FERC Form No. 715
Part 4

UGI UTILITIES, INC.-Electric Division

Transmission Planning Criteria

March 13th, 2025

Bulk Electric System and Non-BES System Transmission Criteria

The UGI Utilities Inc. – Electric Division (UGI) service territory is governed by the reliability standards established by the North American Electric Reliability Corporation (NERC), ReliabilityFirst Corporation (RFC) and PJM Interconnections, LLC (PJM). Where standards developed by these entities are more stringent than UGI's practices, those standards take precedence over UGI's practices. The exact planning requirements of these regulated institutions can be found on their websites and external publications. UGI will adhere to any requirements directed by these agencies in order to meet their established reliability planning criteria.

1.0 SCOPE

UGI Bulk Electric System (BES) facilities currently consists of the 230kV lines to Mountain Substation, up to the 230kV terminals of the 230/66kV transformers.

The Non-BES System currently extends from the high side of the 230/66 kV transformers to the high side of the 66/13 kV transformers.

For this document, UGI Transmission System (transmission system) consists of BES and Non-BES facilities as described above.

2.0 TRANSMISSION PLANNING CRITERIA

The BES shall be planned, protected and operated to maintain compliance with applicable NERC, RFC, PJM, UGI standards, and the criteria designated in this document. The goal is to deliver electricity in a safe, reliable, and economical manner.

UGI's criteria considered when developing plans for the operation of the transmission system include:

2.1 Thermal Criteria

2.1.1 Bulk Electric Thermal Criteria

All new 230 kV lines shall be constructed with minimum size 1590 MCM ACSR conductor having the following thermal capability per circuit:

Table 1. 230kV Conductor Thermal Ratings

	Normal	Emergency
Summer	650MVA	804MVA
Winter	797MVA	966MVA

These ratings are based on a maximum normal conductor temperature of 100°C and a maximum emergency conductor temperature of 125°C.

230kV facilities shall have the following minimum load carrying capability:

Table 2. 230kV Facility Thermal Ratings

	Summer-Amps		Winter-Amps	
	Normal	Emergency	Normal	Emergency
230kV bus	1631	2018	2000	2425
230kV breakers	2080	2320	2460	2680

230kV disconnects	2160	2560	2620	2840

The standard 230/66kV transformer is a 150MVA at 55 °C rise (FOA), and 168MVA at 65 °C rise (FOA) with plus and minus 5% tap changing under load (TCUL) capability. For planning purposes, the thermal capability used is as shown in Table 3 below.

Table 3: Transformer Rating-Allowable Loading

Loading Period	Normal (MVA)	Emergency (MVA)
Summer	192	212
Winter	230	245

2.1.2 Non-Bulk Electric Thermal Criteria

UGI designs the 66kV system so that under normal operation or with any one line or facility out, no conductors become loaded beyond their normal ratings as described in Table 4. UGI designs its system so that no line should exceed its emergency ratings for a period longer than 8 hours in an N-1-1 scenario.

Table 4. 66kV Conductor Thermal Ratings (MVA)

	Summer		Winter	
Conductor	Normal	Emergency (8 hour)	Normal	Emergency (8 hour)
266.8 MCM ACSR*	55	75	70	90
336.4 MCM ACSR	65	87	83	106
556.5 MCM ACSR	92	120	117	145
795 MCM ACSS	116	149	148	181
1/0 Copper*	32	51	50	70
4/0 Copper*	38	59	60	82

*Obsolete conductor size not used on new construction

The 66 kV bus, circuit breakers and associated facilities shall be designed with the minimum load carrying capability such that, the substation terminal equipment and line equipment shall not limit the operating capability of the 66 kV lines. Similarly, the substation equipment shall not limit the operating capability of the transformers.

2.2 Voltage Criteria

2.2.1 Bulk Electric System Voltage

Voltage schedules for UGI bulk power buses are coordinated with the bulk power bus schedules of PPL EU as they provide the source to UGI's single BES substation. In general, the following voltage guidelines have been established:

1. The minimum heavy load operating voltage at 230 kV buses should be no lower than 95% of nominal value.
2. The emergency voltage deviations from normal values at 230 kV buses should be limited to 8%.

2.2.2 Non-Bulk Electric Voltage

The voltage at the 66 kV terminals of a 66/13 kV transformer should not be allowed to go 5% below 66 kV during normal operation and 8% below 66 kV during emergency operation after all available corrective measures have been taken.

2.3 Short Circuit Criteria

All substation breakers and line equipment shall not exceed its rated interrupting capability for all fault types (single line to ground and three phase). Short circuit studies will assume that all generation is in service. Breaker studies should be performed with the system in its normal configuration. New breakers shall be designed to handle the maximum fault current plus a margin to account for future growth.

2.4 Load Loss

2.4.1 Radial Transmission Element

Radial transmission elements serve load from only one transmission source and do not have ties to other transmission sources. Unlike a networked transmission element, radial load cannot be restored until repairs have been completed, although load may be able to be restored through distribution switching. For any P1 contingency, defined by NERC standard TPL-001-4, the loss of load on a radial transmission element should be limited to 50MW or 10,000 customers. Beyond those limits, an additional transmission source should be considered.

2.4.2 Networked Transmission Element

Network transmission elements connect two or more transmission sources and may serve distribution load off the line. The loss of load on a networked transmission element should be limited to 300MW.

2.5 Stability

UGI studies for stability analysis are maintained through PJM during the annual RTEP cycle, as outlined in PJM Manual 14B. This ensures UGI's system remains compliant with NERC TPL-001-4 criteria disturbances within the planning cycle.

2.6 End of Life Criteria

To maintain the integrity of UGI's transmission system, system components are analyzed for potential reliability risks using end of life criteria. "End of life" is defined as the point when an asset has an unacceptable risk of failure by some measure of physical condition and maintenance/refurbishment is no longer able to extend the life within acceptable best practices. In this approach, assets undergo frequent inspections and condition assessment to determine the stage of the component's useful lifespan. Inspection and assessment parameters include, but are not limited to; structural integrity, age, performance history, and expert knowledge from industry/peer groups. When a component is designated as meeting or approaching the end of life criteria, arrangements must be made to correct the issue. This work is prioritized by the potential impact to system reliability. Transmission assets that are evaluated for end of life criteria include infrastructure supporting 66kV and above.