

A. Introduction

1. **Title:** Automatic Underfrequency Load Shedding Program
2. **Number:** PRC-006-MRO-01
3. **Purpose:** The purpose of this standard is to develop, coordinate, and document an Underfrequency Load Shedding (UFLS) program to meet the characteristics as outlined in the NERC UFLS Regional Reliability Standard Characteristics document.
4. **Applicability:**
 - 4.1. Distribution Provider
 - 4.2. Transmission Owners
 - 4.3. Load Serving Entity (all LSE's regardless of size)
 - 4.4. Generator Owner (all generators with an individual nameplate rating or plants, including Wind Generating Stations, with an aggregate nameplate rating of [SERC: 50 MVA] 20 MVA or greater, connected at [SERC: 100 kV] 69kV or above)
 - 4.4.4.5. [SERC: Transmission Planner]
 - 4.5.4.6. Planning Coordinator
5. **(Proposed) Effective Date:**

1st day of the 1st quarter following MRO Board Approval compliance monitoring will begin.

1st day of the 1st quarter following Regulatory Approval, financial sanctions will become effective.

B. Requirements

- R1.** [SERC: Each Transmission Planner in the SERC footprint shall determine appropriate islands to study as a design basis for UFLS. These islands shall be chosen from system studies, actual system operations, or other islands as deemed appropriate. Islands identified to form a design basis for UFLS shall include at least the following two islands:
 - R1.1.** A single island that includes all the of SERC footprint to verify that all SERC UFLS schemes meet the performance requirements when acting together.
 - R1.2.** A single island for each SERC Sub-region to verify that all UFLS schemes within the each sub-region meet the performance requirements when acting together.
- R1.** Load Serving Entities shall furnish data in a pre-arranged format to their Distribution Providers and Transmission Owners with end-use Load connected to their Facilities in the MRO footprint as requested (within 45 days of request). These data shall include *[Violation Risk Factor: Medium] [Time Horizon:]*
 - R1.1.** The Load Serving Entities' forecasted Load magnitude and location for its next annual peak.

Comment [LLE1]: Meets NERC Characteristic 2 and 3.

- R1.2. Load characteristics necessary to set the UFLS relays per R2.6 in the pre-arranged format requested by the Distribution Providers and Transmission Owners with end-use Load connected to their Facilities (where applicable) (e.g. large motor Loads, etc.).
- R1.3. Distributed generation characteristics necessary to set the UFLS relays per R2.6 in the pre-arranged format requested by the Distribution Providers and Transmission Owners with end-use Load connected to their Facilities (where applicable).

R2. [SERC: Each Transmission Planner in the SERC footprint shall design an automatic UFLS scheme that meets the following minimum requirements:]

Each Distribution Provider and Transmission Owner with end-use Load connected to their Facilities in the MRO footprint shall implement an automatic UFLS program for their Facilities or shall participate with one or more Distribution Providers and Transmission Owners with end-use Load connected to their Facilities to collectively implement by mutual agreement a single UFLS program. The automatic UFLS program shall include the following requirements: *[Violation Risk Factor: High] [Time Horizon:]*

R2.1. Have the capability of shedding at least [SERC: 30] [MRO: 30] 25 percent of connected Load determined from the forecasted annual peak hour.

Comment [LLE2]: This will represent the MRO UFLS Program Report and Recommendations document.

~~R2.1.~~ **R2.2.** Shed Load ~~in~~ with a minimum of three ~~steps~~ frequency step points.

~~R2.1.1.~~ **R2.2.1.** If a Distribution Provider or Transmission Owner with end-use Load connected to their Facilities cannot comply with these sub-requirements for its Facilities due to a limited number of feeders or without reconfiguring their feeders, and have not aggregated their Load with other Distribution Providers or Transmission Owners to implement a collective UFLS program, that Distribution Provider or Transmission Owner respectively shall still implement a UFLS program but shall be exempt from R2.2.

