	Mark Schultz	Affirmative	
3	City of Homestead	Orestes J Garcia	Affirmative	
3	City of Leesburg	Chris Adkins	Affirmative	
3	City of Redding	Bill Hughes	Affirmative	
3	City of Tallahassee	Bill R Fowler	Negative	COMMENT RECEIVED
3	Colorado Springs Utilities	Jean Mueller	Affirmative	
3	ComEd	John Bee	Affirmative	
3	Consolidated Edison Co. of New York	Peter T Yost	Affirmative	
3	Cowlitz County PUD	Russell A Noble	Negative	
3	CPS Energy	Jose Escamilla		
3	Delmarva Power & Light Co.	Michael R. Mayer	Affirmative	
3	Dominion Resources, Inc.	Connie B Lowe	Affirmative	
3	DTE Electric	Kent Kujala	Affirmative	
3	FirstEnergy Corp.	Richard S Hoag	Affirmative	
3	Florida Keys Electric Cooperative	Tom B Anthony	Affirmative	
3	Florida Municipal Power Agency	Joe McKinney	Affirmative	
3	Florida Power & Light Co.	Summer C. Esquerre		
3	Florida Power Corporation	Lee Schuster	Affirmative	
3	Fort Pierce Utilities Authority	Thomas Parker		
3	Gainesville Regional Utilities	Kenneth Simmons	Affirmative	
3	Great River Energy	Brian Glover	Affirmative	
3	Hydro One Networks, Inc.	Ayesha Sabouba	Affirmative	
3	JEA	Garry Baker		
3	KAMO Electric Cooperative	Theodore J Hilmes		
3	Kansas City Power & Light Co.	Joshua D Bach	Affirmative	
3	Kissimmee Utility Authority	Gregory D Woessner		
3	Lakeland Electric	Mace D Hunter	Affirmative	
3	Lincoln Electric System	Jason Fortik	Abstain	
3	Los Angeles Department of Water & Power	Mike Anctil	Affirmative	
3	Louisville Gas and Electric Co.	Charles A. Freibert	Abstain	
3	M & A Electric Power Cooperative	Stephen D Pogue	Affirmative	
3	Modesto Irrigation District	Jack W Savage	Affirmative	

3	Muscatine Power & Water	Jenn Stover	Affirmative	
3	National Grid USA	Brian E Shanahan	Affirmative	
3	Nebraska Public Power District	Tony Eddleman	Affirmative	
3	New York Power Authority	David R Rivera	Affirmative	
3	Northeast Missouri Electric Power Cooperative	Skyler Wiegmann	Affirmative	
3	Northern Indiana Public Service Co.	Ramon J Barany	Affirmative	
3	NW Electric Power Cooperative, Inc.	David McDowell	Affirmative	
3	Ocala Utility Services	Randy Hahn	Affirmative	
3	Oklahoma Gas and Electric Co.	Donald Hargrove	Affirmative	
3	Omaha Public Power District	Blaine R. Dinwiddie	Affirmative	
3	Orlando Utilities Commission	Ballard K Mutters	Affirmative	
3	Owensboro Municipal Utilities	Thomas T Lyons	Affirmative	
3	Pacific Gas and Electric Company	John H Hagen	Affirmative	
3	Platte River Power Authority	Terry L Baker	Affirmative	
3	PNM Resources	Michael Mertz		
3	Portland General Electric Co.	Thomas G Ward	Affirmative	
3	Potomac Electric Power Co.	Mark Yerger	Affirmative	
3	Public Service Electric and Gas Co.	Jeffrey Mueller	Affirmative	
3	Puget Sound Energy, Inc.	Andrea Basinski	Affirmative	
3	Sacramento Municipal Utility District	James Leigh-Kendall	Affirmative	
3	Salt River Project	John T. Underhill	Affirmative	
3	Santee Cooper	James M Poston	Abstain	
3	Seattle City Light	Dana Wheelock	Affirmative	
3	Seminole Electric Cooperative, Inc.	James R Frauen	Affirmative	
3	Sho-Me Power Electric Cooperative	Jeff L Neas	Affirmative	
3	Snohomish County PUD No. 1	Mark Oens	Affirmative	
3	South Carolina Electric & Gas Co.	Hubert C Young	Affirmative	
3	Southern California Edison Company	Lujuanna Medina	Affirmative	
3	Tacoma Power	Marc Donaldson	Negative	
3	Tennessee Valley Authority	Ian S Grant	Affirmative	
3	Tri-State Generation & Transmission Association, Inc.	Janelle Marriott	Affirmative	
3	Westar Energy	Bo Jones	Affirmative	
3	Wisconsin Electric Power Marketing	James R Keller	Affirmative	
3	Xcel Energy, Inc.	Michael Ibold	Negative	
4	Alliant Energy Corp. Services, Inc.	Kenneth Goldsmith	Affirmative	
4	Blue Ridge Power Agency	Duane S Dahlquist	Negative	SUPPORTS THIRD PARTY COMMENTS
4	Central Lincoln PUD	Shamus J Gamache	Affirmative	
4	City of Austin dba Austin Energy	Reza Ebrahimian	Affirmative	
4	City of New Smyrna Beach Utilities Commission	Tim Beyrle	Affirmative	
4	City of Redding	Nicholas Zettel	Affirmative	
4	City Utilities of Springfield, Missouri	John Allen	Affirmative	
4	Consumers Energy Company	Tracy Goble	Affirmative	
4	Cowlitz County PUD	Rick Syring	Negative	
4	DTE Electric	Daniel Herring	Affirmative	
4	Flathead Electric Cooperative	Russ Schneider	Negative	
4	Florida Municipal Power Agency	Carol Chinn	Affirmative	
4	Georgia System Operations Corporation	Guy Andrews	Affirmative	
4	Herb Schrayshuen	Herb Schrayshuen	Affirmative	
4	Illinois Municipal Electric Agency	Bob C. Thomas	Affirmative	
4	Integrus Energy Group, Inc.	Christopher Plante		
4	Keys Energy Services	Stan T Rzad	Affirmative	
4	Madison Gas and Electric Co.	Joseph DePoorter	Affirmative	
4	Ohio Edison Company	Douglas Hohlbaugh	Affirmative	
4	Oklahoma Municipal Power Authority	Ashley Stringer	Affirmative	
4	Public Utility District No. 1 of Snohomish County	John D Martinsen	Affirmative	
4	Sacramento Municipal Utility District	Mike Ramirez	Affirmative	
4	Seattle City Light	Hao Li	Affirmative	
4	Seminole Electric Cooperative, Inc.	Steven R Wallace	Affirmative	
4	South Mississippi Electric Power Association	Steve McElhaney		
4	Tacoma Public Utilities	Keith Morisette	Negative	
4	Utility Services, Inc.	Brian Evans-Mongeon	Affirmative	
4	Wisconsin Energy Corp.	Anthony P Jankowski	Affirmative	

5	Amerenue	Sam Dwyer	Negative	SUPPORTS THIRD PARTY COMMENTS
5	American Electric Power	Thomas Foltz	Negative	COMMENT RECEIVED
5	Arizona Public Service Co.	Scott Takinen	Affirmative	
5	Associated Electric Cooperative, Inc.	Matthew Pacobit	Affirmative	
5	Avista Corp.	Steve Wenke		
5	Basin Electric Power Cooperative	Mike Kraft	Affirmative	
5	BC Hydro and Power Authority	Clement Ma	Abstain	
5	Boise-Kuna Irrigation District/dba Lucky peak power plant project	Mike D Kukla	Affirmative	
5	Bonneville Power Administration	Francis J. Halpin	Affirmative	
5	Brazos Electric Power Cooperative, Inc.	Shari Heino	Negative	SUPPORTS THIRD PARTY COMMENTS
5	Calpine Corporation	Hamid Zakery	Affirmative	
5	Choctaw Generation Limited Partnership, LLLP	Rob Watson		
5	City and County of San Francisco	Daniel Mason	Affirmative	
5	City of Austin dba Austin Energy	Jeanie Doty	Affirmative	
5	City of Redding	Paul A. Cummings	Affirmative	
5	City of Tallahassee	Karen Webb	Negative	
5	Colorado Springs Utilities	Kaleb Brimhall	Affirmative	
5	Con Edison Company of New York	Brian O'Boyle	Affirmative	
5	Consumers Energy Company	David C Greyerbiehl	Affirmative	
5	Cowlitz County PUD	Bob Essex	Negative	
5	Dominion Resources, Inc.	Mike Garton	Affirmative	
5	DTE Electric	Mark Stefaniak	Affirmative	
5	Duke Energy	Dale Q Goodwine	Affirmative	
5	Dynegy Inc.	Dan Roethemeyer	Abstain	
5	Electric Power Supply Association	John R Cashin		
5	Entergy Services, Inc.	Tracey Stubbs		
5	Exelon Nuclear	Mark F Draper	Affirmative	
5	First Wind	John Robertson	Affirmative	
5	FirstEnergy Solutions	Kenneth Dresner	Affirmative	
5	Florida Municipal Power Agency	David Schumann	Affirmative	
5	Great River Energy	Preston L Walsh	Affirmative	
5	Hydro-Québec Production	Roger Dufresne	Abstain	
5	Independence Power & Light Dept.	James Nail	Affirmative	
5	JEA	John J Babik	Affirmative	
5	Kansas City Power & Light Co.	Brett Holland	Affirmative	
5	Kissimmee Utility Authority	Mike Blough	Affirmative	
5	Lakeland Electric	James M Howard	Negative	SUPPORTS THIRD PARTY COMMENTS
5	Lincoln Electric System	Dennis Florom	Abstain	
5	Los Angeles Department of Water & Power	Kenneth Silver		
5	Lower Colorado River Authority	Dixie Wells	Affirmative	
5	Massachusetts Municipal Wholesale Electric Company	David Gordon	Abstain	
5	Muscatine Power & Water	Mike Avesing		
5	Nebraska Public Power District	Don Schmit	Affirmative	
5	New York Power Authority	Wayne Sipperly	Affirmative	
5	NextEra Energy	Allen D Schriver	Affirmative	
5	North Carolina Electric Membership Corp.	Jeffrey S Brame	Negative	SUPPORTS THIRD PARTY COMMENTS
5	Northern Indiana Public Service Co.	Michael D Melvin	Affirmative	
5	Oglethorpe Power Corporation	Bernard Johnson	Affirmative	
5	Oklahoma Gas and Electric Co.	Henry L Staples	Affirmative	
5	Omaha Public Power District	Mahmood Z. Safi	Affirmative	
5	Pacific Gas and Electric Company	Alex Chua	Affirmative	
5	Platte River Power Authority	Christopher R Wood	Affirmative	
5	Portland General Electric Co.	Matt E. Jastram	Affirmative	
5	PPL Generation LLC	Annette M Bannon	Abstain	
5	PSEG Fossil LLC	Tim Kucey	Affirmative	

