Old Dominion Electric Cooperative

Transmission Planning Criteria

Transmission Reliability Guidelines

1. General Overview

These reliability guidelines are used to plan the transmission system of Old Dominion Electric Cooperative (ODEC) and contain the criteria to determine ODEC's ability to serve future load and operate the system. In addition to load growth, any significant changes to the generation capacity on ODEC's or neighboring utility systems will also be included in any planning activities.

2. Transmission Criteria

The ODEC service territory is governed by the reliability standards established by the North American Electric Reliability Corporation (NERC), Reliability*First* Corporation (RF), SERC Reliability Corporation (SERC), and the PJM Interconnection, LLC (PJM). The exact planning requirements of these regulated institutions can be found on their websites and external publications. ODEC will adhere to any requirements directed by these agencies in order to meet their established reliability planning criteria.

In addition to these external organizations, ODEC also has its own internal planning criteria which will meet or exceed the planning standards above. The following criteria will be used for all solely owned 69 kV ODEC transmission facilities.

Thermal Requirements

1) For summer system peak load conditions with no line, transformer, or generation unit out of service: no transmission facility shall exceed its normal (continuous) rating. Generation shall be dispatched at delivery rights capacity and at maximum facility output.

2) For winter system peak load conditions with no line, or transformer out of service: no transmission facility shall exceed its normal (continuous) rating. Generation shall be dispatched as in summer but with no solar generation. (Winter ODEC transmission system peak historically is before dawn.)

3) For system light load conditions (30% of peak load, peaking generation off-line) with no line, transformer, or baseload generation (includes wind and solar) unit out of service: no transmission facility shall exceed its normal (continuous) rating. Baseload generation shall be dispatched as for summer peak load. Peaking generation shall be turned off.

4) For a contingency loss of any one facility (line, line section, transformer, or generator), the system shall not exceed its emergency (4 hour) rating. Generation shall be dispatched as for cases (1), (2), and (3) described above.

5) For a contingency loss of any one facility (line, line section, transformer, or generator) and the outage of any one facility at a generation location, the system shall not exceed its emergency (4 hour) rating. Generation shall be dispatched as for cases (1), (2), and (3) described above.

Reactive Requirements

For all the conditions listed under the thermal requirements, voltages shall be within the ranges shown in the following chart:

ODEC Line Voltage Limits		
High	kV **per unit**	74 **1.07**
Normal Low	kV **per unit**	65.5 **0.95**
Emergency Low	kV **per unit**	65 **0.94**
Voltage Drop	kV **percent**	6.9 **10%**

Configuration Requirements

1) A radial 69 kV transmission line shall feed no more than 10,000 consumers, 50 megawatts of load, or have more than 700 MW-Miles of exposure (MW-Mile = Peak MW X Radial Line Length) Once a radial loading limit exceeds any of these thresholds, an additional transmission source is required. This may be a separate source, or it may be a loop back to the source of the original radial line.

2) Circuit breakers will be installed on all line terminal positions in substations. Circuit switchers or circuit breakers with appropriate controls are acceptable for transformer high side protection, provided they meet the interrupting requirements.

3) By-passing of protective devices such as breakers and circuit switchers shall not be allowed for maintenance unless the bypass equipment provides adequate protection.

4) New transmission lines shall have only two terminals.

5) New injection and withdrawal points shall use a ring-bus design. Addition of a facility that would result in more than 6 terminals to the ring bus shall instead be installed as a breaker and a half design.

Communications Requirements

All new generation facilities will require two modes of relay speed communications for protection and control of the system, one mode of which must be fiber optic. These communications shall extend from the generator location to all terminals or switching locations on the system that if opened as part of an N-2, N-1-1, or N-1 during maintenance condition, would cause any portion of the ODEC system to separate from the rest of PJM and be in an island with the generator. Specifics of this requirement will be detailed in a Facilities Study. New baseload and supplemental projects requiring conductor addition or replacement will also replace the existing static conductor with OPGW, if OPGW does not already exist at the location.