~~R2.2.~~ **R2.3.** Size each step equally (the variance between steps shall be no more than two percent of forecasted annual peak hour Load) (additional Load shedding required per R4 or R5 is excluded from this requirement).

~~R2.2.1.~~ **R2.3.1.** If a Distribution Provider or Transmission Owner with end-use Load connected to their Facilities cannot comply with these sub-requirements for its Facilities due to a limited number of feeders or without reconfiguring their feeders, and have not aggregated their Load with other Distribution Providers or Transmission Owners to implement a collective UFLS program, that Distribution Provider or Transmission Owner respectively shall still implement a UFLS program but shall be exempt from R2.3.

R2.4. The first [SERC: highest] set point [SERC: with time delay of less than one second] shall be no lower than 59.3 Hz and not higher than 59.5 Hz. The last [SERC: lowest frequency] set point shall be no lower than [SERC: 58.4] Hz

Comment [LLE3]: MRO study suggests 59.3 as first set point

Comment [LLE4]: MRO study suggest lowest set point of 58.4

58.5 Hz and not higher than 58.7 Hz (additional Load shedding required per R4 or R5 is excluded from this requirement).

Comment [LLE5]: Meets NERC Characteristic 4.1.
Not sure if NERC Characteristic 4.2 is covered. I don't see anything about frequency overshoot (Characteristics 4.3)

R2.5. The difference between frequency set points shall be at least 0.2 Hz but no greater than 0.5 Hz (additional Load shedding required per R4 or R5 is excluded from this requirement).

Comment [LLE6]: MRO study is also in agreement with this statement

R2.6. Intentional relay time delay shall be [SERC: at least 6 cycles.] no greater than ten cycles, with the following documented exceptions. The documentation shall consist of reports of misoperations or distributed generation issues or analysis of large motor Loads:

Comment [LLE7]: MRO study suggests using 6 cycle relay time

R2.2.2.R2.6.1. For installations where large motor Loads may be isolated, undercurrent supervision shall be used to avoid false operation during Fault isolation. If this is not available, planned total time delay may be increased to no greater than 29 cycles.

R2.6.2. For installations where distributed generation may be isolated, undercurrent supervision shall be used to avoid false operation during Fault isolation. If this is not available, planned total time delay may be increased to no greater than 29 cycles.

Block Number	% of Load	Frequency Set Point (Hz)	Relay Time (cy)*	Maximum Breaker Cycle (cy)
1	6	59.3	6	8
2	6	59.1	6	8
3	6	58.9	6	8
4	6	58.7	6	8
5	6	58.4	6	8

* 6 cycle minimum detection time recommended for relay security purposes to prevent false trips.

Comment [LLE8]: MRO Suggested Shedding blocks.

I do not suggest putting these exact specification into the standard. Guideline document?

R2.3.R2.7. Undervoltage inhibit (where applicable) shall be set as low as practical, but shall not be greater than 75 percent of nominal voltage.

R2.4.R2.8. Each Transmission Owner owning capacitor banks connected to the BES shall trip them as necessary to avoid excessive voltage during automatic UFLS events.

Comment [LLE9]: Could meet NERC characteristic 4.4 if more detail is given.

MRO Study suggests automatic measures such as capacitor tripping to maintain voltages.

R3. Each Planning Coordinator in coordination with the Distribution Providers and Transmission Owners with end-use Load connected to their Facilities in the MRO footprint, shall have a documented methodology to determine areas (or sub areas) of credible islanding. The methodology shall address at least the following to identify areas (or sub areas) of credible islanding [*Violation Risk Factor: Lower*] [*Time Horizon:*]

- Historical islanding scenarios
- Areas with a limited number of connecting lines
- System Operating Limit interfaces which define importing areas
- A process to involve stakeholders in the analysis and results

~~R2.5.~~**R3.1.** Each Planning Coordinator shall make its credible island determination methodology available for inspection and technical review by those entities directly and materially affected by the reliability of MRO Bulk Electric System (BES), within 15 business days of the receipt of a request.

