



**Facility Study  
For  
Generation Interconnection  
Request  
GEN-2014-064  
(IFS-2014-002-24)**

***SPP Generator  
Interconnection Studies***

***(#GEN-2014-064)  
(#IFS-2014-002-24)***

**September 2015**

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## Revision History

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Date	Author	Change Description
5/26/2015	SPP	Draft Facility Study Report Revision 0 Issued
6/26/2015	SPP	Final Facility Study Report Revision 1 Issued
9/9/2015	SPP	Final Facility Study Report Revision 2 Issued to Account for Equipment Rating Correction

## **Summary**

Oklahoma Gas and Electric Company (OKGE) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2014-064/IFS-2014-002-24 (248.40 MW/Wind) located in Garfield County, Oklahoma. The Interconnection Customer proposed in-service date for GEN-2014-064/IFS-2014-002-24 is December 1, 2016. Full Interconnection Service will not be possible until after the assigned Interconnection Facilities and Non-Shared Network upgrades are completed. No “Other Network Upgrades” will be required for full Generation Interconnection Service. The dates for completion of all assigned interconnection facilities and Network Upgrades will be determined through negotiation of the Generator Interconnection Agreement. The withdrawal of higher queued Interconnection Requests may cause the need for restudies that may change Network Upgrade requirements. The request for interconnection was placed with SPP in accordance with SPP’s Open Access Transmission Tariff, which covers new generation interconnections on SPP’s transmission system.

## **Phases of Interconnection Service**

It is not expected that interconnection service will require phases however, interconnection service will not be available until all interconnection facilities and network upgrades can be placed in service.

## **Interconnection Customer Interconnection Facilities**

The Interconnection Customer’s generation facility consists of one hundred and eight (108) G.E. 2.3MW wind turbines for a total generation capacity of 248.40 MW. The 34.5kV collector system for this wind farm is planned to be connect to one (1) 138/34.5kV Interconnection Customer owned and maintained transformer at the Interconnection Customer owned substation. An approximate tenth (1/10) of a mile 138kV transmission circuit will connect GEN-2014-064/IFS-2014-002-24 Interconnection Customer owned substation to the existing OKGE owned Otter 138kV substation. The Interconnection Customer will be responsible for all of the transmission facilities connecting the Interconnection Customer owned substation to the Point of Interconnection (POI), at the existing 138kV bus at Oklahoma Gas and Electric Company (OKGE) owned Otter 138kV substation.

The Interconnection Customer will be responsible for any equipment located at the Customer substation necessary to maintain a power factor of 0.95 lagging to 0.95 leading at the POI, including approximately 10.5 Mvar<sup>1</sup> of reactors to compensate for injection of reactive power into the transmission system under light wind conditions. Also, the Interconnection Customer will need to coordinate with the Transmission Owner for relay, protection, control, and communication system configurations.

## **Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades**

To allow interconnection the Transmission Owner will construct a new 138kV line terminal and add four (4) 138kV breakers for acceptance of the Interconnection Customer’s

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<sup>1</sup> This approximate amount of reactors is an approximate minimum amount needed for the current configuration of the wind farm.

Interconnection Facilities. At this time, GEN-2014-064/IFS-2014-002-24 is responsible for \$3,217,651 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. Table 1 displays the estimated costs for Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades.

**Table 1: GEN-2014-064/IFS-2014-002-24 TOIF and Non-Shared Network Upgrades**

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades Description	Allocated Cost (\$)	Allocated Percent (%)	Total Cost (\$)
Interconnection Substation - Transmission Owner Interconnection Facilities 138kV Substation work for 1 line terminal, line switch, dead end structure, line relaying, and revenue metering	\$410,000	100%	\$410,000
Interconnection Substation - Network Upgrades 138kV Substation work for 4 138kV Breaker, line relaying, disconnect switches, and associated equipment	\$2,807,651	100%	\$2,807,651
Total	\$3,217,651	100%	\$3,217,651

