



INTERCONNECTION FACILITIES STUDY REPORT

GEN-2016-009
(IFS-2016-001-02)

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
1/11/2018	SPP	Initial draft report issued.	
1/23/2018	SPP	Initial final report issued.	

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2016-009/IFS-2016-001-02 is for a 29.00 MW generating facility located in Kay County, Oklahoma. The Interconnection Request was studied in the DISIS-2016-001 Impact Study for Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS). Prior to an executed IFS agreement, the Interconnection Customer requested to withdraw NRIS per Section 4.4.1 of the Southwest Power Pool (SPP) Generator Interconnection Procedures (GIP), therefore ERIS-only was analyzed for this request in the DISIS-2016-001-1 Impact Restudy. The Interconnection Customer's requested in-service date is September 30, 2018.

The interconnecting Transmission Owner, Oklahoma Electric and Gas Company, Inc. (OKGE), performed a detailed IFS at the request of SPP. The full report is included in Appendix A. SPP has determined that full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) are completed.

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrades, other direct assigned upgrades, cost estimates, and associated upgrade lead times needed to grant the requested Interconnection Service.

PHASE(S) OF INTERCONNECTION SERVICE

It is not expected that Interconnection Service will occur in phases. However, Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

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).

INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES

The Generating Facility is proposed to consist of two (2) 14.5 MW Allen Bradley AC7B Steam Turbines for a total generating nameplate capacity of 29.00 MW.

The Interconnection Customer's Interconnection Facilities to be designed, procured, constructed, installed, maintained, and owned by the Interconnection Customer at its sole expense include:

- 12.47 kV underground cable collection circuits;
- 12.47 kV to 69 kV transformation substation with associated 12.47 kV and 69 kV switchgear;
- One (1) 69/12.47kV 25/37 MVA (ONAN/ONAF) step-up transformers to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation.
- A less than one (<1) mile overhead 69 kV line to connect the Interconnection Customer's substation to the Point of Interconnection (POI) at the 69 kV bus at existing OKGE substation ("Osage") that is owned and maintained by OKGE;
- All transmission facilities required to connect the Interconnection Customer's substation to the POI;
- Equipment at the Interconnection Customer's substation necessary to maintain a composite power delivery at continuous rated power output at the Point of Interconnection at a power factor within the range of 0.95 leading to 0.95 lagging, unless the Transmission Provider has established different requirements that apply to all synchronous generators in the Control Area on a comparable basis. The Interconnection Customer will be required to provide documentation and design specifications demonstrating how the requirements are met.

The Interconnection Customer shall coordinate relay, protection, control, and communication system configurations and schemes with the Transmission Owner.

TRANSMISSION OWNER INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADE(S)

To facilitate interconnection, the interconnecting Transmission Owner will perform work as shown below necessary for the acceptance of the Interconnection Customer's Interconnection Facilities.

Table 1 and **Table 2** lists the Interconnection Customer's estimated cost responsibility for Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s) and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

Table 1: Transmission Owner Interconnection Facilities (TOIF)

Transmission Owner Interconnection Facilities (TOIF)	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)	Estimated Lead Time
<u>OKGE Osage Interconnection Substation: Transmission Owner Interconnection Facilities</u> Construct one (1) 69 kV line terminal, line switches, dead end structure, line relaying, communications, revenue metering, line arrestor, and all associated equipment and facilities necessary to accept transmission line from Interconnection Customer's Generating Facility.	\$410,000	100%	\$410,000	12 months
Total	\$410,000	100%	\$410,000	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)	Estimated Lead Time
<u>OKGE Osage Interconnection Substation - Non-Shared Network Upgrades</u> Construct one (1) 69 kV 1200 continuous ampacity breakers, control panels, line relaying, cut in transmission line and re-terminate, acquire land, disconnect switches, structures, foundations, conductors, insulators, and all other associated work and materials.	\$240,000	100%	\$240,000	12 Months
Total	\$240,000	100%	\$240,000	

SHARED NETWORK UPGRADE(S)

The Interconnection Customer's share of costs for Shared Network Upgrades is estimated in **Table 3** below.

