

TSR LGE-2022-002

**TSRs #96326846, #96326856, #96326859,
#96326867, #96326869, #96326872**

System Impact Study Report Executive Summary

Version: 1.0

Report Issue Date: June 17, 2022

Report Study Title Posted Date: June 17, 2022

TranServ International, Inc.
3660 Technology Drive NE
Minneapolis, MN 55418
Phone: 763.205.7099

Legal Notice

Neither TranServ International, Inc. (TranServ), nor Louisville Gas & Electric and Kentucky Utilities Companies (LG&E and KU) nor any person acting on or in the behalf, makes any warranty, expressed or implied, with respect to the use of any information or methods disclosed in this document, or assumes any liability with respect to the use of any information or methods disclosed in this Report. Recipients of this Report release TranServ and LG&E and KU from any liability for direct, indirect, consequential, or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise, and regardless of fault, negligence, and/or strict liability.

Table of Contents

1. Executive Summary	4
1.1 Summary of Power Flow Analysis Results	5
1.1.1 Thermal Constraints.....	5
1.1.2 Voltage Constraints.....	6
1.1.3 Non-LG&E and KU Flowgate Constraints	6
1.2 Summary of ATC/AFC/ASTFC Check Results	6
1.3 Conclusion	6

1. Executive Summary

TranServ has evaluated the Long-Term Firm Network Transmission Service Requests (TSRs) listed in Table E-1. A System Impact Study (SIS) was performed to determine the impact of these TSRs on the transmission network, to determine if any transmission constraints prohibit granting the requested service and to identify any limiting constraints. This report documents that SIS.

Table E-1 Request Details

NITS Assign Ref	MW	TS Increment	TS Type	Request Type	Start Time	Stop Time	Q-Time
96326846	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022
96326856	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022
96326859	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022
96326867	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022
96326869	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022
96326872	54	Yearly	ADD NITS LOAD	Original	04/01/2023	01/01/3000	03/11/2022

As shown in Table E-1, TSR #96326846, #96326856, #96326859, #96326867, #96326869, and #96326872 (TSR LGE-2022-002) is a 320 MW load addition. The study was performed as per the Network Integration Transmission Service (NITS) application.

This study included the effect of all earlier queued requests. Representation of these earlier queued requests may also necessitate representation of associated planned transmission improvements. Thus, it is important to realize that if the planned improvements do not come to fruition, the subject request's impact on the transmission system as identified by this study may become invalid and a revised study may become necessary before transmission service can be granted.

An Ad Hoc Study Group was formed in accordance with the LG&E and KU TSR Study Criteria document posted on the LG&E and KU Open Access Same Time Information System (OASIS). Participation in the Ad Hoc Study Group was by invitation to all first-tier Transmission Providers (TPs) and/or Transmission Owners (TOs) of LG&E and KU.

Table E-2 documents the Ad Hoc Study Group Comments which relate to independent testing performed by the Ad Hoc Study Group members consistent with the allowance for such testing in the LG&E and KU GI Criteria document.

**Table E-2
 Ad Hoc Study Group Independent Study Comments**

Ad Hoc Group Member	Date Received	Ad Hoc Group Member Comment provided within the June 06, 2022 Deadline
MISO	05/26/2022	MISO will need to perform an Affected system study for LGE TSR-2022-002.
No other Ad Hoc Member chose to provide independent testing results for this request.		

As given in the LG&E and KU TSR Study Criteria Document, posted on the LG&E and KU OASIS, TSR SISs include both Near-Term Transmission Planning Horizon and Long-Term Transmission Planning Horizon models. The subject Load TSR was evaluated using 2023 Off Peak, 2023 Summer Peak, 2023 Winter Peak, 2031 Summer Peak, and 2031 Winter Peak power flow models based on the 2023OP, 2023S, 2023W 2031S, and 2031W, 2022 TEP Base Case Study (BCS) r20210830 models respectively. Complete model documentation details including adjustments required to create the study models from the BCS models are provided in the Full Report.

1.1 Summary of Power Flow Analysis Results

1.1.1 Thermal Constraints

The TSR 2022-002 potential LG&E and KU thermal constraints due to the subject request are given in Table E-3. These constraints were found for many dispatch/contingency combinations. Only the result with the highest post project loading for each scenario is shown in Table E-3.

