



DISIS 2022-001

Incremental Long-Term Congestion Rights Study Report

GEN-2022-024



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By SPP Generation Interconnections Dept.

REVISION HISTORY

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CONTENTS

Revision History	i
Introduction	1
Study Inputs	2
Model Basis	2
Monitored Facilities	2
Contingency Events	2
Network Upgrades	2
Contingent Upgrades	3
Customer Transfer Paths	3
Study Methodology	4
Transfer Analysis	4
ILTCR Study Results	5
Conclusion	6
Appendix A	1

INTRODUCTION

Incremental Long-Term Congestion Rights (ILTCRs) were made available by FERC 685 Guideline 3 as a reimbursement mechanism for sponsors of transmission upgrades. The guideline specifies that long-term firm transmission rights made feasible by transmission upgrades or expansions must be available upon request to any party that pays for such upgrades or expansions in accordance with the transmission organization's prevailing cost allocation methods for upgrades or expansions. Effective July 1, 2020, ILTCR is the default cost recovery mechanism for eligible Network Upgrades (NU) with Directly Assigned Upgrade Cost (DAUC) as a result of a Generation Interconnection Study (GIS), Aggregate Transmission Service Study (ATSS), or a Sponsored Upgrade Study in SPP.

The objective of the ILTCR analysis is to determine the incremental Available Transfer Capability (ATC) created on each of the Upgrade Sponsor submitted source-to-sink paths over a ten-year period resulting from the construction of the Network Upgrade. The Upgrade Sponsor may then have the option to use the results of this study to obtain candidate ILTCRs on the path selected.

The ILTCR study process was completed for GEN-2022-024 (the Customer) that has Directly Assigned Upgrade Costs (DAUC) for the following network upgrades from DISIS-2022-001-2 Studies.

- Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station. (DISIS-2022-001-2)
- Rebuild the RIV4525 to G20-079-TAP 161kV Line 1. (DISIS-2022-001-2)

STUDY INPUTS

MODEL BASIS

The 2026 ITP Transmission Services (TS) cases were the starting point for the analysis. The following details specify the particular models utilized for this evaluation.

- Model years 2026, 2027, 2028, 2030, 2035
 - Peak (2026SP, 2027SP, 2028SP, 2030SP, 2035SP)
 - Winter Peak (2026WP, 2027WP, 2028WP, 2030WP, 2035WP)
 - Light Load (2027LP)

MONITORED FACILITIES

The monitored elements include all SPP control area branches, ties, and buses 69 kV and above, and all first tier Non-SPP control area branches and ties 100 kV and above. NERC Power Transfer Distribution Flowgates for SPP and first tier Non-SPP control areas are monitored. Additional NERC Flowgates are monitored in second tier or greater Non-SPP control areas.

- All branches and ties within the following areas:
 - SPP Internal Areas for 60kV – 999kV facilities:
 - 506– 546, 640 – 659, 998, 999
 - SPP External Areas for 100kV – 999kV facilities:
 - 327, 330, 351, 356, 502, 600, 615, 620, 627, 635, 661, 680
- NERC, SPP, and Tier 1 Permanent Monitor Flowgates (thermal)

CONTINGENCY EVENTS

The contingency set includes all SPP control area branches and ties 69kV and above, first tier Non-SPP control area branches and ties 115 kV and above, any defined contingencies for these control areas, and generation unit outages for the SPP control areas with SPP reserve share program redispatch.

- All branches, ties, shunts, and generators within the following areas:
 - SPP Internal Areas for 60kV – 999kV facilities:
 - 515 – 546, 640, 641, 642, 645, 650, 652, 659, 998, 999
 - SPP External Areas for 100kV – 999kV facilities:
 - 327, 330, 351, 356, 502, 600, 615, 620, 627, 635, 661, 680
- NERC, SPP, and Tier 1 Permanent Contingent Flowgates
- SPP T.O. Specific P1, P2, P4, and P5 TPL-005-1 Contingencies
- SPP T.O. Specific Op Guide Implementation

NETWORK UPGRADES

The Network Upgrades were sorted based on construction lead-time in order to reflect the sequence of in-service dates for the upgrades. Each Network Upgrade was evaluated sequentially and as a standalone addition. Sequentially, the first Network Upgrade was evaluated in comparison to the TS Case. The second Network Upgrade was evaluated on top of the previously added Network Upgrade. The process was repeated until all Network Upgrades were evaluated. Network

Upgrades that share the same construction lead-time were evaluated as incremental upgrades to the final set of Network Upgrades with the same lead-times. The studied Network Upgrades and associated lead time for the Customer is listed in Table 1.