Table 3: Interconnection Customer Shared Network Upgrades

Shared Network Upgrades Description	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)
Currently None	\$0	N/A	\$0
Total	\$0	N/A	\$0

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.

OTHER NETWORK UPGRADE(S)

Certain Other Network Upgrades are **currently not the cost responsibility** of the Interconnection Customer but will be required for full Interconnection Service.

Table 4: Interconnection Customer Other Network Upgrade(s)

Other Network Upgrade(s) Description	Current Cost Assignment	Estimate In-Service Date
Currently None		

Depending upon the status of higher- or equally-queued customers, the Interconnection Request's in-service date is at risk of being delayed or Interconnection Service is at risk of being reduced until the in-service date of these Other Network Upgrades.

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 29.00 MW can be granted. Interconnection Service will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) are completed. The Interconnection Customer's estimated cost responsibility for Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades is summarized in the table below.

Table 5: Cost Summary

Description	Allocated Cost Estimate
Transmission Owner Interconnection Facilities	\$410,000
Network Upgrades	\$240,000
Total	\$650,000

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 Open Access Transmission Tariff (OATT).

APPENDICES

A: TRANSMISSION OWNER'S INTERCONNECTION FACILITIES STUDY REPORT

See next page for the Transmission Owner's Interconnection Facilities Study Report.



FACILITY STUDY

for

Generation Interconnection Request 2016-009

29 MW Generating Facility
In Kay County
Oklahoma

January 2, 2018

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OG&E Electric Services

Summary

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Oklahoma Gas and Electric (OG&E) performed the following Facility Study to satisfy the Facility Study Agreement executed by the requesting customer for SPP Generation Interconnection request Gen-2016-009. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system. The requirements for interconnection consist of adding one new breakers and a line terminal to Osage substation. The total cost for OKGE to add one breakers and a terminal in Osage substation, the interconnection facility, is estimated at \$650,000.

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Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a wind generating facility within the service territory of OG&E Electric Services (OKGE) in Kay County Oklahoma. The proposed 69kV point of interconnection is at Osage Substation in Kay County Oklahoma. This substation is owned by OKGE.

The cost for adding a new 69kV terminal to Osage Substation, the required interconnection facility, is estimated at \$410,000.

Network Constraints in the Southwest Public Service (SPS), OKGE and Western Farmers Electric Cooperative (WFEC) systems may be verified with a transmission service request and associated studies.

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for interconnection consist of adding a new 69kV terminal in Osage Substation. This 69kV addition shall be constructed and maintained by OKGE.

The total cost for OKGE to add a new 69kV terminal in Osage Substation, the interconnection facility, is estimated at \$410,000. This cost does not include building the 69kV line from the Customer substation into Osage Substation. The Customer is responsible for this 69kV line up to the point of interconnection. This cost does not include the Customer's 69kV substation and the cost estimate should be determined by the Customer.

This Facility Study does not guarantee the availability of transmission service necessary to deliver the additional generation to any specific point inside or outside the Southwest Power Pool (SPP) transmission system. The transmission network facilities may not be adequate to deliver the additional generation output to the transmission system. If the customer requests firm transmission service under the SPP Open Access Transmission Tariff at a future date, Network Upgrades or other new construction may be required to provide the service requested under the SPP OATT.

The costs of interconnecting the facility to the OKGE transmission system are listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice for OG&E to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with re-closer de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this generator interconnection, no breakers were found to exceed their interrupting capability after the addition of the Customer's generation and related facilities. OG&E found no breakers that exceeded their interrupting capabilities on their system. Therefore, there is no short circuit upgrade costs associated with the Gen-2016-009 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2018 DOLLARS)
OKGE – Interconnection Facilities - Add a single 69kV line terminal to an existing substation. Dead end structure, line switch, line relaying, revenue metering including CTs and PTs	\$410,000
OKGE – Network Upgrades at an existing sub, Install 1-69kV 1200A breaker, line relaying, disconnect switches, and associated equipment	\$240,000
OKGE - Right-of-Way for 345kV terminal addition	No Additional ROW
Total	\$650,000

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January 2, 2018

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Osage Substation