~~R2.6.~~**R3.2.** If entities directly and materially affected by the reliability of MRO BES provide written comments on the credible island determination methodology, the Planning Coordinator shall provide a written response to that commenting entity within 45 calendar days of receipt of those comments. The response shall indicate whether a change will be made to the credible island determination methodology and, if no change will be made, the reason why.

~~R2.7.~~**R3.3.** The Planning Coordinator shall use this methodology at least every five years to determine areas (or sub areas) of credible islanding within their area of responsibility.

R3.4. The Planning Coordinator shall supply the results of the determination (within 30 days of completion of the process) to the Distribution Providers, Transmission Owners with end-use Load connected to their Facilities and Generator Owners in the MRO footprint of identified areas (or sub areas) of credible islanding.

R3. The Transmission Planner shall design his UFLS scheme to meet performance requirements R3.1 through R3.4 for each identified island (if any) in his footprint. The Transmission Planner shall design his UFLS scheme such that when taken together with all of the other UFLS schemes in the Region, the composite will meet performance requirements R3.1 through R3.4 for the Region considered as an island. The Transmission Planner shall design his UFLS scheme such that when taken together with all of the other UFLS schemes in his Subregion, the composite will meet performance requirements R3.1 through R3.4 for the Subregion considered as an island. These performance requirements shall be satisfied for underfrequency conditions resulting from an imbalance between load and generation of 25 percent for all design basis islands (generation equals 75% of load). [Violation Risk Factor: High]

R3.1. Frequency decline shall be arrested at no less than 58.0 Hz.

R3.2. Frequency shall not remain below 58.5 Hz for greater than 10 seconds, cumulatively, and shall not remain below 59.5 Hz for greater than 30 seconds, cumulatively. [Note: the SERC UFLS Standard Drafting Team requested these criteria be changed by NERC]

R3.3. Frequency overshoot resulting from operation of UFLS relays shall not exceed 61.0 Hz for any duration and shall not exceed 60.5 Hz for greater than 30 seconds, cumulatively. [Note: we are requesting these criteria be changed by NERC]

R3.4. Bulk Electric System voltage during and following UFLS operations shall be controlled such that the per unit Volts per Hz (V/Hz) will not exceed 1.18 for longer than 2 seconds, cumulatively, and will not exceed 1.10 for longer than 45 seconds, cumulatively. [Note: we are requesting these criteria be changed by NERC]

R3.R4. Distribution Providers, Transmission Owners with end-use Load connected to their Facilities and Generator Owners in identified areas (or sub areas) of credible islanding (as determined in R3) shall participate in the appropriate engineering assessment that specifically address generation/Load imbalances in the area of credible islanding [*Violation Risk Factor: Lower*] [*Time Horizon: J*].

R3.1.R4.1. Distribution Providers and Transmission Owners with end-use Load connected to their Facilities shall utilize one or both of the following:

R3.1.1.R4.1.1. Install UFLS capability in the island area so as to cover potential generation/Load imbalances (the amount of Load to be shed in the island area and the corresponding Load shedding step sizes, relay trip and time delay settings shall be determined by appropriate engineering assessments that specifically address the islanding scenario).

R3.1.1.1.R4.1.1.1. Identified areas (or sub areas) of credible islanding with a forecasted annual peak Load of 1000 MW or less shall be exempt from any additional UFLS requirements.

R3.1.1.2.R4.1.1.2. Distribution Providers and Transmission Owners with end-use Load connected to their Facilities in the MRO footprint are not required to install UFLS greater than 50 percent of the forecasted annual peak Load in the identified areas (or sub areas) of credible islanding. If more than 50 percent UFLS is indicated then only the requirements in R2 apply.