Table 1: Network Upgrades

Upgrade ID	Upgrade Name	Estimated Lead-Time (months)
170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	36
TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	36

CONTINGENT UPGRADES

Contingent upgrades are not yet in-service. These facilities have been assigned to higher queued interconnection customers. These facilities were included in the models respective of their estimated lead-time for this study prior to determining the incremental transfer amount that each Network Upgrade provided. The list of contingent upgrades and their associated lead-time for the participating Customers is listed in Table 2

Table 2: Contingent Upgrade Sequence

Upgrade ID	Upgrade Name	Estimated Lead-Time (months)
TBD	Reconfigure the Neosho Transformers	18
170066, 170093	Line - Beckham County - Potter -345 kV New Line (2024 ITP)	36
170653	Axtell 345/115 kV New Transformer	78

CUSTOMER TRANSFER PATHS

The Customer is eligible to select up to three (3) source-to-sink transfer paths per Network Upgrade. The list of valid source-to-sink paths is posted on the SPP OASIS site under Source/Sink Summary and were available to Customers with a valid OASIS certificate.

Customers may select paths for ILTCR studies using their new generator that was studied as a source. The generator must be registered in the Marketplace before it is able to participate in the Congestion Hedging process.

Each source-to-sink transfer path was collected by SPP for the Customer and those submissions are captured in the Results section.

STUDY METHODOLOGY

TRANSFER ANALYSIS

A DC transfer analysis was conducted using PowerGEM TARA to determine the limiting flowgates in each applicable case for the respective transfer paths provided by the Customer. Constraints were defined as any overloaded facility in which the transfer had three (3) percent or more TDF or OTDF impact for system intact or contingency conditions respectively. AC Contingency Analysis was performed on each case to identify existing overloaded flowgates that were not caused by the Customer, Network Upgrade, or the source-to-sink transfer path. These flowgates were filtered out of the transfer analysis results for the respective case in which they were reported in the AC Contingency Analysis.

Once the initial DC limiting flowgates were filtered to valid results, the top five (5) limiting flowgates in each applicable case for the respective transfer paths provided by the Customer were AC verified. If the AC verified results reported a non-converged condition and all other AC verified transfers were not zero, then the AC non-converged condition was reviewed for appropriate adjustments until an AC transfer limit was established. If no adjustments were found to resolve the AC non-converged condition, then the AC transfer limit was reported as 0 MW to reflect the condition in which no transfer could be achieved.

With the transfer limits AC verified, the deltas between the minimum AC transfer amounts across all analyzed cases for each path with and without the associated Network Upgrade were determined as follows:

- If $ATC_{pre-NU} < 0$ and $ATC_{post-NU} < 0$, then individual increment = 0
- If $ATC_{pre-NU} < 0$ and $ATC_{post-NU} > 0$, then individual increment = $ATC_{post-NU}$
- If $ATC_{pre-NU} > 0$ and $ATC_{post-NU} > 0$, then individual increment = $ATC_{post-NU} - ATC_{pre-NU}$

If the Network Upgrade costs were shared between multiple Customers, then the minimum delta was allocated to each participating Customer in the same proportion as the pro-rata share of the total cost of the upgrade allocated. The lowest amount of candidate MWs that can be awarded is 0.1 MW. Therefore, any candidate MWs below 0.1 MWs is reported as 0.0 MWs.

ILTCR STUDY RESULTS

Table 3 summarizes the minimum incremental ATC created across all seasons for each of the source-to-sink paths provided by the Customer for the Network Upgrades.

Appendix A includes the detailed results of the top five (5) most limiting flowgates for each transfer path as submitted by the Customer.

