

FERC Form No. 715
Part 4

Southern Maryland Electric Cooperative, Inc. (SMECO)

Transmission Planning Study Guidelines

1. Introduction: SMECO's transmission system consists of a 230 kV loop throughout its service territory. The system is designed for operation in a networked configuration to maximize reliability. The SMECO 230 kV transmission system interconnects exclusively to the neighboring Potomac Electric Power Company ("PEPCO") transmission system at the Ryceville, Aquasco, and Hawkins Gate Switching Stations. The SMECO transmission planning criteria ensures compliance with the transmission planning standards of the North American Electric Reliability Corporation (NERC), ReliabilityFirst Corporation (RF), and PJM Interconnection, LLC (PJM). These planning criteria ensure the SMECO 230 kV transmission system can be operated without loss of load during certain contingency situations, as detailed in Section 3 (Studied Contingencies) of this response.

2. Transmission Criteria: The SMECO service territory is governed by the reliability standards established by NERC, RF, and PJM. The exact planning requirements of these regulated institutions can be found on their websites and external publications. SMECO complies with the planning and operational requirements of these reliability groups and meets their respective reliability planning criteria.

PJM manages a regional planning process for generation and transmission system expansion to help ensure the continued reliability of the BES. This process culminates in an annual Regional Transmission Expansion Plan (RTEP) to help ensure that all affected BES systems, including SMECO, meet firm transmission service and load growth needs, meet planned generation interconnection and retirement power supply needs, and address any operational performance issues. The PJM RTEP planning criteria are detailed in PJM's Manual 14B document available on the PJM website. The SMECO electric system complies with the stated PJM reliability standards.

3. Stability Requirements: SMECO commissioned a consultant to perform transient stability studies to ensure the system can withstand PJM criteria disturbances and maintain stable operation.

Studied Contingencies: The stability of the system is maintained without loss of load during and after the following types of contingencies occurring at the most critical locations at winter and summer load levels:

- A three-phase fault with normal clearing time.
- A three-phase fault with stuck breaker or other cause for delayed clearing.
- Single contingencies (NERC Category P1)
- Double circuit tower line contingencies (NERC Category P7)
- Bus contingencies (NERC Category P2)
- N-1-1 contingencies (NERC Category P3 and P6)

Monitoring Requirement:

- Rotor angle, real power output, and terminal voltage are monitored.
- Following the disturbance, the voltages of the monitored buses maintain voltages within +/- 5% of the pre-contingency voltages.
- Pre- and Post-contingency thermal limits

Evaluation Frequency: SMECO conducts stability analysis as needed when there have been significant changes to the transmission system and/or generation profile. The most-recent study was completed in February 2017.

4. System Disturbances: Facility loading and voltages on the SMECO 230 kV transmission system should remain within acceptable limits during both normal operation and outage contingency situations as may be experienced during system fault, facility outage, or maintenance situations. The SMECO system is designed to ensure it is capable of withstanding sudden disturbances that have a reasonable probability of occurring without having cascading facility outages. Generally speaking, normal thermal limit facility ratings are considered during normal system configuration and operation or maintenance situations with emergency thermal limit facility ratings allowed during facility outage contingency situations. The maximum allowed voltage change at any given time is typically 8% where applicable. The maximum permissible voltage limit in all cases is 1.05 per-unit. The minimum permissible voltage limit under normal or maintenance situations is 0.95 per-unit and 0.92 per-unit during outage contingency situations.

5. Relaying and Protective Devices: Devices are installed to the extent necessary to provide two independent high-speed protection schemes to limit equipment damage, to limit the shock to the system, and to speed restoration of service. Installed relaying does not restrict the normal or emergency network transfer capabilities of the system. SMECO commissioned a consultant to perform short circuit studies at all facility busses to identify the impact of faults and ensure circuit breakers have adequate interrupting capability.

Evaluation Frequency: SMECO conducts fault analysis every five years or as needed when there have been significant changes to the transmission system and/or generation profile. The most-recent study was completed in February 2017.

6. Ratings: Typical line ratings are stated as normal, 24-hour Long-Term Emergency, or 4-hour Short-Term Emergency following PJM, IEEE 738-2012, and IEEE 605-2008 rating methodologies. Such ratings assume the conductor is in good physical condition with no noted defects. Power transformer ratings are based on the manufacturer's stated nameplate ratings for the given device. Underground transmission conductor ratings are typically based on final circuit installation engineering calculations performed by the installation project management consultant team. SMECO's facility rating methodology is documented as SMECO Procedure No. 3030 "SMECO Transmission Facility Rating Methodology," developed pursuant to and consistent with NERC Standard FAC-008-3. SMECO Procedure No. 3030 is available from SMECO upon request.