LINCOLN ELECTRIC SYSTEM PLANNING RELIABILITY CRITERIA AND GUIDELINES

Approved by:

Transmission Steering Committee

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LINCOLN ELECTRIC SYSTEM

Lincoln Electric System Planning Reliability Criteria and Guidelines

Background

Since 2006 Lincoln Electric System (LES) has been registered as a functional entity under various categories with the North American Electric Reliability Corporation (NERC). These registrations require LES to plan its transmission system expansion in a reliable manner such that the expansion satisfies all applicable standards and requirements. Enforcement of the NERC Reliability Standards is handled by the Midwest Reliability Organization (MRO), which is a NERC Regional Entity that has been delegated the responsibility of ensuring member compliance. Also, as a member of the Southwest Power Pool Regional Transmission Organization (SPP RTO), LES must comply with the applicable requirements of the SPP criteria[1] and the SPP Open Access Transmission Tariff, and participate in the SPP model development process.

Objective

The objective of these criteria and guidelines are to provide a basis for planning the LES portion of the Bulk Electric System (100kV and above) so that it is capable of performing reliably under a wide variety of system conditions without exceeding System Operating Limits (i.e., violating equipment and electric system thermal, voltage, and stability limits). The planned transmission system must be capable of satisfying the requirements detailed in the NERC Reliability Standards, while the planning process also considers both continuity of service and capital investment.

General Requirements and Considerations

The NERC Reliability Standards define specific performance requirements that provide a high degree of reliability for the planned Bulk Electric System (BES). The LES portion of the BES shall be planned so that it will meet the applicable NERC Reliability Standards and SPP criteria under normal, emergency, and extreme conditions. The transmission system shall also be planned considering typical LES design practices, per the LES Engineering Design Guidelines.

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[1] **Exceptions to the SPP criteria**

Although LES is expected to comply with the SPP criteria, LES has requested and received waivers from the following specific SPP criteria:

1. Disturbance Monitoring Equipment
2. Protection System Review
3. Special Protection Systems Equipment
4. Undervoltage Load Shedding
5. Electrical Facility Ratings

For a more detailed description of the conditions for LES being granted waivers from these criteria, please see the SPP criteria waiver documentation maintained by the LES's Regulatory Compliance Department.

Transmission Planning Reliability Criteria
The following company-specific planning criteria for the Bulk Electric System will be used in local transmission planning activities.

Steady State Voltages:

1) Intact System: BES transmission system bus voltage levels shall be maintained between 0.95 PU and 1.05 PU of nominal system voltage.

2) Post-Contingency System: The BES transmission system bus voltage levels shall be maintained within emergency voltage limits prior to readjustment but including operation of Special Protection Systems. The emergency BES transmission system bus voltage levels shall be maintained between 0.90 PU and 1.05 PU of nominal system voltage. This implies that there will not be unacceptable system performance on other systems.

Transient Stability Criteria:
LES adheres to the SPP Disturbance Performance Requirements, which specifies both the Rotor Angle Damping Requirement and Transient Voltage Recovery Requirement.

Loading Criteria:
LES's facilities shall be rated according to the LES Rating Methodology.

LES Specific Guidelines
LES adopts the following guidelines in addition to the NERC, MRO, and SPP system performance requirements referenced above. LES will review these guidelines and their associated impacts on both continuity of service and capital investment, and use prudent business and engineering judgment during their implementation.

1) With any transmission system component already out of service, followed by system adjustments, the loss of any double-circuit line or the loss of any combination of facilities resulting from the failure of a circuit breaker to clear a fault will not cause an exceedance of any System Operating Limit.

2) The transmission system shall generally be planned so that not more than 80MW of load is connected between two separate transmission sources or generally not more than four "large power transformers" are connected between two separate transmission sources, unless the affected customers can be reasonably served by adjacent distribution class facilities.