Table 3: GEN-2022-024 Candidate ILTCRs

NU #	NU	Source	Sink	Min Delta (MW)	Cost Allocation (%)	cILTCR (MW)
170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	0	10.41%	0
170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	0	10.41%	0
170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	0	10.41%	0
TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CCCO.COGEN	0	20.84%	0
TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CSWS.RFWIND	0	20.84%	0
TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	1.4	20.84%	0.3

CONCLUSION

The ILTCR analysis determined the incremental ATC created on the Customer submitted source-to-sink paths as provided by the associated Network Upgrade. The Customer may choose the one source-to-sink path in which to receive candidate ILTCRs based on the ATC results presented. If a source-to-sink path that reported no incremental ATC (0 MW) is chosen, then the Customer will not receive any candidate ILTCRs for the Network Upgrade. This data will be included in the applicable agreement(s) and executed before filing with FERC.

The Customer must notify SPP 45 days in advance of energization of the associated Network Upgrade via RMS ticket. Tracking of the Network Upgrade progress can be achieved by utilizing the SPP Quarterly Project Tracking workbooks posted on the SPP website. Once the Network Upgrade is energized, SPP will make available TCR MWs for the candidate ILTCR until the end of that TCR year in the next feasible monthly TCR auction.

APPENDIX A

IC	NU	Network Upgrade Name	Source	Sink	Limit	Case	Monitored Facility	Contingency Name	Base FCITC	Upgrade FCITC	ATC Increase
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	1	30WP0	523131 GRPLNS-HV2-3 115 523130 GRPLNS-HV4-3 115 1	Base Case	238.9	238.9	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	2	30SP0	523131 GRPLNS-HV2-3 115 523130 GRPLNS-HV4-3 115 1	Base Case	239.3	239.3	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	3	35SP0	523131 GRPLNS-HV2-3 115 523130 GRPLNS-HV4-3 115 1	Base Case	239.7	239.7	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	4	35WP0	523131 GRPLNS-HV2-3 115 523130 GRPLNS-HV4-3 115 1	Base Case	241.1	241.1	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	GPWA.GPWA	5	35SP0	523103 NOBLE_WND 3 115 523131 GRPLNS-HV2-3 115 1	Base Case	248.7	248.7	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	1	30SP0	640178 GENEVA 7 115 640174 FRIEND 7 115 1	P12:115:NPPD:LN009::SHELDON.CRETE.CKT1::	29.4	29.4	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	2	35WP0	640178 GENEVA 7 115 640174 FRIEND 7 115 1	P12:115:NPPD:LN009:SHELDON.CRETE.CKT1::	41.4	41.4	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	3	35SP0	640278 SHELDON7 115 640153 CRETE_7 115 1	P13:115-345:NPPD:MCCOOL 3:T2::	41.8	41.8	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	4	30WP0	640178 GENEVA 7 115 640174 FRIEND 7 115 1	P12:115:NPPD:LN009:SHELDON.CRETE.CKT1::	42.1	42.1	0
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	MEAN.CRETEGEN	5	30SP0	640278 SHELDON7 115 640153 CRETE_7 115 1	P13:115-345:NPPD:MCCOOL 3:T2::	52.9	52.9	0