R3.1.1.3.R4.1.1.3. Upon determination of a new credible island which requires mitigation as required in R4.1.1, the Distribution Providers and Transmission Owners with end-use Load connected to their Facilities shall have two years to comply with R4.1.1.

R3.1.2.R4.1.2. Apply other methods of balancing Load and resources.

R3.1.2.1.R4.1.2.1. Identified areas (or sub areas) of credible islanding with a forecasted annual peak Load of 1000 MW or less shall be exempt from any additional other methods of balancing Load and resources requirements.

R3.1.2.2.R4.1.2.2. Upon determination of a new credible island which requires mitigation as required in R4.1.2, the Distribution Providers and Transmission Owners with end-use Load connected to their Facilities shall have two years to comply with R4.1.2.

R4.2. Generator Owners in the MRO footprint in identified areas (or sub areas) of credible islanding (as determined in R3) shall participate in the appropriate engineering assessments by the Planning Coordinator to possibly optimize unit

trip setting changes to enhance the coordination within the potential area of credible islanding.

R4. [SERC] All Transmission Planners within the SERC footprint are responsible for assessing the effectiveness of the design of their UFLS schemes. [Violation Risk Factor: High]

Comment [LLE10]: Similar to RFC R9?

R4.1. [SERC] Transmission Planners shall verify UFLS schemes are coordinated by performing dynamic simulations that demonstrate the performance requirements of R3 are met.

R4.2. If the aggregation of the subregion's UFLS schemes fails to meet all the requirements in R3:

R4.2.1. An individual Transmission Planner in that subregion can demonstrate that its UFLS scheme meets the requirements of R3 by performing dynamic simulations that apply its UFLS scheme on its individual system or on the entire subregion and all identified islands in which it would be required to operate.

R4.2.2. If the footprint of a UFLS scheme has peak system load that is less than 3% of SERC's has peak system load, then the Transmission Planner will be compliant to this standard if it's UFLS scheme meets the requirements in items R3.1 and R3.2 when the scheme is applied alone to the subregion.

Comment [LLE11]: I do not believe this requirement was proof read.

R4.3. Transmission Planners shall conduct a UFLS assessment at least once every five years.

R4.3.1. {shall specify any conditions under which the Transmission Planner conduct the assessment at more frequency intervals}
- if new islands are identified [by experience]
- material changes to the scheme
- material changes to the specified islands

R4.4. Transmission Planners shall provide the assessment results to SERC or NERC within 30 calendar days of a request

R5. [SERC] Each Transmission Owner in the SERC footprint shall coordinate with all Distribution Providers and Load Serving entities serving the connected load to implement the automatic UFLS scheme developed by the Transmission Planner responsible for their system. Transmission Owners may participate with other Transmission Owners to implement the UFLS scheme developed by the Transmission Planner responsible for their collective systems.

R5. If automatic underfrequency protection is installed, each Generator Owner’s unit shall not trip faster than the minimum tripping time delays in the following table: *[Violation Risk Factor: High] [Time Horizon:]*

Comment [LLE12]: Meets NERC characteristic 5 and 6.
Comment [LLE13]: SERC isn't sure they are going to add this requirement.

Table 1

<u>Frequency (Hz)</u>	<u>Minimum Time Delay (Sec)</u>
≥ 59.5	Automatic Frequency Dependent Tripping Not Permitted
≤59.2 to > 58.5	2,700.0
<59.5 to > 59.2	120.0
≤58.5 to > 58.2	15.0
≤58.2	Owner’s Discretion

[MRO] Table 1

<u>Frequency (Hz)</u>	<u>Minimum Time Delay (Sec)</u>
≥ 59.5	Automatic Tripping Not Permitted
≤59.5 to > 59.3	2,700
<59.3 to > 59.0	300
<59.0 to > 58.4	80
<58.4 to > 58.0	30
<58.0 to > 57.6	7.5
≤58.2	0

R5.1. It is the sole responsibility of the Generator Owner to ensure that the time vs. frequency requirement listed in Table 1 is met. In those cases where a generator must be tripped for its own protection outside the specifications in the above Table 1, the Generator Owners may become compliant by arranging for Load shedding to be installed by mutual agreement, in addition to that required of Distribution Providers and Transmission Owners with end-use Load connected to their Facilities in R2.

R5.1.1. This additional Load shedding shall be equal to or greater than the generator MW dispatch, instituted at the same frequency and time as the generator would be expected to trip.

R5.1.2. If the generator is located within a credible island, arrangement for additional Load shedding shall be within the credible island.

R6. Distribution Providers, Generator Owners or Transmission Owners owning non-Fault clearing tie-tripping schemes, islanding schemes, automatic load-restoration schemes, additional Load shedding schemes or any other schemes that are part of or impact the UFLS programs shall document such schemes in sufficient detail to allow modeling for dynamics simulations *[Violation Risk Factor: Lower] [Time Horizon:]*.

Comment [LLE14]: Underfrequency Tie line separation is not part of the MRO program.
Comment [LLE15]: MRO study suggests not using automatic load restoration, but using manual load restoration once frequency is recovered to 60 Hz.

R7. Each Planning Coordinator shall establish and maintain an UFLS database in a pre-arranged format [*Violation Risk Factor: Lower*] [*Time Horizon:*].

Comment [LLE16]: Meets NERC characteristic 7, but need to specify that the PC shall provide data to MRO within 30 days of request.

R7.1. The database shall be updated every 5 years or as required by changes in system conditions.

R7.2. The database shall include the areas of credible islanding determined in R3.3.

R8. [SERC: Each Transmission Owner shall provide data for the SERC UFLS database. This data shall be provided within 30 calendar days of a request by the Region. The data will be requested by the Region at least one every five years.]

Comment [LLE17]: This requirement meets NERC characteristic 7 and 10.3.

Distribution Providers, Transmission Owners and Generator Owners required to comply with the relevant sections of R2, R4, R5, or R6 shall populate the Planning Coordinator's UFLS database (within 45 days of request), in the pre-arranged format, as follows [*Violation Risk Factor: Lower*] [*Time Horizon:*]:

R8.1. [SERC: Each Distribution Provider and Load Serving Entity in the UFLS program shall provide UFLS data to their Transmission Owner within 30 calendar days of a request by the Transmission Owner. The data to be provided by each applicable entity (Transmission Owner, Distribution Provider, Load Serving Entity) shall be in the format shown in Attachment I.]

Comment [LLE18]: SERC notes that this is their current "Portal Form" and I could not find this form to see what information was on it. Also, this sentence is listed as a separate sub-requirement.

Distribution Providers and Transmission Owners shall supply the following applicable information as implemented:

Comment [LLE19]: Meets NERC characteristic

R8.1.1. Frequency trip points.

R8.1.2. Percent of forecasted peak hour Load dropped at each Trip Point.

R8.1.3. Relay operating time delay, intentional and unintentional.

R8.1.4. Circuit breaker operating time.

R8.1.5. UFLS relay undervoltage inhibit voltage level.

R8.1.6. Information describing any other schemes that are part of or impact the UFLS program.

R8.1.7. Any underfrequency trip set points, overvoltage trip set points and time delays of capacitor banks connected to the BES tripping.

R8.2. [SERC: Generator Owners shall supply Underfrequency trip set points and time delays for generating units within 30 calendar days of a request by the Transmission Owner.]

Generator Owners shall supply the following information as implemented:

R8.2.1. Underfrequency trip set points and time delays of generating units.

R8.2.2. Information describing any other schemes that are part of or impact the UFLS program.