### Shared Network Upgrades

The Interconnection Customer was studied within the DISIS-2014-002 Impact Study and DISIS-2014-002-1 Impact Restudy with Energy Resource Interconnection Service (ERIS) only. At this time, the Interconnection Customer is allocated \$0 for Shared Network Upgrades. If higher queued interconnection customers withdraw from the queue, suspend or terminate their GIA, restudies will have to be conducted to determine the Interconnection Customers' allocation of Shared Network Upgrades. All studies have been conducted on the basis of higher queued interconnection requests and the upgrades associated with those higher queued interconnection requests being placed in service. At this time, the Interconnection Customer is allocated the following cost for Shared Network Upgrade:

**Table 2: GEN-2014-064/IFS-2014-002-24 Shared Network Upgrades**

Shared Network Upgrades Description	Allocated Cost (\$)	Allocated Percent (%)	Total Cost (\$)
Currently GEN-2014-064/IFS-2014-002-24 is not allocated Shared Network Upgrades	\$0	n/a	\$0
Total	\$0	n/a	\$0

### Other Network Upgrades

Certain Other Network Upgrades are currently not the cost responsibility of the Customer but will be required for full Interconnection Service. Currently, no Other Network Upgrades are assigned to GEN-2014-064/IFS-2014-002-24. The withdrawal of higher queued Interconnection Requests may cause the need for restudies that may change Network Upgrade requirements.

### Conclusion

Interconnection Service for GEN-2014-064/IFS-2014-002-24 will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are

constructed. The Interconnection Customer is responsible for \$3,217,651 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated \$0 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 248.40 MW, as requested by GEN-2014-064/IFS-2014-002-24, can be allowed.

At this time the total allocation of costs assigned to GEN-2014-064/IFS-2014-002-24 for interconnection Service are estimated at \$3,217,651.



## **FACILITY STUDY**

**for**

### **Generation Interconnection Request 2014-064**

GEN-2014-064/IFS-2014-002-24

248 MW Wind Generating Facility  
In Garfield County  
Near Covington, Oklahoma

January 9, 2015

Andrew R. Aston, PE  
Lead Engineer  
Transmission Planning  
**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-2014-064 . 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 four breakers and a line terminal to Otter substation. The total cost for OKGE to add four breakers and a terminal in the Otter substation, the interconnection facility, is estimated at \$3,217,651.

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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 Garfield County Oklahoma. The proposed 138kV point of interconnection is at Otter Substation in Garfield County Oklahoma. This substation is owned by OKGE.

The cost for adding a new 138kV terminal to Otter 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 138kV terminal in Otter Substation. This 138kV addition shall be constructed and maintained by OKGE. The Customer did not propose a route of its 138kV line to serve its 138kV facilities. It is assumed that obtaining all necessary right-of-way for the line into the new OKGE 138kV substation facilities will not be a significant expense.

The total cost for OKGE to add a new 138kV terminal in an existing Substation, the interconnection facility, is estimated at \$410,000. This cost does not include building the 138kV line from the Customer substation into Otter Substation. The Customer is responsible for this 138kV line up to the point of interconnection. This cost does not include the Customer's 138-34.5kV 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-2014-064 interconnection.

**Table 1: Required Interconnection Network Upgrade Facilities**

Facility	ESTIMATED COST (2015 DOLLARS)
OKGE – <b>Interconnection Facilities</b> - Add a single 138kV line terminal to an existing 138kV Substation. Dead end structure, line switch, line relaying, revenue metering including CTs and PTs	<b>\$410,000</b>
OKGE – <b>Network Upgrades</b> at an existing 138kV sub, Install 4-138kV 2000A breaker, line relaying, disconnect switches, and associated equipment	<b>\$2,807,651</b>
OKGE - Right-of-Way for 138kV terminal addition	No Additional ROW
<b>Total</b>	<b>\$3,217,651</b>

Prepared by Andrew R. Aston, P.E.  
Lead Engineer, Transmission Planning  
OG&E Electric Services

January 11, 2015

Reviewed by:

Steve M. Hardebeck, P.E.  
Manager, Transmission Planning

## Otter Substation

