INDEPENDENT, INNOVATIVE, RELIABLE TRANSMISSION MANAGEMENT SERVICES

TSR LGE-2016-004

(TSR #82410554)

System Impact Study Report

Executive Summary

PROPRIETARY

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1. Executive Summary

TranServ has evaluated the Long-Term Firm Network Transmission Service Request (TSR) listed in Table 1-1. A System Impact Study (SIS) was performed to determine the impact of this TSR 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 1-1 Request Details

Assign Ref	POR	POD	MW	TS Increment	TS Type	Request Type	Start Time	Stop Time	Q-Time
82410554	LGEE	LGEE	24	Yearly	Network	Original	06/01/2016	06/01/2021	03/11/2016

As shown in Table 1-1, TSR #82410554 (TSR LGE-2016-004) is a yearly network request for 24 MW.

An Ad Hoc Study Group was formed. 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.

As given in the LG&E and KU TSR Study Criteria Document, posted on the LG&E and KU Open Access Same-Time Information System (OASIS), TSR SISs include both Near-Term Transmission Planning Horizon and Long-Term Transmission Planning Horizon models. The subject TSR was evaluated using 2016 Summer Peak, 2016 Winter Peak, 2021 Off Peak, 2026 Summer Peak, and 2026 Winter Peak power flow models based on the 2018S, 2018W, 2021L, 2026S, and 2026W 2017 Base Case Study (BCS) R20160304 models (2017 BCS models). The TSR LGE-2016-004 models incorporate the 2016 Transmission Expansion Plan (TEP) LG&E and KU system improvements schedule.

All appropriate prior queued transactions were modeled prior to modeling of the subject request. This study included the effect of all earlier queued requests. Representation of these earlier queued requests may also have necessitated the 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.

The subject request starts within the posted Available Transfer Capability (ATC)/Available Flowgate Capability (AFC)/Available Share of Total Flowgate Capacity (ASTFC) horizons, thus an OASIS ATC/AFC/ASTFC check was performed.

1.1 Summary of Power Flow Analysis Results

1.1.1 Thermal Constraints

No system intact or contingency thermal constraints due to the subject request were found.

1.1.2 Voltage Constraints

No system intact or contingency voltage constraints due to the subject request were found.

1.1.3 LG&E and KU Reliability Margin Constraints

An LG&E and KU reliability margin constraint due to the subject request was found as shown in the Table 1-2.

Table 1-2
2016 Summer Peak NITS LG&E and KU Reliability Margin Constraint Results

Facility	Rating	Pre Project		Post Project		DF	MVA Impact
		MVA	%	MVA	%		
7TRIMBLE CO 345.00 1 TO 06CLIFTY 345.00	1134	1121.12	98.86	1130.52	99.69	39.17%	9.400

As can be seen in Table 1-2, the loading on the Trimble County-Clifty Creek 345 kV line is between 98% and 100% of the applicable facility rating. Although this loading was not identified as a thermal constraint because it does not exceed the applicable facility rating, it is identified as a Reliability Margin constraint because it exceeds 98% of the applicable facility rating. The Reliability Margin is defined as 2% of the applicable facility rating and is considered to reserve capacity for the 2% uncertainty component of the Transmission Reliability Margin (TRM).

1.1.4 Non-LG&E and KU Flowgate Constraints

As given in the LG&E and KU TSR Study Criteria Document, no LG&E and KU flowgate analysis was performed as part of this study. However, an analysis of third party flowgates was performed and no third party flowgate constraints due to the subject request were found.

1.2 Summary of ATC/AFC/ASTFC Check Results

Since the subject request starts within the OASIS ATC/AFC/ASTFC posting horizon, an ATC/AFC/ASTFC check was performed. No ATC or ASTFC constraints, due to the subject request, were found. The OASIS AFC check indicated that the subject requested failed for some months.

Table 1-3 summarizes the AFC constraints to providing the requested service.

Table 1-3
AFC Constraint Summary

Start Date	Stop Date	Flowgate Number	Flowgate Name	Flowgate Type	Flowgate owner	CAP	Dir	PTDF/ OTDF	Impact	Final AFC
2016/06/01	2016/06/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.191	4.58	**-119.28**
2016/07/01	2016/08/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1881	4.51	**-248.43**
2016/08/01	2016/09/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1919	4.61	**-183.01**
2017/06/01	2017/07/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1947	4.67	**-158.58**
2017/07/01	2017/08/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1918	4.6	**-196.96**
2017/08/01	2017/09/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1897	4.55	**-260.06**
2017/09/01	2017/10/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1956	4.69	**-194.89**
2017/10/01	2017/11/01	1025	TRMCLFROCJEF	PTDF	LGEE	24	1	0.1907	4.58	**-6.38**
2016/07/01	2016/08/01	2816	TRMCLFTRMGHE	PTDF	LGEE	24	1	0.2948	7.08	**-89.87**
2016/08/01	2016/09/01	2816	TRMCLFTRMGHE	PTDF	LGEE	24	1	0.2964	7.11	**-5.53**
2017/07/01	2017/08/01	2816	TRMCLFTRMGHE	PTDF	LGEE	24	1	0.3002	7.2	**-27.76**
2017/08/01	2017/09/01	2816	TRMCLFTRMGHE	PTDF	LGEE	24	1	0.2956	7.09	**-106.72**
2016/06/01	2016/06/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1947	4.67	**-0.12**
2016/07/01	2016/08/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1918	4.6	**-102.91**
2016/08/01	2016/09/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1956	4.69	**-47.33**
2017/06/01	2017/07/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1984	4.76	**-16.27**
2017/07/01	2017/08/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1954	4.69	**-51.71**
2017/08/01	2017/09/01	2830	TRMCLF__PTDF	PTDF	LGEE	24	1	0.1933	4.64	**-117.18**

As can be seen from Table 1-3, the requested service cannot be granted for the following months:

- June 2016
- July 2016
- August 2016
- June 2017
- July 2017
- August 2017
- September 2017
- October 2017

1.3 Conclusion

An LG&E and KU reliability margin constraint has been identified, as listed in Table 1-2. This constraint must be mitigated by the “Mitigation Needed By” date shown in Table 1-4 in order to provide the requested service to the TSR-2016-004 request.

Table 1-4
LG&E and KU Mitigation Needed by and Estimated Mitigation Dates

Facility to Mitigate	Mitigation Needed By	Mitigation	Expected Mitigation Date
TRIMBLE CO CLIFTY 345 kV Line	2016S	Existing operating guide	2016S

As can be seen in Table 1-2, the loading on the Trimble County – Clifty Creek 345 kV line was not found to be a reliability margin constraint in the 2026 models. Thus this is only a near-term constraint which, as per LG&E and KU planning guidelines, can be mitigated with an operating guide.

LG&E and KU's non-binding planning level cost estimate to mitigate the network constraint is $0 USD. LG&E/KU has determined that direct assignment facilities are not required for this request. A detailed, non-binding planning level cost estimate is given in Section 6 of the full report. As noted in Section 6, LG&E/KU's non-binding planning level cost estimate is $0 USD and no Facility Study will be required.

No ATC or ASTFC constraints due to the subject request were found. It is also important for the customer to realize that due to the AFC constraints shown in Table 1-3, this service cannot be granted for the months of June through August 2016 and June through October 2017. However, this request will be reevaluated prior to approving the request. If the same condition remains, the service will not be granted for the months of June through August 2016 and June through October 2017.

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