



**SPP**

*Southwest  
Power Pool*

**Facility Study  
For  
Generator Interconnection  
Request  
GEN-2011-021**

***SPP Generator  
Interconnection***

***(#GEN-2011-021)***

**January 2014**

---

## Revision History

---

Date	Author	Change Description
07/10/2012	SPP	Facility Study Report Issued
03/26/2013	SPP	Account for Definitive Interconnection System Impact Restudy Results (DISIS-2011-001-3)
01/10/2014	SPP	Account for Definitive Interconnection System Impact Restudy Results (DISIS-2011-001-4)

## Summary

OG&E Electric Services (OKGE) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2011-021 (299 MW/Wind). The originally proposed in-service date was November 30, 2012. GEN-2011-021 will be delayed until the Transmission Owner Interconnection Facilities and Shared Network Upgrades are constructed for full Interconnection Service. 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 will be responsible for all of the transmission facilities connecting the customer owned substation to the Point of Interconnection (POI), a 345kV tap on the planned GEN-2008-047 Tap (Beaver County) on the Hitchland – Woodward 345kV Priority Project line. Additionally, Interconnection Customer will have to install additional line terminal equipment, breakers, relays, and any other associated equipment at the GEN-2008-047 Tap (Beaver County) substation. Finally, the Customer will also 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.

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

To allow interconnection the Transmission Owner will need to add terminal equipment at GEN-2008-047 Tap (Beaver County) to adequately inject GEN-2011-021 into this substation. At this time the Customer is responsible for \$3,954,353.00 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades.

## Shared Network Upgrades

The Interconnection Customer was studied within the DIS-2011-001-4 Impact Restudy. At this time, the Interconnection Customer is allocated \$33,852,155.25 for Shared Network Upgrades.

Upgrade Description	Allocated Cost	Total Cost
Beaver County - Buckner 345kV circuit #1. Build approximately 48 miles of 345kV from Beaver County - Buckner (construction by OKGE).	\$21,004,135.54	\$105,609,050.00
Beaver County - Buckner 345kV circuit #1. Build approximately 48 miles of 345kV from Beaver County - Buckner (construction by Sunflower).	\$12,848,019.71	\$64,600,000.00
<b>Total</b>	<b>\$33,852,155.25</b>	

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.

### **Other Network Upgrades**

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

1. Hitchland – Woodward 345kV double circuit transmission line, scheduled for 6/30/2014 in-service
2. Hitchland 345/230/13kV Autotransformer circuit #2, scheduled for 6/30/2014
3. Spearville – Clark – Thistle – Wichita 345kV double circuit 345kV transmission line, scheduled for 12/31/2014 in-service
4. Thistle – Flat Ridge 138kV circuit #1, scheduled for 12/31/2014 in-service
5. Thistle – Woodward 345kV double circuit transmission line, scheduled for 12/31/2014 in-service
6. Thistle 345/138kV Transformer circuit #1, scheduled for 12/31/2014 in-service
7. TUCO – Border – Woodward 345kV circuit #1, scheduled for 5/19/2014 in-service

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

### **Conclusion**

Interconnection Service for GEN-2011-021 will be delayed until the Transmission Owner Interconnection Facilities and Shared Network Upgrades are constructed. The Customer is responsible for \$3,954,353.00 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is also allocated \$33,852,155.25 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 299 MW, as requested by GEN-2011-021, can be allowed. At this time the total allocation of costs of Interconnection Service for GEN-2011-021 are estimated at \$37,806,508.25.



## **FACILITY STUDY**

**for**

### **Generation Interconnection Request 2011-021**

299 MW Wind Generating Facility  
In Beaver County  
Oklahoma

June 18, 2012

Steve M. Hardebeck, 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-2011-021. 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 two breakers and a line terminal to previously proposed Beaver County substation. Beaver County substation was proposed in conjunction with Facility Study Gen-2008-047 and expanded under DISIS 2010-002. The total cost for OKGE to add two breakers and a terminal in the Beaver County substation, the interconnection facility, is estimated at \$3,954,353.

## Table of Contents

Table of Contents	3
Introduction	4
Interconnection Facilities	5
Interconnection Costs	6
One-Line diagram of Interconnection	7

## **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 Beaver County Oklahoma. The proposed 345kV point of interconnection is at Beaver County Substation in Beaver County Oklahoma. This substation is owned by OKGE. The proposed in-service date is September 15, 2014.

The cost for adding a new 345kV terminal to the Substation, the required interconnection facility, is estimated at \$1,099,958.

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 345kV terminal in Beaver County Substation. This 345kV addition shall be constructed and maintained by OKGE. The Customer proposed a route of its 345kV line to enter Beaver County substation from the south to serve its 345kV facilities. It is assumed that obtaining all necessary right-of-way for the line into the new OKGE 345kV substation facilities will not be a significant expense.

The total cost for OKGE to add a new 345kV terminal in the existing Beaver County Substation, the interconnection facility, is estimated at \$1,099,958. This cost does not include building the 345kV line from the Customer substation into the EHV Substation. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-34.5kV 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 299MW 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-2011-021 interconnection.

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

Facility	ESTIMATED COST (2012 DOLLARS)
OKGE – <b>Interconnection Facilities</b> - Add a single 345kV line terminal to an existing EHV Substation. Dead end structure, line switch, line relaying, revenue metering including CTs and PTs	<b>\$1,099,958</b>
OKGE – <b>Network Upgrades</b> at an existing EHV sub, Install 2-345kV 5000A breakers, line relaying, disconnect switches, and associated equipment	<b>\$2,854,395</b>
OKGE - Right-of-Way for 345kV terminal addition	No Additional ROW
<b>Total</b>	<b>\$3,954,353</b>

Prepared by Steve M. Hardebeck, PE

June 18, 2012

Lead Engineer, Transmission Planning  
OG&E Electric Services

Reviewed by:  
*Travis D. Hyde - P.E.*

Travis D. Hyde  
Director, T&D Planning

# Beaver County Substation

