INTERCONNECTION FACILITIES STUDY REPORT

Oklahoma Gas and Electric Company

Shared Network Upgrade(s)

IFS-2015-002

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
4/24/2017	SPP	Initial draft report issued.	

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SUMMARY

INTRODUCTION

The interconnecting Transmission Owner, Oklahoma Gas and Electric Company (OKGE), performed a detailed Interconnection Facilities Study (IFS) at the request of SPP for Shared Network Upgrade(s) assigned in the SPP Generator Interconnection Impact Study DISIS-2015-002 and its subsequent restudies. The scope of the IFS is defined in the Generator Interconnection Procedures (GIP) under Attachment V of the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT). The latest restudy iteration of DISIS-2015-002 is DISIS-2015-002-2 which posted on November 29th, 2016. Generator Interconnection Request(s) (GIRs) that have cost allocation responsibilities for assigned Network Upgrade(s) will require the assigned Network Upgrade(s) to be in-service for full Interconnection Service. The request for interconnection was placed with SPP in accordance with SPP's OATT, which covers new generator interconnections on SPP's transmission system. Based on DISIS-2015-002-2 Impact Restudy results, the following Shared Network Upgrade(s) are needed:

- Border – Chisholm 345kV Circuit #1 and #2
- Border – Crawfish Draw345kV Circuit #2
- Border Reactive Power Support
- Cleo Corner – Cleo Plant Tap 138kV Circuit #1, Terminal equipment upgrade
- GEN-2015-063 Tap – Mathewson 345kV Circuit #1, Replace structures

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrade(s), other direct assigned upgrade(s), and associated upgrade lead times needed to grant the requested Interconnection Service at the specified Point of Interconnection (POI).

GENERATOR INTERCONNECTION REQUEST(S)

The GIR(s) assigned the Shared Network Upgrade(s) are listed in the corresponding **Tables 1**.

Table 1: Generator Interconnection Requests for Shared Network Upgrade(s)

GI Request Number	Point of Interconnection (POI)	Capacity (MW)
GEN-2015-020/IFS-2015-002-07	Oasis 115kV	100.00
GEN-2015-031/IFS-2015-002-27	Swisher 230kV	150.50
GEN-2015-047/IFS-2015-002-02	Sooner 345kV	300.00
GEN-2015-048/IFS-2015-002-11	Cleo Corner 138kV	200.00
GEN-2015-056/IFS-2015-002-40	Crossroads 345kV	101.20
GEN-2015-058/IFS-2015-002-42	Atoka 115kV	50.00
GEN-2015-060/IFS-2015-002-13	Woodward EHV 138kV	250.50
GEN-2015-062/IFS-2015-002-15	Breckinridge 138kV	4.505
GEN-2015-063/IFS-2015-002-16	Tap Woodring - Mathewson	300.00
GEN-2015-068/IFS-2015-002-34	TUCO Interchange 345kV	300.00
GEN-2015-075/IFS-2015-002-30	Carlisle 69kV	51.50
GEN-2015-079/IFS-2015-002-28	Tap Yoakum – Hobbs 230kV	129.20
GEN-2015-080/IFS-2015-002-29	Tap Yoakum – Hobbs 230kV	129.20

The GIR(s) mentioned above were included in the DISIS-2015-002 Impact Study and its subsequent restudies, the latest being DISIS-2015-002-2.

CREDITS/COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

Interconnection Customer shall be entitled to compensation in accordance with Attachment Z2 of the SPP OATT for the cost of SPP Network Upgrades, including any tax gross-up or any other tax-related payments associated with the Network Upgrades, that are not otherwise refunded to the Interconnection Customer. Compensation shall be in the form of either revenue credits or incremental Long Term Congestion Rights (iLTCR).

SHARED NETWORK UPGRADE(S) FACILITIES DESCRIPTIONS AND COSTS

Table 2 lists Shared Network Upgrade(s) description, costs, and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

Shared Network Upgrade(s) Cost Allocation by each GIR(s) responsibility is shown in the **Appendix A**.

Table 2: Shared Network Upgrade(s)

TOIF and Non-Shared Network Upgrades Description	Allocated Cost Estimate ($)	Estimated Lead Time
Border – Chisholm 345kV Circuit #1 and #2: Build eighteen (18) miles of double 345kV circuit from Border (OKGE) – Chisholm (AEP), convert Border to breaker-and-a-half configuration, seven (7) 345kV 5000 continuous ampacity breakers, control panels, line relaying, disconnect switches, structures, foundations, conductors, insulators, and all other associated work and materials.	$40,128,835	36 Months
Border – Crawfish Draw345kV Circuit #2: Build new line terminal at Border Substation, one (1) 345kV 5000 continuous ampacity breaker, 35-75Mvar reactor, control panels, line relaying, disconnect switches, structures, foundations, conductors, insulators, and all other associated work and materials.	$6,062,588	12 Months
Border Reactive Power Support: Build 600 Mvars of capacitive dynamic and static reactive power support including 300Mvar Static Var Compensator (SVC) and 300Mvars of switchable capacitor bank(s), one (1) 345kV 5000 continuous ampacity breaker, control panels, line relaying, disconnect switches, structures, foundations, conductors, insulators, and all other associated work and materials.	$32,633,384	24 Months
Cleo Corner – Cleo Plant Tap 138kV Circuit #1: Change CT tap setting and testing	$61,890	6 Months
GEN-2015-063 Tap – Mathewson 345kV Circuit #1: Replace one hundred-seventy(117) structures to achieve conductor limit	$4,715,335	9 Months
Total	**$83,602,032**	

