Sunflower Electric Power Corporation

Mid-Kansas Electric Company, Inc.

Local Planning Criteria

Effective April 1, 2018

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Revision history is depicted below.

The most recent version number, along with the effective date listed below, represents the current criteria in effect and expressly terminates and supersedes all previous policy revisions listed below.

REVISION NUMBER	EFFECTIVE DATE	AFFECTED PAGE #	DESCRIPTION OF REVISION/CHANGE
1.0	4/1/2018	All	First issue Local Planning Criteria

Next Review Date: By April 1, 2019

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1. Introduction

This document contains planning criteria, assumptions, and guidelines used by the planning department of Sunflower Electric Power Corporation (Sunflower). Sunflower's sister company, Mid-Kansas Electric Company, Inc. (Mid-Kansas) (f/k/a Mid-Kansas Electric Company, LLC), through its relationship with Sunflower, utilizes Sunflower staff to perform planning studies and evaluations of the Sunflower and Mid-Kansas systems referenced herein.

Changes to the local planning criteria will be discussed during the annual local planning meeting.

2. Planning Criteria

2.1. System Voltages

Sunflower's standard (nominal) voltage levels include 345 kV, 230 kV, 138 kV, 115 kV and 69 kV. Sunflower local planning also includes 34.5 kV facilities owned and operated by its Members[1].

2.2. Steady State, Contingency, Short-Circuit, and Stability Criteria for Facilities 60 kV+

Sunflower follows and operates its 60 kV+ facilities according to its Transmission System Planning Performance Requirements. Standards requirements are outlined in the NERC Reliability Standard TPL-001-4.

Steady State Criteria

2.2.1. Normal Condition (No contingency): Transmission voltages shall be maintained no less than 95% of nominal voltage, nor shall they be greater than 105% of nominal voltage.

2.2.2. Emergency Condition (One or more contingencies): Transmission voltages shall be maintained no less than 90% of nominal voltage, nor shall they be greater than 105% of nominal voltage.

2.3. Facility Ratings for 60 kV+

Applicable facility ratings shall not be exceeded. This includes normal ratings for non-contingency events and applicable emergency ratings for all other events unless otherwise noted. Normal and emergency ratings are developed in accordance with Sunflower's Facility Ratings Methodology. The rating applied shall be of an

[1] Sunflower Members include Lane-Scott Electric Cooperative, Inc.; Prairie Land Electric Cooperative, Inc.; Pioneer Electric Cooperative, Inc.; The Victory Electric Cooperative Association, Inc.; Western Cooperative Electric Association, Inc.; and Wheatland Electric Cooperative, Inc.
Mid-Kansas Members include Lane-Scott Electric Cooperative, Inc.; Prairie Land Electric Cooperative, Inc.; Southern Pioneer Electric Company; The Victory Electric Cooperative Association, Inc.; Western Cooperative Electric Association, Inc.; and Wheatland Electric Cooperative, Inc.

appropriate duration considering both the limiting piece of equipment and the contingencies considered.

2.4. Steady State Voltage Criteria for 34.5 kV Facilities

Sunflower's local planning criteria for facilities with voltage level of 34.5 kV follows the Steady State criteria for 34.5 kV facilities provided for in the 34.5 kV annual local planning assessment[2].

Steady State Voltage Criteria:

2.4.1. Normal and Emergency Conditions: For Load Serving Buses, voltage shall be maintained no less than 95% of nominal voltage, nor shall they be greater than 105% of nominal voltage. For Non-Load Serving Buses, voltage shall be maintained no less than 90% of nominal voltage, nor shall they be greater than 105% of nominal voltage.

2.5. Power Quality

2.5.1. Instantaneous Flicker

Sunflower's local planning criteria for Power Quality follows recommendations for rapid voltage changes and flicker evaluation procedures outlined in IEEE Standard 1453-2015. Although this criterion is directed at events such as motor starting, capacitor switching, and voltage regulator switching; it will also be used as an indication of acceptable switching operations at Sunflower facilities. Unacceptable switching transients will be investigated on a case-by-case basis.

Indicative Planning Levels for Rapid Voltage Changes (IEC 61000-3-7)		
Number of Changes, N	**$\Delta V/V_r$ (%)**	
	MV	**HV – EHV**
N ≤ 4 per day	5.0 – 6.0	3.0 – 5.0
N ≤ per hour	4.0	3.0
2 < N ≤ 10 per hour	3.0	2.5

2.5.2. Continuous Flicker Limits (Pst, Plt)

2.5.2.1. **P_{st}**: Based upon assessing disturbances with a short duty-cycle or those that produce continuous fluctuations over a **10 minute observation period**.

2.5.2.2. **P_{lt}**: Calculated from 12 successive P_{st} values

[2]The annual local planning assessments are not publicly available as they contain confidential Critical Energy Infrastructure Information (CEII).

3. Criteria for Providing Redundant Feeds for Loads on Radial Lines

One of the following thresholds, Zonal Concept or Delivery Point Concept, must be met before a redundant feed (back-feed) study is considered for loads served radially on Sunflower's system. The study recommendation will be based on evaluating multiple options for redundancy and the recommended solution will be based on least cost planning and engineering economic principals.

3.1. Zonal Concept

3.1.1. The Zonal Concept is available to accommodate areas where multiple customers are being served by a single point of failure. The combination of the affected customers' (all customers served radially from the interconnection point of the looped system) MW-mile loading may qualify for a redundant feed study. The redundant feed study will provide feasible solutions to be discussed at the annual local planning meeting.

3.1.1.1. The MW-mile loading is more than **2,000**; and

3.1.1.2. The MW loading is more than **30**

OR

3.2. Delivery Point Concept

3.2.1. The Delivery Point Concept accommodates areas where a single load is served on radial line. The customer's MW-mile loading may qualify for a redundant feed study. The redundant feed study will provide feasible solutions to be discussed at the annual local planning meeting.

3.2.2. On a radial feed, if a single load at a Point of Delivery (POD) multiplied by the length of the radial line exceeds **300** MW-miles mitigations a redundant feed study may be considered in the annual planning process.

Under the Zonal Concept and the Delivery Point Concept, the number of miles included in the calculations of the MW-mile consist of radial Sunflower or Member-owned lines at voltages greater or equal to 34.5 kV.

4. Definitions

4.1. Load Serving Buses

Section of line where a wholesale or retail customer takes delivery off of the 34.5 kV system.

4.2. Non-Load Serving Buses

The section of line on the source side of a voltage regulator.

4.3. Normal Conditions

Defined by P0 of TPL-001-4. There is no loss of a single generator, transmission circuit, single pole of a DC line, shunt device, or transformer forced out of service followed by another single generator, transmission circuit, single pole of a different DC line, shunt device, or transformer forced out of service prior to system adjustments.

4.4. Emergency Conditions

Defined by P1-P7 of TPL-001-4. One or more loss of a single generator, transmission circuit, single pole of a DC line, shunt device, or transformer forced out of service followed by another single generator, transmission circuit, single pole of a different DC line, shunt device, or transformer forced out of service prior to system adjustments.

4.5. Medium Voltage (MV)

1 kV < V $\leq$ 35 kV

4.6. High Voltage (HV)

35 kV < V $\leq$ 230 kV

4.7. Extra-High Voltage (EHV)

V > 230 kV