5	Public Utility District No. 2 of Grant County, Washington	Michiko Sell		
5	Puget Sound Energy, Inc.	Lynda Kupfer	Affirmative	
5	Sacramento Municipal Utility District	Susan Gill-Zobitz	Affirmative	
5	Salt River Project	William Alkema	Affirmative	
5	Santee Cooper	Lewis P Pierce	Abstain	
5	Seattle City Light	Michael J. Haynes	Affirmative	
5	Seminole Electric Cooperative, Inc.	Brenda K. Atkins	Affirmative	
5	Snohomish County PUD No. 1	Sam Nietfeld	Affirmative	
5	South Carolina Electric & Gas Co.	Edward Magic	Affirmative	
5	Southern California Edison Company	joseph mccawley	Affirmative	
5	Southern Company Generation	William D Shultz	Affirmative	
5	Southern Indiana Gas and Electric Co.	Rob Collins	Affirmative	
5	Tacoma Power	Chris Mattson	Negative	
5	Tampa Electric Co.	RJames Rocha	Affirmative	
5	Tennessee Valley Authority	Brandy B Spraker	Affirmative	
5	Tri-State Generation & Transmission Association, Inc.	Mark Stein		
5	Westar Energy	Bryan Taggart	Affirmative	
5	Wisconsin Electric Power Co.	Linda Horn	Affirmative	
5	Wisconsin Public Service Corp.	Scott E Johnson		
5	Xcel Energy, Inc.	Mark A Castagneri	Negative	COMMENT RECEIVED
6	AEP Marketing	Edward P. Cox	Negative	SUPPORTS THIRD PARTY COMMENTS
6	Ameren Missouri	Robert Quinlivan	Negative	SUPPORTS THIRD PARTY COMMENTS
6	APS	Randy A. Young	Affirmative	
6	Associated Electric Cooperative, Inc.	Brian Ackermann	Affirmative	
6	Bonneville Power Administration	Brenda S. Anderson	Affirmative	
6	City of Austin dba Austin Energy	Lisa Martin	Affirmative	
6	City of Redding	Marvin Briggs	Affirmative	
6	Cleco Power LLC	Robert Hirchak	Affirmative	
6	Colorado Springs Utilities	Shannon Fair	Affirmative	
6	Con Edison Company of New York	David Balban	Affirmative	
6	Constellation Energy Commodities Group	David J Carlson	Affirmative	
6	Dominion Resources, Inc.	Louis S. Slade	Affirmative	
6	Duke Energy	Greg Cecil	Affirmative	
6	FirstEnergy Solutions	Kevin Querry	Affirmative	
6	Florida Municipal Power Agency	Richard L. Montgomery	Affirmative	
6	Florida Municipal Power Pool	Thomas Reedy	Affirmative	
6	Florida Power & Light Co.	Silvia P Mitchell	Affirmative	
6	Kansas City Power & Light Co.	Jessica L Klinghoffer	Affirmative	
6	Lakeland Electric	Paul Shipps	Negative	SUPPORTS THIRD PARTY COMMENTS
6	Lincoln Electric System	Eric Ruskamp	Abstain	
6	Los Angeles Department of Water & Power	Brad Packer	Affirmative	
6	Lower Colorado River Authority	Michael Shaw	Affirmative	
6	Luminant Energy	Brenda Hampton		
6	Muscatine Power & Water	John Stolley		
6	New York Power Authority	Shivaz Chopra	Affirmative	
6	New York State Electric & Gas Corp.	Julie S King	Affirmative	
6	Northern Indiana Public Service Co.	Joseph O'Brien	Affirmative	
6	Oglethorpe Power Corporation	Donna Johnson	Affirmative	
6	Oklahoma Gas and Electric Co.	Jerry Nottmangel	Affirmative	
6	Omaha Public Power District	Douglas Collins	Affirmative	
6	PacifiCorp	Sandra L Shaffer	Affirmative	
6	Platte River Power Authority	Carol Ballantine	Affirmative	
6	Portland General Electric Co.	Shawn P Davis	Affirmative	
6	Power Generation Services, Inc.	Stephen C Knapp	Affirmative	
6	Powerex Corp.	Gordon Dobson-Mack		
6	PPL EnergyPlus LLC	Elizabeth Davis	Abstain	
6	PSEG Energy Resources & Trade LLC	Peter Dolan	Affirmative	

6	Sacramento Municipal Utility District	Diane Enderby	Affirmative	
6	Salt River Project	William Abraham	Affirmative	
6	Santee Cooper	Michael Brown	Abstain	
6	Seattle City Light	Dennis Sismaet	Affirmative	
6	Seminole Electric Cooperative, Inc.	Trudy S. Novak	Affirmative	
6	Snohomish County PUD No. 1	Kenn Backholm	Affirmative	
6	South Carolina Electric & Gas Co.	Matt H Bullard		
6	Southern California Edison Company	Joseph T Marone	Affirmative	
6	Southern Company Generation and Energy Marketing	John J. Ciza	Affirmative	
6	Southern Indiana Gas and Electric Co.	Brad Lisembee	Affirmative	
6	Tacoma Public Utilities	Michael C Hill	Negative	
6	Tampa Electric Co.	Benjamin F Smith II		
6	Tennessee Valley Authority	Marjorie S. Parsons	Affirmative	
6	Westar Energy	Grant L Wilkerson	Affirmative	
6	Western Area Power Administration - UGP Marketing	Mark Messerli	Affirmative	
6	Wisconsin Public Service Corp.	David Hathaway		
6	Xcel Energy, Inc.	Peter Colussy	Negative	COMMENT RECEIVED
8		Roger C Zaklukiewicz	Affirmative	
8		David L Kiguel	Negative	COMMENT RECEIVED
8	Massachusetts Attorney General	Frederick R Plett	Affirmative	
8	Volkman Consulting, Inc.	Terry Volkman	Affirmative	
9	Central Lincoln PUD	Bruce Lovelin	Affirmative	
9	City of Vero Beach	Ginny Beigel	Affirmative	
9	Commonwealth of Massachusetts Department of Public Utilities	Donald Nelson	Affirmative	
9	New York State Public Service Commission	Diane J Barney		
10	Florida Reliability Coordinating Council	Linda C Campbell	Affirmative	
10	Midwest Reliability Organization	Russel Mountjoy	Affirmative	
10	New York State Reliability Council	Alan Adamson	Affirmative	
10	Northeast Power Coordinating Council	Guy V. Zito	Affirmative	
10	ReliabilityFirst	Anthony E Jablonski	Affirmative	
10	SERC Reliability Corporation	Joseph W Spencer	Affirmative	
10	Texas Reliability Entity, Inc.	Karin Schweitzer	Negative	COMMENT RECEIVED
10	Western Electricity Coordinating Council	Steven L. Rueckert	Affirmative	

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**Exhibit H**

**Standard Drafting Team Roster**

## Team Roster

### Project 2008-02 Underfrequency Load Shedding (UFLS)

	Participant	Contact Information
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