All studies have been conducted assuming that higher-queued Interconnection Request(s) and the associated Network Upgrade(s) will be placed into service. If higher-queued Interconnection Request(s) withdraw from the queue, suspend or terminate service, the Interconnection Customer's share of costs may be revised. Restudies, conducted at the customer's expense, will determine the Interconnection Customer's revised allocation of Shared Network Upgrades.

CONCLUSION

The Network Upgrade(s) listed in this Shared Interconnection Facilities Study are required for full Interconnection Service for the GIRs listed in **Table 1**. Interconnection Service will be delayed until the Shared Network Upgrade(s) listed in **Table 2** are constructed. The Shared Network Upgrades is summarized in the table below.

Description	Allocated Cost Estimate ($)
Border – Chisholm 345kV Circuit #1 and #2	$40,128,835
Border – Crawfish Draw345kV Circuit #2	$6,062,588
Border Reactive Power Support	$32,633,384
Cleo Corner – Cleo Plant Tap 138kV Circuit #1	$61,890
GEN-2015-063 Tap – Mathewson 345kV Circuit #1	$4,715,335
Total	**$83,602,032**

A draft Generator Interconnection Agreement will be provided to the Interconnection Customer consistent with the final results of this IFS report. The Transmission Owner and Interconnection Customer will have 60 days to negotiate the terms of the GIA consistent with the SPP OATT.

APPENDICES

A: TRANSMISSION OWNER'S SHARED NETWORK UPGRADE(S) COST ALLOCATION PER GENERATOR INTERCONNECTION REQUEST

See next page for the Transmission Owner's Shared Network Upgrade(s) Cost Allocation per Generator Interconnection Request.

Appendix A. Cost Allocation by Upgrade

(Does Not Include Interconnection Costs or Previously Allocated Network Upgrades)

Border - Chisholm 345kV CKT 1 & 2 **$40,128,835**

Build approximately 18 miles of double 345kV Border - Chisholm for OKGE facilities. Upgrade Border configuration. AEP to provide its facilitity costs and upgrades

	Allocated Cost	Allocated %
GEN-2015-020	$3,638,320	9.07%
GEN-2015-031	$3,120,313	7.78%
GEN-2015-056	$3,856,091	9.61%
GEN-2015-058	$1,996,541	4.98%
GEN-2015-068	$14,479,925	36.08%
GEN-2015-075	$2,247,383	5.60%
GEN-2015-079	$5,395,132	13.44%
GEN-2015-080	$5,395,132	13.44%
Total Allocated Costs	**$40,128,835**	

Border 345kV Reactive Power Support **$32,633,384**

Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation

	Allocated Cost	Allocated %
GEN-2015-020	$3,069,038	9.40%
GEN-2015-031	$2,923,068	8.96%
GEN-2015-056	$3,203,972	9.82%
GEN-2015-058	$1,636,045	5.01%
GEN-2015-068	$11,284,661	34.58%
GEN-2015-075	$1,788,649	5.48%
GEN-2015-079	$4,363,976	13.37%
GEN-2015-080	$4,363,976	13.37%
Total Allocated Costs	**$32,633,384**	

Cleo Corner - Cleo Plant Tap 138kV CKT 1 **$61,890**

Change CT tap settings and testing

	Allocated Cost	Allocated %
GEN-2015-048	$57,865	93.50%
GEN-2015-060	$4,025	6.50%
Total Allocated Costs	**$61,890**	

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

Crawfish Draw - Border 345kV CKT 2 **$6,062,588**

Build new line reactor, substation dead end structure, and associated relay and protection equipment.

	Allocated Cost	Allocated %
GEN-2015-020	$550,686	9.08%
GEN-2015-031	$502,406	8.29%
GEN-2015-056	$582,123	9.60%
GEN-2015-058	$300,820	4.96%
GEN-2015-068	$2,166,227	35.73%
GEN-2015-075	$337,496	5.57%
GEN-2015-079	$811,415	13.38%
GEN-2015-080	$811,415	13.38%
Total Allocated Costs	**$6,062,588**	

GEN-2015-063 Tap - Mathewson 345kV CKT 1 **$4,715,335**

Replace 117 structures

	Allocated Cost	Allocated %
GEN-2015-047	$781,149	16.57%
GEN-2015-062	$19,533	0.41%
GEN-2015-063	$3,914,653	83.02%
Total Allocated Costs	**$4,715,335**	

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs