

Title: FRCC Automatic Underfrequency Load Shedding Program

A. Introduction

1. **Title:** FRCC Automatic Underfrequency Load Shedding Program
2. **Number:** PRC-006-FRCC-01
3. **Purpose:** Provide last resort system preservation measures by implementing a Regional Underfrequency Load Shedding (UFLS) program.
4. **Applicability:**
 - 4.1 Load Serving Entity (LSE) within the FRCC Region
(LSE with prior actual summer peak demand (integrated hourly) > 25 MW and responsible for facilities that are part of the required underfrequency load shedding (UFLS) program designed, installed, and operated for the protection of the Bulk Electric System.)
 - 4.2 Distribution Provider (DP) within the FRCC Region
(DP with prior actual summer peak demand (integrated hourly) > 25 MW and owns, controls, or operates relays that are part of the required underfrequency load shedding (UFLS) program designed, installed, and operated for the protection of the Bulk Electric System.)
 - 4.3 The LSE or DP may meet these requirements through participation in an aggregated UFLS Program.
5. **Effective Date:** One (1) calendar year after FERC approval.

B. Requirements:

- R1. LSEs and DPs shall install UFLS relays in accordance with the following requirements (This requirement is applicable on an aggregated basis when UFLS assignments are aggregated among multiple LSEs and DPs.):
[Violation Risk Factor: Lower], [Time Horizon: Long-term Planning]
 - 1.1. UFLS assignments shall meet the frequency set-points, load percentages and time delays specified in Appendix A of this standard.
 - R2. LSEs and DPs shall provide updated UFLS assignment data to the FRCC System Protection and Control Subcommittee (SPCS) each year by February 1st. [Violation Risk Factor: Lower], [Time Horizon: Long-term Planning]
 - 2.1. LSEs and DPs may aggregate the reporting of UFLS assignments with other LSEs and DPs. When multiple LSEs and DPs are reporting their aggregate UFLS assignments, they must notify the FRCC SPCS and designate one of the LSEs or DPs as the responsible entity for compliance reporting purposes.
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2.2. LSEs and DPs or the designated aggregating LSE or DP, where applicable, shall calculate the amount of load armed at each UFLS step on a coincident summer peak basis in accordance with Appendix A of this standard.

R3. Automatic restoration of load shed as a result of an underfrequency condition is not authorized within the FRCC region.
[Violation Risk Factor: Medium], [Time Horizon: Long-term Planning]

C. Measures:

M1. The annual data submittal for each FRCC LSE and DP Entity (reference M2) demonstrates the UFLS installed and in-service in accordance with requirement 1, as well as the frequency set-points, load percentages and time delays specified in Appendix A of this standard.

M2. Each FRCC LSE and DP has annually provided a list of UFLS load assignments to the FRCC SPCS by February 1st.

M2.1. LSEs and DPs that aggregate the reporting of UFLS load assignments with other LSEs and DPs have designated a single LSE or DP responsible for reporting and compliance monitoring purposes and shall communicate this designation to the FRCC SPCS and to the associated LSEs and DPs.

D. Compliance:

1. Compliance Monitoring Process

1.1 Compliance Monitoring Responsibility: FRCC Regional Entity

1.2 Compliance Monitoring Period and Reset Timeframe: Not Applicable

1.3 Data Retention: The LSEs and DPs shall keep evidence for Measures M1 and M2 for three (3) years plus the current year, or since the last compliance audit, whichever is longer.

1.4 Additional Compliance Information: None



2. Violation Severity Levels (VSLs)

	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	UFLS installation and load assignments meet less than 100% but more than 95 % of the frequency set-points, load percentages and time delays specified in Appendix A of this standard.	UFLS installation and load assignments meet 95 % or less, but greater than 85 % of the frequency set-points, load percentages and time delays specified in Appendix A of this standard.	UFLS installation and load assignments meet 85 % or less, but greater than 70 % of the frequency set-points, load percentages and time delays specified in Appendix A of this standard.	UFLS installation and load assignments meet 70% or less of the frequency set-points, load percentages and time delays specified in Appendix A of this standard.
R2.	Updated UFLS assignment data has not been provided to the FRCC System Protection and Control Subcommittee (SPCS) by February 1 st of the year, but has been submitted on or by March 1 st of the year.	Updated UFLS assignment data has not been provided to the FRCC System Protection and Control Subcommittee (SPCS) by March 1 st of the year, but has been submitted on or by April 1 st of the year.	Updated UFLS assignment data has not been provided to the FRCC System Protection and Control Subcommittee (SPCS) by April 1 st of the year, but has been submitted on or by May 1 st of the year.	Updated UFLS assignment data has not been provided to the FRCC System Protection and Control Subcommittee (SPCS) by May 1 st of the year.



	Lower VSL	Moderate VSL	High VSL	Severe VSL
R3.				Utilization of automatic load restoration following an underfrequency condition for all or a portion of the load shed during the underfrequency condition.

E. Revision History:

Revision	Date	Action	Change Tracking
01	TBA	Conversion of prior RRO legacy document.	New

Appendix A

FRCC Regional Underfrequency Load Shedding (UFLS) Implementation Schedule:

1. Load Serving Entities (LSEs) and Distribution Providers (DPs) must install automatic underfrequency relays which will disconnect 55 – 59% of their projected summer peak demand (integrated hourly) in accordance with the following schedule. Projected summer peak demand loads shall be based on the FRCC Databank Model. Note (1)

(1) UFLS Step	(2) Frequency (hertz) Set-Points	(3) Time Delay (seconds) Note (2)	(4) Discrete Block Amount of Load as % of Total LSE or DP Peak System Load (%) Note (3) Amount of Load (% of member system)	(5) Total Cumulative Amount of Load as % of Total LSE or DP Peak System Load (%) Note (3) Cumulative Amount of Load (%)	(6) Acceptable Range for UFLS Load Assignment for Total Cumulative Amount of Load as % of Total LSE or DP Peak System Load (%) Note (3) Note (4)
A	59.7	0.28	9	9	8 -12
B	59.4	0.28	7	16	15 – 19
C	59.1	0.28	7	23	22 - 26
D	58.8	0.28	6	29	28 – 32
E	58.5	0.28	5	34	33 – 37
F	58.2	0.28	7	41	40 – 44
L	59.4	10.0	5	46	45 - 49
M	59.7	12.0	5	51	50 – 54
N	59.1	8.0	5	56	55 - 59

Appendix A (cont.)

Note 1: The FRCC Databank models are typically completed in August. The February 1 update schedule assumes the previous year's Databank case will be used. This allows four months to update the UFLS assignments.

Note 2: Time Delay = Intentional Delay + Relay Delay + Breaker Delay

Note 3: UFLS load assignments shall be reported as a percentage of total LSE or DP peak system load. Total LSE or DP peak system load = LSE or DP projected coincident summer peak demand (integrated hourly).

Note 4: Recognizing that it is not possible to make UFLS relay assignments that exactly match the schedule above, the following variances in the load assignments annually reported to the SPCS are permitted:

- 1) For LSEs and DPs with projected summer peak demand greater than 100 MW, the load assigned for each UFLS step must be within the schedule ranges provided in column 6.
- 2) For LSEs and DPs with projected summer peak demand > 25 MW and ≤ 100 MW, the load assigned for UFLS steps A through F, may deviate from schedule ranges provided in column 6 as long as cumulative values meet or exceed the amounts prescribed for UFLS steps A through F in column 5.