FERC Form No. 715
Part 4

TRANSMISSION PLANNING RELIABILITY CRITERIA

The reliability guidelines used to plan the Duquesne Light Company (DLC) transmission system are the criteria by which the ability of the transmission system to serve its projected future load is determined. In addition to load growth, any significant changes to the generation capacity on DLC's or neighboring utility systems must also be included in the evaluation of the DLC bulk electric transmission system.

DLC defines its electric transmission system as facilities with voltages of 69 kV and above, this includes transformers with low side voltages of 69 kV and 138 kV and lines with voltages of 69 kV, 138 kV, and 345 kV. The transmission system consists of over 670 circuit-miles of overhead and underground transmission lines.

The DLC service territory is governed by the reliability standards established by the North American Electric Reliability Corporation (NERC), ReliabilityFirst Corporation (RF), and PJM Interconnections, LLC (PJM) organizations. DLC became a member of the PJM Interconnection on January 1, 2005.

The exact planning requirements of these regulated institutions can be found on their respective websites and external publications. DLC will adhere to any requirements directed by these agencies to meet their established reliability planning criteria. In addition to these external organizations, DLC also maintains its own internal planning criteria which meet or exceed the planning standards identified above.

As a major metropolitan area, the City of Pittsburgh is home to a large urban population, business district, several universities, and various critical infrastructure including multiple hospital networks that are utilized by the surrounding tri-state area. As such, DLC considers that more stringent transmission system planning guidelines are appropriate to offer an increased level of reliability over what the NERC criteria alone provides. The following assessments and criteria will be used for all DLC transmission facilities.

Steady State Thermal and Voltage Criteria:

- Normal operation of the system will not load any electric facility beyond its normal continuous rating.
- The loss of any single transmission line, generating unit, power transformer, substation bus, circuit breaker, or double-circuit line due to the outage of a single tower or pole, does not result in any system electric facility being operated beyond its applicable emergency ratings.

- Customer load will remain uninterrupted for routine maintenance of BES and non-BES transmission facilities
- The voltages on the DLC bulk electric system will not exceed +/- 5% of nominal voltage under pre-contingency or post contingency events.
- The loss of any single facility will not result in a voltage deviation of more than 0.05 per-unit on the DLC bulk electric transmission system.

The DLC Bulk Electric System (BES) utilizes underground high-pressure fluid-filled transmission cables to supply the City of Pittsburgh with some of these cables sharing a common trench or common oil return pipe. As failures of this equipment could result in long duration repair efforts, DLC analyzes outages of these common facilities to ensure that an outage would not cause loss of load anywhere on its system and that all other facilities on the DLC transmission system will continue to operate under their continuous ratings. DLC will evaluate and, as necessary, implement transmission solutions to address N-2 contingency scenarios that violate these criteria.

Additionally, DLC endeavors to diversify sources of supply, wherever possible, such that the loss of a single substation does not interrupt service to DLC's load centers. DLC also takes into consideration existing major facilities that are obsolete and/or known to require high and expensive maintenance. Options are evaluated to reduce or eliminate these costs.

The DLC transmission system is also required to be periodically reviewed and modified in order to reliably support and supply its distribution load. Potential drivers of transmission projects include efforts to accommodate load growth, back-up capacity needs of the underlying electrical system, or to expand the intelligence of the electric grid.

In support of reliable service, where feasible and cost effective, DLC's guidelines recommend that once a bulk power substation, whose primary load is not a single industrial customer, exceeds or is projected to exceed 100 MVA (approximately 22,000 customers), the station will require at least three (3) transmission sources. This practice helps to ensure continuous reliable service during routine maintenance scenarios as well as single contingency events.