**Table E-3
 TSR 2022-002 LG&E and KU Thermal Constraints**

Model	Facility	Rating	Pre Project		Post Project		DF
			MVA	%	MVA	%	
2031S	7BUCKNER 345.00 TO 7MIDDLETOWN 345.00 1	1195	1206.77	101	1247.74	104.41	12.80%

As can be seen from Table E-3, the Buckner – Middletown 345 kV line loads beyond acceptable levels even prior to the addition of the study TSR. Additional analysis indicates that the Buckner – Middletown 345 kV line upgrade is needed by 5/30/2030 prior to the addition of the TSR-2022-002 TSR and is needed by 5/30/2027 after to the addition of the TSR-2022-002 TSR. Thus, TSR-2022-002 advances the need to ameliorate the Buckner – Middletown 345 kV line overload by three years from year 2030 to 2027.

The TO has indicated that there is an existing 2022 Preliminary TEP project (as posted on OASIS) planned for the facility that alleviates the constraint. The project is timed for Summer 2025 but is still subject to approval.

The TSR 2022-002 third-party thermal constraints due to the subject request are given in Table E-4. These constraints were found for many dispatch/contingency combinations. Only the result with the highest post project loading for each scenario is shown in Table E-4.

**Table E-4
 TSR 2022-002 Third-Party Thermal Constraints**

Model	Third Party	Facility	Rating	Pre Project		Post Project		DF
				MVA	%	MVA	%	
2023S	MISO / Duke	08GIBSON 345.00 TO 08FRNCSC 345.00 1	1388	1371.42	98.81	1391.16	100.23	6.17%
2023W	MISO / Duke	08DUFF 345.00 TO 08FRNCSC 345.00 1	1195	1206.13	100.93	1219.43	102.04	4.16%
2031S	MISO / Duke	08GIBSON 345.00 TO 08FRNCSC 345.00 1	1388	1391.07	100.22	1408.13	101.45	5.33%
2031W	MISO / Duke	08DUFF 345.00 TO 08FRNCSC 345.00 1	1195	1204.02	100.75	1215.94	101.75	3.73%

As shown in Table E-4, all constraints are MISO facilities. Duke has confirmed that the Duff to Francisco 345 kV line and the Gibson to Francisco 345 kV line thermal overloads are considered constraints. The Table E-4 results will be further evaluated in the MISO Affected System Study (AFS).

1.1.2 Voltage Constraints

No LG&E and KU or third party voltage constraints were identified.

1.1.3 Non-LG&E and KU Flowgate Constraints

No Flowgate constraints due to subject request were identified.

1.2 Summary of ATC/AFC/ASTFC Check Results

Since the subject request is an Add NITS load request, no Available Transfer Capability (ATC)/Available Flowgate Capability (AFC)/Available Share of Total Flowgate Capacity (ASTFC) check was performed.

1.3 Conclusion

As shown in Table E-3, a pre-existing LG&E and KU constraint has been identified that may be accelerated by the subject TSRs. A project was identified in the 2022 Preliminary TEP to address the constraint. The Transmission Owner (TO) has indicated that network facilities are required.

LG&E and KU has provided a good faith estimate of the cost to provide the network facilities. LG&E and KU's non-binding planning level network facilities cost estimate is **\$120,267,000 USD**. The Transmission Owner (TO) has indicated, as detailed in Section 6 of the full report, that the network facilities require 24-month lead time. Both the cost and expected in-service date of the network facilities which will be further refined in the Facility Study.

Third party constraints have been identified for the subject TSR. MISO/Duke third party constraints were identified and as shown in Table E-2, MISO will be performing an Affected System Study. Thus the granting of this request is contingent upon the MISO's affected system study. The customer must work with MISO to ameliorate the third party constraints. No other Ad Hoc Study Group member provided a request to perform an affected system study.

The full report is available on the LG&E and KU Critical Energy Infrastructure Information (CEII) File Transfer Protocol (FTP) site. See the study report title posting on OASIS for instructions pertaining to accessing the LG&E and KU CEII FTP site. The LG&E and KU secure CEII FTP site URL is: <https://eftws.lge-ku.com/EFTClient/Account/Login.htm>.