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LG&E and KU Energy Transmission Owner

Facility Connection Requirements

Written Procedures for Compliance

FAC-001-2

Version 3
Effective Date: December 31, 2015

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LG&E and KU Energy Transmission Owner Facility Connection Requirements

Effective Date: December 31, 2015

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Revision History

Version	Date	Description
0	December 10, 2007	Initial Development
1	February 13, 2008	Revised to include information on procedures for coordinated joint studies of new facilities for Transmission and End-User facilities; and procedures for notification of new or modified Transmission Facilities
2	October 20, 2011	Removed verbatim copy of language containing the text of standard as approved. Revised *Introduction* section to include document section numbers applicable to each type facility. Changed company name from E.ON U.S. to LKE, and updated references & links to supporting documents. Revised surge protection requirements and included in R2.1.4. Added signature page and revision block.
3	December 31, 2015	Revised signature page. Added paragraph to the *Introduction & Scope* section describing the LKE OATT and ITO functions. Added brief descriptions of the LKE OATT Part I, II, & III to the *Generator Facilities* and *End-User Facilities* sections. Revised planning and notification procedures in the *Transmission Facilities* section. Made various changes in formatting to align with the requirements of version 2 of the standard (FAC-001-2), and LGE/KU's standard procedure template.

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1.0 Introduction & Scope

LG&E and KU Energy, LLC (LKE) prepared this document to identify the requirements for connecting new facilities to the LKE transmission system or materially modifying existing facilities. This document is written to comply with North American Electric Reliability Council (NERC) reliability standards, specifically the FAC-001-2 Facility Interconnection Requirements standard.

The requirements identified by this document are consistent with those used by LKE when installing new facilities or modifying existing facilities. They are subject to change to reflect changes or clarifications in planning, operating, or interconnection policies. LKE shall reserve the right to take such actions as deemed necessary to ensure the reliability of the interconnected transmission system. All connections to LKE facilities at 69kV and above should be based on good utility practice and must be in compliance with all applicable standards of LKE, NERC, and the Southeastern Electric Reliability Council (SERC).

LKE has an Open Access Transmission Tariff (OATT) to maintain compliance with FERC Transmission Requirements. Unique to the LG&E/KU OATT is the role of the Independent Transmission Organization (ITO), who administers the OATT and its processes. The OATT is a means for customers to request for services from and on the LKE transmission system. It also identifies how LKE maintains, offers, and monitors the transmission system. The OATT primarily outlines:

- How a customer makes these requests for services
- The means with how these requests are provided
- How these services would be implemented
- Agreements for binding the services
- Schedule rates offered with these services
- How the customer interacts with the Transmission Service Provider

This document (fac_conn_procedures.pdf) is published on the LKE website at: http://www.lge-ku.com/regulatory as *"Facility Connection Procedures"*.

Supporting Documents

The following two supporting documents referenced herein are available at: http://www.oatioasis.com/LGEE/index.html

- *LG&E/KU Open Access Transmission Tariff ("OATT")*
- *LG&E/KU Transmission System Planning Guidelines*

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2.0 Responsibilities and Procedures

For new or materially modified existing interconnections, the following sections address procedures for performing coordinated studies to determine the impacts on affected system(s), procedures for notifying those responsible for the reliability of affected system(s), and reference general design and operating requirements. *Section 2.1* outlines the requirements for connecting Generation Facilities, *Section 2.2* outlines the requirements for connecting Transmission Facilities, and *Section 2.3* outlines the requirements for connecting End-user Facilities.

2.1 *Generation Facilities*

Impact Studies, Planning, and Notifications:

The transmission expansion process for LKE is currently the responsibility of the Independent Transmission Operator (ITO). The ITO performs impact studies, including those for generator interconnections and major load connections. The expansion plan is designed based on NERC planning requirements and the LG&E/KU Transmission System Planning Guidelines.