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IC	NU	Network Upgrade Name	Source	Sink	Limit	Case	Monitored Facility	Contingency Name		Base FCITC	Upgrade FCITC	ATC Increase
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	1	30SP0	542966 WGARDNR5 161 543049 CEDRCRK5 161 1	P23:345:KCPL:WGARD-R13-17:EHV:::	355.2	355.2	0	
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	2	35SP0	542966 WGARDNR5 161 543049 CEDRCRK5 161 1	P23:345:KCPL:WGARD-R11-17:EHV:::	361.1	361.1	0	
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	3	30SP0	542981 LACYGNE7 345 542968 STILWEL7 345 1	P23:345:KCPL:LACYGNE-R3-10:EHV:::	1056.4	1056.4	0	
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	4	35SP0	767240 G22-013-TAP 345 542981 LACYGNE7 345 1	532793 NEOSHO 7 345 767240 G22-013-TAP 345 1	1146	1146	0	
GEN-2022-024	170693	Rebuild the RIV4525 to G20-079-TAP 161kV Line 1	GEN-2022-024	NPPD.GGS.2	5	35SP0	767240 G22-013-TAP 345 532793 NEOSHO 7 345 1	542981 LACYGNE7 345 767240 G22-013-TAP 345 1	1148.3	1148.3	0	
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CCCO.COGEN	1	35SP0	514798 SNRPMPT4 138 514743 OSAGE 4 138 1	514704 MILLERT4 138 514802 SOONER 4 138 1	192.7	192.6	0	
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CCCO.COGEN	2	30SP0	514743 OSAGE 4 138 997173 524:OSAGE3 69.0 3	P13:069:OKGE:BKRBKR_3W007 :::HV:	207.7	207.7	0	
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CCCO.COGEN	3	30SP0	514743 OSAGE 4 138 997172 524:OSAGE4 69.0 4	P13:69:OKGE:BKRBKR_3W7:::H V:	207.9	207.9	0	
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the	GEN-2022-024	CCCO.COGEN	4	30SP0	997173 524:OSAGE3 69.0 514742 OSGE 2 69.0 3	P13:069:OKGE:BKRBKR_3W007 :::HV:	208.4	208.4	0	

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IC	NU	Network Upgrade Name	Source	Sink	Limit	Case	Monitored Facility	Contingency Name	Base FCITC	Upgrade FCITC	ATC Increase
		exiting GEN-2020-007 tap switching station									
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CCCO.COGEN	5	30SP0	514798 SNRPMPT4 138 514743 OSAGE 4 138 1	514704 MILLERT4 138 514802 SOONER 4 138 1	208.9	208.6	0
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CSWS.RFWIND	1	35SP0	514744 CHILOC02 69.0 514762 3SANDS 2 69.0 1	514760 KILDARE4 138 514761 WHEAGLE4 138 1	124.2	123.9	0
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CSWS.RFWIND	2	30SP0	514744 CHILOC02 69.0 514762 3SANDS 2 69.0 1	514760 KILDARE4 138 514761 WHEAGLE4 138 1	144.7	143.4	0
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CSWS.RFWIND	3	35SP0	515426 RDRUNNR4 138 515427 RCKFALL4 138 1	Base Case	189	189	0
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	CSWS.RFWIND	4	30SP0	515426 RDRUNNR4 138 515427 RCKFALL4 138 1	Base Case	189.3	189.3	0
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV	GEN-2022-024	CSWS.RFWIND	5	35WP0	515426 RDRUNNR4 138 515427 RCKFALL4 138 1	Base Case	203.7	203.7	0

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IC	NU	Network Upgrade Name	Source	Sink	Limit	Case	Monitored Facility	Contingency Name	Base FCITC	Upgrade FCITC	ATC Increase
		line to tap the exiting GEN-2020-007 tap switching station									
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	1	30WP0	514941 HSL4 138 515046 HAMMTAP4 138 1	515059 SQUIRCK4 138 515060 INGLEWD4 138 1	37.1	38.5	1.4
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	2	30SP0	514941 HSL4 138 515046 HAMMTAP4 138 1	P12:138:OKGE-WFEC:BKRBRKR1800:::HV:	39	39.6	0.6
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	3	35SP0	515059 SQUIRCK4 138 515060 INGLEWD4 138 1	514941 HSL4 138 515046 HAMMTAP4 138 1	42.6	42.7	0.1
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	4	30SP0	515059 SQUIRCK4 138 515060 INGLEWD4 138 1	514941 HSL4 138 515046 HAMMTAP4 138 1	62.5	62.9	0.4
GEN-2022-024	TBD	Reroute the existing LaCygne – Neosho 345kV line to tap the exiting GEN-2020-007 tap switching station	GEN-2022-024	OKGE.NUEN.C10M	5	35SP0	514941 HSL4 138 515046 HAMMTAP4 138 1	P12:138:OKGE-WFEC:BKRBRKR1800:::HV:	63.5	63.6	0.1