R9. All Planning Coordinators within MRO shall perform a joint assessment of the effectiveness of the design and implementation of the UFLS programs within MRO. This assessment shall include effects of neighboring areas. This assessment shall be conducted periodically (at least every five years or as required by changes in system

Comment [LLE20]: Meets NERC Characteristic 10. Missing the requirement to have Planning Coordinator or Transmission Planner provide data to MRO and NERC within 30 days of request.

Comment [LLE21]: Meets NERC Characteristic 10.2

conditions) and shall include, but not be limited to *[Violation Risk Factor: Lower]*
[Time Horizon:]:

- R9.1.** A review of the current frequency set points and timing.
- R9.2.** **Dynamic** simulation of possible Disturbances that cause the Planning Coordinators' systems or portions of the Planning Coordinators' systems to experience significant imbalance between Load and generation.
- R9.3.** Determination of the need to install underfrequency tripping of bulk power capacitor banks to avoid excessive voltage during automatic UFLS.

Comment [LLE22]: Meets NERC Characteristic 10.1

R10. **Coordination** of UFLS programs **[SERC: with external entities]** shall be accomplished by the following requirements *[Violation Risk Factor: Lower]: [Time Horizon:]*

Comment [LLE23]: SERC Notes: Thought of SERC being required to perform studies with neighbor's UFLS settings or reviewing results from reports done for adjacent regions, but what could we do if such a study failed performance requirements or showed another type of lack of coordination? SERC could make recommendations that another region changes their settings, but we would have no authority to enforce the change to ensure that performance requirements are achieved.

- R10.1.** Planning Coordinators **[SERC: Transmission Planners]** shall provide the data in the database required in R8 **[SERC: and Assessment results required in SERC R4]** to neighboring **[SERC: entities responsible for UFLS assessment external to SERC.]** Planning Coordinators within MRO.
- R10.2.** Planning Coordinators shall provide the data in the database required in R8 and assessment results required in R9 to neighboring entities responsible for UFLS assessment external to MRO.
- R10.3.** Planning Coordinators **[SERC: Transmission Planners]** shall request UFLS data and assessment results from neighboring entities responsible for UFLS assessment external to MRO.

C. Measures

- M1.** The Load Serving Entity shall have documentation showing that the information requested in R1 was supplied to its Distribution Provider and Transmission Owner when requested within the time period specified.
- M2.** Every Distribution Provider and Transmission Owner in the MRO footprint shall have documentation showing they comply with all the requirements of R2.
- M3.** The Planning Coordinator shall have documentation detailing processes to assess areas of credible islanding giving consideration to the items listed in R3. The Planning Coordinator shall have evidence that an assessment to determine if credible islands exist was performed within the past 5 years. The Planning Coordinator shall have documentation that the results of the assessment were supplied to the applicable Distribution Providers, Transmission Owners with end-use Load connected to their Facilities and Generator Owners in the MRO footprint.
- M4.** Distribution Providers and Transmission Owners with end-use Load connected to their Facilities and Generator Owners in the MRO footprint in identified areas (or sub areas) of credible islanding (as determined in R3) shall have documentation of participation in the appropriate engineering assessment and documentation of installed UFLS capability as required in R4.
- M5.** The Generator Owner shall have documentation that it complies with the frequency protection settings of generators or has made arrangements for additional Load shedding, if appropriate, as required in R5.

- M6.** Distribution Providers, Generator Owners and Transmission Owners owning non-Fault clearing tie-tripping schemes, islanding schemes, automatic load-restoration schemes or any other schemes that are part of or impact the UFLS programs shall have documentation of these schemes as required in R6 and evidence that this documentation was provided to the Planning Coordinator.
- M7.** Planning Coordinator shall have evidence it established and maintained an UFLS database as required in R7.
- M8.** The respective Distribution Providers, Transmission Owners and Generator Owners shall have evidence that the information as required in R8 was supplied to the Planning Coordinator to populate the UFLS Database.
- M9.** The Planning Coordinator shall have evidence that the assessment of the design effectiveness and implementation of UFLS as required by R9 have been completed.
- M10.** The Planning Coordinator shall have evidence that the data in the database and relevant study results have been exchanged with neighboring Planning Coordinators as required by R10.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Midwest Reliability Organization

1.2. Compliance Monitoring Period and Reset Time Frame

On request (within 45 calendar days)

1.3. Data Retention

5 years

1.4. Compliance Monitoring and Assessment Processes

1.5. Additional Compliance Information

None

2. Violation Severity Levels

R #	LOWER	MODERATE	HIGH	SEVERE
R1		The Load Serving Entity did not send the information required in R1.2 and R1.3 to the Distribution Provider and Transmission Owner with directly connected end-use Load in the MRO footprint as requested		The Load Serving Entity did not send the information required in R1.1 to the Distribution Provider and Transmission Owner with directly connected end-use Load in the MRO footprint as requested

PRC-006-MRO-01 — Automatic Underfrequency Load Shedding Program

<p>R2</p>	<p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities total UFLS is less than 25% but greater than or equal to 23% of the connected Load at the forecasted annual peak hour as required in R2.1;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities intentional relay time delays are greater than 10 cycles, but less than or equal to 12 cycles, except as allowed by R2.6.1 or R2.6.2, as required in R2.6</p>	<p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities total UFLS is less than 23% but greater than or equal to 21% of the connected Load at the forecasted annual peak hour as required in R2.1;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities UFLS program steps are not equal to within 2% of the forecasted annual peak hour Load as required in R2.3;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities intentional relay time delays are greater than 12 cycles, but less than or equal to 14 cycles, except as allowed by R2.6.1 or R2.6.2, as required in R2.6</p>	<p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities total UFLS is less than 21% but greater than or equal to 18% of the annual forecasted peak hour Load, as required in R2.1;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities difference between frequency set points is less than 0.2 Hz or greater than 0.5 Hz, as required in R2.5;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities undervoltage inhibit (where applicable) is set greater than 75 % of nominal voltage, as required in R2.7;</p> <p>OR</p> <p>Transmission Owners capacitor banks connected to the BES are not tripped as specified in R2.8;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their</p>	<p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities total UFLS is less than 18% of the annual forecasted peak hour Load, as required in R2.1;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities UFLS program contains less than three steps as required in R2.2, except as allowed by R2.2.1;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities first set point of the UFLS program is less than 59.3 Hz, or the last set point is less than 58.5 Hz or greater than 58.7 Hz, as required in R2.4;</p> <p>OR</p> <p>The Distribution Provider and Transmission Owner with end-use Load connected to their Facilities intentional relay time delays are greater than 20 cycles, as required in R2.6, except as allowed by R2.6.1 or R2.6.2, as required in R2.6</p>
------------------	---	---	--	---

PRC-006-MRO-01 — Automatic Underfrequency Load Shedding Program

			Facilities intentional relay time delays are greater than 15 cycles, but less than or equal to 20 cycles, as required in R2.6	
R3	<p>The Planning Coordinator did not make its credible islanding determination methodology available within 15 business days of the receipt of a request, as required in R3.1;</p> <p>OR</p> <p>The Planning Coordinator did not respond to comments on its credible islanding determination methodology within 45 calendar days of receipt of a written comment, as required in R3.2</p>	<p>The Planning Coordinator performed the assessment required in R3 but did not report the results to the Distribution Provider and Transmission Owner with end-use Load connected to their Facilities and Generator Owner in the MRO footprint affected by the credible islanding, as required in R3.4;</p> <p>OR</p> <p>The Planning Coordinator did not perform the assessment within 5 years of the previous determination, as required in R3.3</p>	The Planning Coordinator in the MRO footprint failed to address one or more of the bullet point per R3 to identify areas (or sub areas) of credible islanding in the methodology	The Planning Coordinator did not perform the determination of credible islands as required in R3
R4			The Distribution Provider, Transmission Owner with end-use Load connected to their Facilities or Generator Owner in the MRO footprint did not participate in the appropriate engineering assessment that specifically address generation/Load imbalances in the area of credible islanding as required in R4	The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities did not document the installation of UFLS capability or application of other methods of balancing Load and resources as required in R4.1 or R4.2.
R5		Greater than 0% but less than or equal to 5% of a Generator Owner's total MWs is tripped by		Greater than 5% of a Generator Owner's total MWs is tripped by UF protection sooner than

PRC-006-MRO-01 — Automatic Underfrequency Load Shedding Program

		UF protection sooner than the minimum time delays required in the Table 1 in R5 without using the mitigation technique suggested in R5.1		the minimum time delays required in the Table 1 in R5
R6		The Distribution Providers, Generator Owner or Transmission Owners owning schemes that effect the UFLS program as mentioned in R6 failed to document one of the schemes identified in R6 in sufficient detail for dynamics modeling		The Distribution Providers, Generator Owner or Transmission Owners owning schemes that effect the UFLS program as mentioned in R6 failed to document more than one of the schemes identified in R6 in sufficient detail for dynamics modeling
R7			The Planning Coordinator established and maintained the UFLS database required by R7 but areas of credible islanding were not included as required by R7.2	The Planning Coordinator has not established and maintained UFLS database as required by R7 OR The Planning Coordinator has established and maintained the UFLS database as required by R7 but has not been updated within the last 5 years or as required by changes in system conditions as required by R7.1
R8	The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities supplied the information but between 1% and 2% of the information submitted for any of the individual applicable	The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities supplied the information but greater than or equal to 2% but less than 3% of the information submitted for any of the individual	The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities supplied the information and greater than or equal to 3% but less than 6% of the information submitted for any of the individual	The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities supplied the information and greater than or equal to 6% of the information submitted for any of the individual applicable

PRC-006-MRO-01 — Automatic Underfrequency Load Shedding Program

	<p>sub requirements listed in R8.1 is incomplete</p> <p>OR</p> <p>The Distribution Providers, Transmission Owners with end-use Load connected to their Facilities and Generator Owners failed to supply the information within 45 days but not longer than 90 days from the request</p>	<p>applicable sub requirements listed in R8.1 is incomplete</p> <p>OR</p> <p>The Generator Owner supplied the information within 45 days from the request but failed to submit underfrequency trip set points and time delays for 1 generator as required by R8.2</p>	<p>applicable sub requirements listed in R8.1 is incomplete</p> <p>OR</p> <p>The Generator Owner supplied the information within 45 days from the request but failed to submit underfrequency trip set points and time delays for more than 1 generator as required by R8.2</p>	<p>sub requirements listed in R8.1 is incomplete</p> <p>OR</p> <p>The Generator Owner failed to supply the information within 45 days from the request but failed to submit underfrequency trip set points and time delays for more than 1 generator as required by R8.2</p> <p>OR</p> <p>The Distribution Providers or Transmission Owners with end-use Load connected to their Facilities failed to supply the information within 90 days of the request</p>
R9		<p>The Planning Coordinator performed the assessment of the effectiveness of the design and implementation of the UFLS programs within its planning area, but the assessment was incomplete in one of the areas identified in R9.1 through R9.3.</p>		<p>Planning Coordinator performed the assessment of the effectiveness of the design and implementation of the UFLS programs within its planning area, but the assessment was incomplete in two or more of the areas identified in R9.1 through R9.3</p>
R10		<p>The Planning Coordinator did not provide the data and study results with neighboring Planning Coordinators as required in one of the areas identified in R10.1 through R10.3</p>		<p>The Planning Coordinator did not provide the data and study results with neighboring Planning Coordinators as required in two or more of the areas identified in R10.1 through R10.3</p>

E. Regional Variances

None.

F. Associated Documents

Version History

Version	Date	Action	Change Tracking