The process for transmission system planning on the LKE Transmission System is described in Attachment K of the OATT, and in the LKE *Transmission System Planning Guidelines* document. Impact studies to be considered include fault duty, stability, steady state load flow, and transfer capability.

The results of this process will form the basis for an interconnection agreement between LKE and the interconnecting generator owner. The final agreement will be reviewed and approved by the ITO.

Requirements and procedures for notification shall be consistent with the LKE Pro forma Open Access Transmission Tariff (OATT).

- Part I of the OATT contains definitions and common service provisions.
- Part II of the OATT pertains to Point-to-Point Transmission Service in conjunction with the applicable common service provisions and appropriate schedules and attachments.
- Part III of the OATT pertains to Network Integration Transmission Service in conjunction with the applicable common service provisions and appropriate schedules and attachments.
- Attachment M of the OATT describes the Large Generator Interconnection Procedures.
- Attachment N of the OATT describes the Small Generator Interconnection Procedures.

General Design and Operating Guidelines:

(See Appendix 1 of this document)

2.2 *Transmission Facilities*

Impact Studies, Planning, and Notifications:

For new or modified transmission interconnections, the interconnecting party should contact the respective Planning Coordinator(s) (PC). The PC(s) will perform the required studies as part of the annual TPL-001-4 Planning Assessment. Impacts to adjacent systems will be included in the annual planning assessment. Results of the annual assessment are provided to the neighboring planning coordinators annually.

The annual transmission planning assessment complies with the requirements of TPL-001-4 and the LG&E and KU Planning Guidelines posted on OASIS.

The results of this process will form the basis for an interconnection agreement between LKE and the interconnecting transmission owner. The final agreement will be reviewed and approved by the respective Planning Coordinator(s).

As in the interconnection process of a generator, all Transmission Facilities will be subject to system protection, metering, communication, operation, and information coordination as outlined in Attachment M: Appendix 6 of the LKE Pro forma Open Access Transmission Tariff. Similarly, Transmission Facilities shall be consistent with good utility practice and NERC guidelines.

General Design and Operating Guidelines:

(See Appendix 1 of this document)

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2.3 *End-user Facilities*

Impact Studies, Planning, and Notifications:

The transmission expansion process for LKE is currently the responsibility of the ITO. The ITO performs impact studies, including those for generator interconnections and major load connections. The expansion plan is designed based on NERC planning requirements and the LKE Transmission System Planning Guidelines.

The process for transmission system planning on the LKE Transmission System is described in Attachment K of the OATT, and in the LKE *Transmission System Planning Guidelines* document. Impact studies to be considered include fault duty, stability, steady state load flow, and transfer capability.

Additional information for new and modified End-user Facilities is contained in the following Retail Tariffs:

- Louisville Gas and Electric: http://www.lge-ku.com/rsc/lge/lgereselectric.pdf
- Kentucky Utilities: http://www.lge-ku.com/rsc/ku/kuelecrates.pdf
- Old Dominion Power: http://www.lge-ku.com/rsc/ku/odpelecrates.pdf
- KU in Tennessee: http://www.lge-ku.com/rsc/ku/tenn_elecrates.pdf

Requirements and procedures for notification shall be consistent with the LKE Pro forma Open Access Transmission Tariff.

- Part I of the OATT contains definitions and common service provisions.
- Part II of the OATT pertains to Point-to-Point Transmission Service in conjunction with the applicable common service provisions and appropriate schedules and attachments.
- Part III of the OATT pertains to Network Integration Transmission Service in conjunction with the applicable common service provisions and appropriate schedules and attachments.
- As in the interconnection process of a generator, all End-user Facilities will be subject to system protection, metering, communication, operation, and information coordination as outlined in Attachment M: Appendix 6 of the LKE Pro forma Open Access Transmission Tariff. Similarly, End-user Facilities shall be consistent with good utility practice and NERC guidelines.

General Design and Operating Guidelines:

(See Appendix 1 of this document)

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Appendix 1
General Design and Operating Guidelines

These general design and operating guidelines apply to Generation Facilities, Transmission Facilities, and End-user Facilities, interconnected with the LKE Transmission System. All such facilities shall be designed and operated consistent with good utility practices and NERC Guidelines.

1. Voltage level and MW and MVAR capacity or demand at point of connection.
Specific guidelines as to voltage level and MW and MVAR capacity or demand at point of connection are addressed in the LKE Pro forma Open Access Transmission Tariff.

2. Breaker duty and surge protection.
All facilities must equal or exceed the fault duty capability necessary to meet system short circuit requirements as determined through short circuit analyses. Each facility owner is responsible for the short circuit capabilities of their own current carrying elements and the ratings of their own interrupting devices. It is the responsibility of the attaching party to coordinate their relays and devices with the LKE transmission system. Generation and transmission customers are responsible for notifying LKE of any changes in their facilities that may cause an increase in fault currents.

All facilities shall be protected against voltage stresses caused by lightning, switching surges, and temporary over-voltages. Typically, this would include station shielding against direct lightning strikes, surge arresters, spark gaps, and/or circuit breaker pre-insertion resistors.

3. System protection and coordination.
System protection and coordination is addressed in Attachment M: Appendix 6: Article 5.10, 9.7.4, and 24 of the LKE Pro forma Open Access Transmission Tariff. Parties shall communicate in advance of any changes in their respective facilities, which reasonably can be expected to affect protective device coordination for either party.

4. Metering and telecommunications.
Attachment M: Appendix 6: Article 7 and Article 8 of the LKE Pro forma Open Access Transmission Tariff, address metering requirements and telecommunications requirements.

5. Grounding and safety issues.
Grounding and safety considerations should be consistent with good utility practice and NESC guidelines. In addition, any safety or grounding standards identified by the ITO or LKE shall be followed. Facility owners must provide to LKE any design details related to the system grounding.

6. Insulation and insulation coordination.
Insulation coordination is required for system reliability and safety. The owner of proposed interconnected equipment which may impact the performance and reliability of the LKE system shall document and submit applicable information as part of the interconnection proposal, including, but not limited to: conductor spacing, surge arrester application and other substation insulation design.

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7. Voltage, Reactive Power, and power factor control.
Power factor control shall be within the same range as LKE, pursuant to good utility practices. Additional requirements for voltage, reactive power, and power factor control are contained in Attachment M: Appendix 6: Article 9.6, Attachment N: Appendix 9: Article 1.8, and Schedule 2 of the LKE Pro forma Open Access Transmission Tariff.

8. Power quality impacts.
Power quality impacts are addressed in Attachment M: Appendix 6: Article 9.7.6 of the LKE Pro forma Open Access Transmission Tariff.

9. Equipment Ratings.
Equipment ratings shall be coordinated with LKE to ensure reliability and compatibility with LKE equipment ratings.

10. Synchronizing of facilities.
Facilities shall be synchronized with the transmission system consistent with Attachment M: Appendix 6: Article 9.5 of the LKE Pro forma Open Access Transmission Tariff.

11. Maintenance coordination.
Maintenance practices of connected generation, transmission, and end-user facilities shall be performed at a level that ensures the reliability and continuity of service of the interconnected transmission system. Relevant maintenance records should be maintained. Maintenance coordination and notification shall be consistent with the LKE Pro forma Open Access Transmission Tariff.

12. Operational issues (abnormal frequency and voltages).
Abnormal voltage and frequency issues are addressed in Attachment M: Appendix 6: Articles 9.6.2.1 and 9.7.3 of the LKE Pro forma Open Access Transmission Tariff.

13. Inspection requirements for existing or new facilities.
Inspection and testing requirements are addressed in Attachment M: Appendix 6: Article 6 of the LKE Pro forma Open Access Transmission Tariff.

14. Communications and procedures during normal and emergency operating conditions.
Communications and procedures shall be consistent with Attachment M: Appendix 6: Article 8 of the LKE Pro forma Open Access Transmission Tariff.